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Maintenance of Hydraulic System in Mechanical Engineering

Yuejing Jiang

Dalian Ocean University, Dalian, Liaoning, China
ryzz_9999@163.com

ABSTRACT. This article discusses the impact of impurities, water and air on the hydraulic system, and explains the related issues that need to be paid attention to in the regular maintenance of the hydraulic system, in order to provide a reference for the maintenance of the hydraulic system.

KEYWORDS: Mechanical engineering, Hydraulic system, Maintenance

1. Introduction

With the rapid development of the national economy, my country's engineering projects are increasing day by day, and their scale is also expanding. Mechanical equipment is an indispensable equipment in engineering construction, which is related to the quality of engineering construction. Therefore, it is necessary to ensure the normal operation of the machine. Hydraulic system is an important part of many large-scale machinery and equipment, and it is of great significance to the normal operation of machinery and equipment. Therefore, the maintenance of the hydraulic system needs to be done well.

2. Scientific Selection of Hydraulic Oil

In the hydraulic system, the realization of lubrication, sealing effect and pressure transmission are all done through hydraulic oil. Part of the hydraulic system has malfunctions, and the decrease in durability is mainly caused by the failure to select suitable hydraulic oil. Therefore, before actually using the hydraulic system, it is necessary to reasonably select hydraulic oil based on the model of the equipment. If the corresponding hydraulic oil cannot be used, other hydraulic oils can be used instead to ensure the good operation of hydraulic equipment as much as possible, and give full play to the role of hydraulic oil. Different brands and types of hydraulic oil cannot be mixed, because the chemical composition of different hydraulic oils will also have certain differences. Mixed use will cause the hydraulic oil to deteriorate and make its actual performance change to a certain extent.

3. Avoid Impurities to the Hydraulic System

Because the hydraulic system contains many extremely precise parts, it is very important to ensure a good cleanliness of the hydraulic system. If the hydraulic system is contaminated by impurities, it will greatly affect its actual operational safety. The sources of impurities are various, mainly including air and moisture entering the hydraulic oil, residual substances in the pipelines of the hydraulic system, substances produced by the oxidation of the hydraulic oil itself, and pollutants produced during the work of hydraulic related parts. In order to effectively avoid the impact of these substances on the normal operation of the hydraulic system, the specific control can be carried out from the following levels: First, to prevent the pollution caused by residual substances, the hydraulic system should be cleaned carefully before and after the hydraulic system is actually assembled. Every part of it. When filling hydraulic oil into the hydraulic system, ensure the good cleanliness of the relevant refueling tools, and never give up the use of filters to increase the actual refueling speed. For the operator, it is necessary to ensure that the clothing is clean and tidy. This is to avoid the falling of fibers and other substances in the hydraulic oil; secondly, to effectively avoid the pollution caused by the generated pollutants, the hydraulic oil temperature should be strictly controlled. Control work to keep it within the range of 50-70 degrees, and implement cooling treatment operations for the hydraulic oil tank by various methods such as ventilation and increasing the volume of the oil tank. In the process of disassembling components such as filters, oil pipes and fuel tanks, cleaning is first required; for the wiping materials used, materials that do not contain fibers need to be selected; for the hammers used, rubber-attached surfaces can be used. Special hammer; again, in order

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to reduce the pollution caused by external influences, you can start with the environment where the equipment is running, control the dust contained in the actual working environment, install the air filter equipment in it, and repair the relevant parts And the disassembly process needs to be performed in a dust-free environment. In addition, cleaning operations should be implemented for the hydraulic system at regular intervals. The cleaning oil used needs to be consistent with the brand of the hydraulic oil used in the original system. Ensure that the oil temperature is within the range of 45-80 degrees. Use a lot of oil for cleaning. Try to remove all kinds of impurities contained in the hydraulic system. At least three times of cleaning should be guaranteed. After cleaning, if the oil still has a certain temperature, all the oil needs to be discharged from the hydraulic system. After all operations are completed, add new oil again; finally, in order to remove impurities in the hydraulic system, the oil filter can be installed in the pressure pipeline, suction port, etc., or an external circulation filter can be added according to actual needs Device, as far as possible to improve the system's actual control level of pollutants. For the filtering device, it must be cleaned every certain period. If it is found to be damaged, it needs to be replaced in the first time.

4. Avoid Water and Air from Affecting the Hydraulic System

Under normal conditions, the proportion of air in hydraulic oil is in the range of 6%-8%. When the pressure drops, a part of the air contained in the hydraulic oil will be separated, so that when the bubbles burst, it will cause cavitation on all related parts, causing these parts to produce noise. If the vibration is more severe or frequent, it will greatly affect the stable operation of the hydraulic system and cause its actual work efficiency to decrease. Therefore, in order to effectively avoid the impact of this situation on the hydraulic system, it is necessary to do the following work: firstly, exhaust the air contained in the hydraulic system at regular intervals to ensure that it can work normally and stably; secondly, regarding hydraulic pressure The oil suction pipe of the oil pump must not only ensure a good seal, but also not expose it on the oil surface; finally, the drive facilities of the hydraulic oil pump should use a double-lip genuine oil seal to ensure that it has a better sealing function. If the hydraulic oil contains a lot of water, it will not only cause it to emulsify and deteriorate, but it will also cause corrosion to related hydraulic components, accelerate the wear rate of the equipment, and cause great harm. In order to effectively avoid the influence of water on the normal operation of the hydraulic system, not only should we pay high attention to the maintenance, but also the maintenance and management of the oil storage device. The hydraulic oil with a large actual water content needs to be removed by multiple filtering methods. The water contained in it.

5. Related Matters Needing Attention in the Homework

For mechanical equipment, in order to extend its actual service life and reduce the occurrence of equipment failures, rough operations cannot be carried out during specific operations. Therefore, a large impact load will be generated during this process, which will not only cause part of the structure At the same time, the wear and tear of the hydraulic system will cause a great impact on the hydraulic system, resulting in damage to hydraulic related components such as oil seals and tubing. Personnel who actually apply and operate equipment need to continue to summarize, use mechanical equipment scientifically, and form good operating habits. In addition, during the actual operation of mechanical equipment, high attention should be paid to the sound emitted by the operation of the equipment. For various noise problems generated by the hydraulic system, the reasons should be found and resolved in the first time. Some work is usually carried out in the form of shifts, which requires records of equipment operation and system leakage to ensure that staff have a good grasp of equipment conditions and provide a strong guarantee for its stable operation.

6. Matters Needing Attention in Regular Maintenance

At present, many hydraulic systems are equipped with smart devices, which can give hints to hidden dangers in the system. However, because of its actual monitoring range has certain limitations, we need to organically combine the detection results of smart devices with Maintenance and management of hydraulic system. In specific maintenance, it is necessary to select hydraulic oil with suitable viscosity based on the environment and specific characteristics of the hydraulic system, and fully consider the anti-emulsification and oxidation resistance of the hydraulic oil. For all the used oil products, sampling inspection work needs to be performed in the first time, and hydraulic oil that does not meet the requirements should not be used. The various components and hydraulic oil contained in the hydraulic system need to be replaced and maintained in combination with the service life and the actual replacement cycle. The maintenance of the hydraulic system can be divided into the following different stages: 250 hours of maintenance, each filter should be inspected and cleaned, and replaced when necessary; 500 hours of maintenance, for Every filter element must be replaced; for 1000 hours of maintenance, in addition to the above operations, the hydraulic oil must be replaced; for 7000-10000 hours of maintenance, relevant professionals should be assigned to perform inspections, adjustments and maintenance operations. Based on the summary of past mass production experience, hydraulic pumps need to be

overhauled after working for more than 10,000 hours, otherwise it will cause more serious safety problems. With the increasing development of science and technology, hydraulic systems are widely used in mechanical engineering, causing their working conditions to become more complex. In the specific production process, it is necessary to vigorously apply modern technology to implement maintenance for the hydraulic system. Today, with the highly intelligent development of hydraulic systems, I believe that in the future construction machinery production, high-precision hydraulic systems will become the dominant.

7. Conclusion

All in all, the hydraulic system is a very important part of construction machinery. In order to ensure the normal operation of the hydraulic system, it is necessary to scientifically select hydraulic oil and reduce the adverse effects of impurities, water and air on the hydraulic system, so that the hydraulic system is more stable and the mechanical equipment can work normally.

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