

“TECHNICAL MAINTENANCE SYSTEM OF MACHINES AND MECHANISMS”

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Annotatsiya:

This article examines the principles and significance of the technical maintenance system applied to machines and mechanisms in industrial production. The main purpose of the study is to describe how properly organized maintenance activities contribute to improving equipment performance, reducing breakdowns, and ensuring continuous operation of technological processes. The paper explores the main types of maintenance, including preventive, scheduled, and corrective maintenance. It also considers modern approaches such as condition-based monitoring and predictive maintenance supported by digital technologies and automated control systems. Furthermore, the study emphasizes the importance of timely maintenance in increasing the reliability, safety, and efficiency of industrial equipment. The results indicate that an effective maintenance system helps to reduce operational costs, minimize downtime, and extend the service life of machines and mechanisms.

Keywords: Maintenance system, machines, mechanisms, reliability, preventive maintenance, predictive maintenance, industrial equipment, efficiency.

“MASHINA VA MEXANIZMLARNING TEXNIK XIZMAT KO‘RSATISH TIZIMI”

Annotatsiya:

Ushbu maqolada sanoat ishlab chiqarishida qo‘llaniladigan mashina va mexanizmlarning texnik xizmat ko‘rsatish tizimining tamoyillari va ahamiyati o‘rganiladi. Tadqiqotning asosiy maqsadi — to‘g‘ri tashkil etilgan texnik xizmat ko‘rsatish faoliyati uskunalar ish faoliyatini yaxshilash, nosozliklarni kamaytirish va texnologik jarayonlarning uzluksiz ishlashini ta‘minlashga qanday hissa qo‘shishini yoritishdir. Maqolada texnik xizmat ko‘rsatishning asosiy turlari, jumladan profilaktik, rejalashtirilgan va tuzatish (ta‘mirlash) xizmatlari tahlil qilinadi. Shuningdek, holatga asoslangan monitoring va raqamli texnologiyalar hamda avtomatlashtirilgan boshqaruv tizimlari yordamida amalga oshiriladigan bashoratli texnik xizmat ko‘rsatish kabi zamonaviy yondashuvlar ham ko‘rib chiqiladi. Bundan tashqari, tadqiqot texnik xizmatni o‘z vaqtida amalga oshirish sanoat uskunalarining ishonchliligi, xavfsizligi va samaradorligini oshirishdagi muhim rolini ta‘kidlaydi. Natijalar shuni ko‘rsatadiki, samarali texnik xizmat ko‘rsatish tizimi ekspluatatsiya xarajatlarini kamaytiradi, to‘xtab qolish vaqtini qisqartiradi hamda mashina va mexanizmlarning xizmat muddatini uzaytiradi.

Kalit so‘zlar: texnik xizmat ko‘rsatish tizimi, mashinalar, mexanizmlar, ishonchlilik, profilaktik xizmat, bashoratli xizmat, sanoat uskunalari, samaradorlik.

«СИСТЕМА ТЕХНИЧЕСКОГО ОБСЛУЖИВАНИЯ МАШИН И МЕХАНИЗМОВ»

Аннотация:



В данной статье рассматриваются принципы и значение системы технического обслуживания машин и механизмов, применяемых в промышленном производстве. Основная цель исследования заключается в описании того, как правильно организованные мероприятия по техническому обслуживанию способствуют повышению эффективности работы оборудования, снижению количества поломок и обеспечению непрерывности технологических процессов. В работе анализируются основные виды технического обслуживания, включая профилактическое, плановое и ремонтное обслуживание. Также рассматриваются современные подходы, такие как мониторинг состояния оборудования и прогнозное техническое обслуживание, основанные на цифровых технологиях и автоматизированных системах управления. Кроме того, подчеркивается важность своевременного технического обслуживания для повышения надежности, безопасности и эффективности промышленного оборудования. Результаты показывают, что эффективная система технического обслуживания позволяет снизить эксплуатационные затраты, уменьшить время простоя и увеличить срок службы машин и механизмов.

Ключевые слова: система технического обслуживания, машины, механизмы, надежность, профилактическое обслуживание, прогнозное обслуживание, промышленное оборудование, эффективность.

Introduction

The rapid development of modern industry requires highly reliable and efficient operation of machines and mechanisms. In this context, the technical maintenance system plays a crucial role in ensuring uninterrupted production processes and maintaining the performance of industrial equipment at an optimal level. Technical maintenance includes a set of planned and unplanned activities aimed at preventing failures, detecting defects in time, and restoring the working condition of machines and mechanisms. Properly organized maintenance not only increases the service life of equipment but also improves safety and reduces production costs. Today, with the advancement of digital technologies and automation, maintenance systems are becoming more intelligent and predictive. This allows industries to monitor equipment condition in real time and prevent possible breakdowns before they occur. Therefore, studying the technical maintenance system of machines and mechanisms is highly important for improving industrial efficiency and ensuring sustainable development of production processes.

Main Body

The technical maintenance system of machines and mechanisms is a complex and structured approach that ensures the continuous, safe, and efficient operation of industrial equipment. In modern production environments, where automation and high-speed processes dominate, even a short equipment failure can lead to significant financial losses. Therefore, maintenance is considered a strategic element of industrial management. One of the fundamental goals of the maintenance system is to **prevent unexpected failures** and ensure the stable functioning of machines. This is achieved through regular technical inspections, diagnostics, and timely replacement of worn-out components. Proper lubrication, tightening of mechanical parts, calibration of instruments, and cleaning of systems are also important routine operations that contribute to equipment reliability. The maintenance system is generally divided into several types. **Preventive maintenance** is performed regularly to avoid possible breakdowns. It is based on experience, technical documentation, and operating conditions. **Scheduled maintenance** is organized according to a predetermined plan, depending on machine usage



time or production cycles. This allows enterprises to reduce risks and ensure predictable operation. **Corrective maintenance** is carried out after a failure occurs. Although it is necessary in some cases, it is less efficient compared to preventive methods because it often results in production downtime and higher repair costs. For this reason, modern industries aim to minimize corrective maintenance through better planning and monitoring. In recent years, **predictive maintenance** has become one of the most advanced approaches. It uses sensors, IoT technologies, and data analysis systems to monitor the real-time condition of equipment. Parameters such as vibration level, temperature changes, pressure fluctuations, and noise signals are analyzed to detect early signs of malfunction. This allows engineers to take action before a serious breakdown occurs. The effectiveness of the maintenance system also depends on **human factors**, such as the qualification of technical staff, their experience, and ability to work with modern diagnostic tools. Proper training of maintenance personnel ensures accurate fault detection and timely decision-making. From an economic perspective, a well-organized maintenance system reduces operational costs by minimizing emergency repairs, decreasing machine downtime, and extending the service life of equipment. It also improves production efficiency and product quality, which is very important in competitive industrial markets. In conclusion, the development and implementation of an effective technical maintenance system is a key factor in achieving high productivity, reliability, and sustainability in modern industrial enterprises.

Conclusion

The technical maintenance system of machines and mechanisms is a vital element of modern industrial production. Its proper organization ensures the stable and efficient operation of equipment, reduces unexpected breakdowns, and improves overall productivity. The analysis shows that preventive, scheduled, corrective, and predictive maintenance methods each play an important role in maintaining the reliability of machines. In particular, modern predictive maintenance based on digital technologies allows early detection of faults and helps avoid serious failures. In addition, an effective maintenance system contributes to reducing operational costs, minimizing downtime, and extending the service life of industrial equipment. It also improves safety conditions in production and ensures higher quality of manufactured products. In conclusion, the development and continuous improvement of technical maintenance systems is essential for achieving long-term efficiency, reliability, and competitiveness in industrial enterprises.

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