



PREPARATION OF AGRICULTURAL MACHINERY FOR STORAGE

Ravshanov Sh.

Artikbayev B.

Khusenov U. F. (SRIAM)

Abstract

The article presents the technology of preparing agricultural machinery for storage and the need for scientific research aimed at its organization.

Keywords: Agricultural machinery, use, seasonal, storage, open, closed, service life, technical condition, cost, efficiency.

Introduction

Increasing production efficiency in agriculture, ensuring the supply of modern machinery, rational use of technical equipment, and reduction of operating costs are defined as priority tasks at the level of state policy [1-3].

It is well known that agricultural production has a seasonal character; therefore, most agricultural machines are used seasonally. After harvesting and completion of tillage operations, machines are placed in storage until the next season.

For example, one hour of downtime of a modern combine harvester during the harvesting season can cause economic losses amounting to hundreds of thousands of soums for a farm. Improper storage of machinery during winter leads to an increase in the time required for field preparation and reduces the service life of aggregates by up to one quarter. According to statistical data, the main cause of failures of agricultural machinery at the beginning of the season is the violation of winter storage requirements.

Storage is considered an organizational set of economic and technical measures that makes it possible to almost completely eliminate corrosion and deterioration of high-performance tractors and agricultural machines during idle periods.

The costs associated with storage are justified by the importance of maintaining the technical condition of machines. Poor storage quality negatively affects the operational performance of machines, especially considering their seasonal use. The quality of storage is one of the key factors ensuring long-term operation and productivity of agricultural machinery.

The following types of storage are distinguished: inter-shift storage - when the interruption in use does not exceed 7 days; short-term storage - from 7 days to 1 month; long-term storage - more than 1 month.





Storage of agricultural machinery requires the implementation of the following operations: cleaning of the machine, sealing to protect against atmospheric precipitation, and preservation (conservation) of parts prone to corrosion. In such cases, storage is carried out at maintenance facilities or inter-shift storage sites. For short-term storage, maintenance operations are usually performed.

The aim of the study is to improve the process of storing agricultural machinery, to evaluate the economic and technical efficiency of storage methods, and to substantiate optimal storage conditions in order to reduce repair costs and prevent downtime during the working season.

Materials and Methods

Numerous studies have been conducted by researchers on the use, maintenance, and storage of machine-tractor fleets [4-9]. These studies address theoretical and practical issues aimed at improving reliability, extending service life, maintaining technical condition, and reducing operating costs.

The rules for storing agricultural machinery and complex harvesters regulate a set of organizational and technical measures aimed at protecting units from corrosion, polymer degradation, and various types of damage. Organizational measures include procurement of equipment, arrangement of special areas for conservation of units and parts, and organization of maintenance during preservation.

The choice of storage method depends on the design features of machines, their quantity, the composition and usage pattern of the machinery fleet, climatic conditions, and the availability of storage facilities such as warehouses, garages, sheds, and **open areas** on the farm.

The main storage methods are divided into three types: closed storage, open storage, and combined storage.

In closed storage, machine units and components are placed in special facilities. One of the advantages of this method is the reduction of labor and costs associated with preparation for storage. However, its disadvantage is the high financial cost required for constructing closed facilities.

Open storage involves keeping agricultural machinery in open areas with removal of important units and components. This method ensures a sufficient level of protection provided proper conservation and preparation of storage areas are carried out. It is mainly applicable for implements such as plows, harrows, rollers, cultivators, etc.

The combined (mixed) storage method implies placing machines on supports in open areas or under sheds, while removable units and components are stored in





warehouses. Among all methods, closed storage provides the best protection against direct sunlight and temperature effects.

The use of engineering communications and the creation of optimal temperature and humidity conditions ensure high-quality protection against corrosion. Proper storage of agricultural machinery reduces repair costs and lowers the cost of agricultural production, thereby increasing overall efficiency.

Approximately 25% of agricultural machinery is sent for repair in spring instead of going to the field after winter. The most important factor in ensuring preservation is compliance with storage rules. Failure to follow these rules leads to additional costs in spring, whereas proper conservation in autumn is significantly cheaper.

Basic storage rules

Cleaning. Machinery must not be left in the condition in which it was used. Cleaning is a mandatory step before winter storage. Residual grain in combine bunkers attracts rodents, which damage wiring, seals, rubber, and plastic components. Fertilizer residues are even more harmful due to their aggressive chemical properties, causing corrosion of metal parts. Even dirt can retain moisture and lead to paint damage. Machine surfaces must be inspected, and damaged paint coatings must be cleaned, primed, and repainted.

Relieving tension. All chains, springs, and belts must be loosened to prevent deformation during idle periods. Chains should be lubricated, and in open storage conditions, it is preferable to remove them.

Removal of electronics. When storing machinery outdoors, all complex electronic components (monitors, batteries, starters, generators) should be removed and stored separately in closed rooms. Openings must be sealed with waterproof materials such as polyethylene film.

Fuel filling. According to storage requirements, fuel tanks of self-propelled machines should be completely filled with winter fuel to prevent condensation and corrosion. To avoid damage to sprayers, approximately 60 liters of antifreeze liquid should be circulated through the system to remove water residues.

Protection of rubber parts. All rubber components (seals, hoses, pipes) should be treated with silicone grease. Tire pressure should be reduced to 70% and protected with covers or treated to reduce ultraviolet exposure. Additionally, unloading the wheels using supports is recommended.

Compliance with storage rules ensures the absence of downtime, reduces repair costs, and guarantees timely start of seasonal agricultural operations. Regular inspection of machinery 1-2 times per month during storage is also necessary.





Conclusion

Proper storage of agricultural machinery in accordance with the above requirements prevents corrosion processes, reduces wear of rubber-technical components, and maintains the stability of the technical condition of machines. This, in turn, decreases the need for spare parts and reduces financial costs during preparation for the next season.

At the same time, a well-organized storage process extends the service life of machinery, ensures its reliability and readiness for operation. As a result, the need for large-scale repairs or procurement of new equipment before each season is significantly reduced, leading to an overall increase in economic efficiency in agricultural enterprises.

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