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В збірнику представлені тези доповідей науково-педагогічних працівників, наукових співробітників, аспірантів та студентів НУБіП України, провідних вітчизняних і закордонних вищих навчальних закладів та наукових установ, в яких розглядаються завершені етапи розробок.

The Proceedings presents abstracts of reports of scientific and pedagogical workers, research staff, graduate students and students of the NULES of Ukraine, leading domestic and foreign higher educational institutions and scientific institutions, in which completed stages of development are considered.

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TECHNICAL MEANS FOR CONSERVATION OF GREASE SPREADING MACHINES OF GRAIN HARVESTERS IN OPEN AREAS

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Technical means of applying conservation materials on the surface of agricultural machinery have a wide nomenclature [1-5]. They are powered by the power grid or internal combustion engines (ICE) of tractors and cars. If the preparation of machines for storage is carried out in the premises of the workshop or the storage area at the technical service point (PTO), the electrical network is used. In the conditions of an open storage area, the technical means for applying conservation materials are driven by the internal combustion engines of a car or tractor.

Features of operating conditions, economic capabilities of agricultural enterprises, availability of material, technical and energy resources, physical and rheological properties of protective compounds used, volume and timing of conservation works should be taken into account when choosing or developing the appropriate types of technical means. Self-propelled units for the storage of cars ATO-9984 (on a tractor chassis), ATO-16366 (on a car chassis) have been developed for the application of liquid conservation compositions on open areas.

The units are equipped with compressors and pneumatic spraying devices for applying conservation materials. The analysis of the device of the units shows that almost all the equipment for applying liquid preservative compositions is borrowed from the painting industry. Due to the fact that the use of self-propelled storage units turned out to be unprofitable, their production was limited to a few samples.

Self-propelled units on car chassis (ATO-4822, ATO-9966B, ATO-9966G), intended for maintenance of tractors and combines in the field, were also equipped with compressors and were used in the conservation of agricultural machinery at storage sites. In connection with the fact that these units have long been withdrawn from production, and new ones are not produced, the problem of developing a mobile unit with a source of compressed air for the operation of conservation equipment at equipment storage sites has become urgent.

The process of preservation of equipment is usually carried out in the fall in conditions of air temperature reduced to 5^{o}C, at which the viscosity of preservation

compositions increases sharply. High viscosity impairs the manufacturability of their mechanized application by spraying.

The introduction of solvents into viscous conservation materials, as well as their heating, makes it possible to reduce their viscosity. The solvent serves as an intermediate agent, after the application of conservation materials, it evaporates due to evaporation. The advantages of using a solvent include the possibility of simplifying the application technology, improving the integrity and uniformity of the resulting coating, and the disadvantages include the deterioration of the protective properties of the coatings and the cost of its purchase.

The process of applying viscous conservation compositions with heating allows to increase the thickness and protective properties of the conservation coating, to save organic solvents. But at the same time, the technical device of the equipment is complicated, there is a need for a source of thermal energy or a converter of mechanical energy into thermal energy.

In the analysis of the known technical means for applying viscous preservation compositions with heating, their technological potential was evaluated. During the classification of technical means, the systematization and grouping of equipment models that were produced by industry or were produced in the form of experimental batches and experimental products was carried out according to general features.

When classifying technical means for applying viscous compositions, differences in technical performance, energy source, method of converting mechanical energy, method of heating the composition in the tank, design of the heated hose, method of supplying the heated composition to the sprayer and method of its spraying were taken into account.

When developing technical means, it is necessary to take into account their mobility, the possibility of movement within the territory of the farm. Currently, the use of self-propelled and trailed units with anti-corrosion equipment has become economically unprofitable 64, 80, 81. Therefore, the use of mounted conservation units is more promising for conservation works.

The conducted analysis of the classification features of the equipment made it possible to determine promising technical solutions, based on which it is planned to develop a compact technical means for applying viscous compounds with heating: implementation - mounted on a tractor; source of energy for heating-tractor generator 28 V; compressor and generator drive - from tractor GDP; heating of the warehouse in the tank-through the wall of the tank from the 28 V heating element; supply of heated composition from the tank - by compressed air pressure; heating of a hose with a heated composition - from an electric spiral; application of the composition - with a pneumatic spray gun. In the MEP-02 mobile power drive (Fig. 1), attached to the MTZ-80 tractor, the compressor and generator are driven from the GDP.

The power train is equipped with a frame with a lock for an auto-clutch, a gearbox with a cardan shaft, a compressor, a receiver, air hoses, a blow gun, an auto-tractor generator, an electric cord for connecting external equipment. The power drive is used for the production, supply of compressed air and low-voltage electricity to the

equipment for applying liquid and thickened conservation compositions, blowing surfaces with air, inflating pneumatic tires.

For application of viscous compositions, the power drive is equipped with a conservation apparatus PRK-5-28 (Figure 1). The PRK-5-28 device includes a spray gun, a distributor, a rotating head, a flexible nozzle with a nozzle, an air hose, a suction nozzle with a heating spiral with a power of 0.1 kW and a replaceable polyethylene cylinder for a viscous composition. Electricity is supplied via wires attached to the air hose.

Fig. 1. Mobile power drive MEP-02 and conservation apparatus PRK-5-28

The viscous composition is prepackaged in polyethylene cylinders. For work, a suction nozzle is inserted into the cylinder with the help of a rotating head, the neck of the cylinder is hermetically pressed against the distributor. When the spiral is turned on, the composition in the cylinder is heated, under the pressure of compressed air, the heated composition enters the spray gun, then into the flexible nozzle with a nozzle. When leaving the nozzle, the composition is sprayed with compressed air and applied to the surface of the machines.

Disadvantages of the PRK-5-28 apparatus: frequent interruptions of the conservation process to replace the cylinder, prolonged heating of the composition at each cylinder replacement due to the low power of the spiral, weak mechanical strength of polyethylene cylinders.

A mobile installation for applying thickened lubricant allows you to work without technological interruptions. The installation includes a hand cart, a tank with thermal insulation of the walls and a heated lid, a pneumatic reducer, hoses for supplying lubricant and compressed air to the CO-71 spray gun, an air hose for connecting to an external compressor, an electric control panel with a step-down transformer. for connection to a 220 V power grid

In the heated tank, a grid is placed above the bottom, under which a local heating chamber is formed. A tray with a heat-dissipating material - periclase, in which a heating burner (220 V) is attached to the bottom of the tank.

The paper presents the results of research into the process of heating a viscous lubricant in a local heating chamber. A regression equation was obtained that describes the influence of the parameters of the local chamber (volume, heater power, gap between the grid and the tank wall, the size of the grids) and the concentration of the Emulgin additive on the intensity of heating of thickened lubricants. It is shown that with a decrease in the cells of the dividing grid, the heating of the lubricant in the local chamber accelerates: with a heater power of 0.56 kW and a chamber volume of 3.5 l, the temperature of the lubricant rises by 29 ^{o}C within 15 minutes. Proposals have been developed for the use of a 12/220 V voltage inverter to power the TEN burner of the installation from the auto-tractor generator.

At the same time, it is forgotten that in the wet weather of the autumn season, a system is needed to protect working personnel from electric shock with a voltage of 220 V. Solving this task will complicate the design of the installation, and will require the involvement of a qualified electrician to monitor the operation of the protection system. At the same time, the work does not address the issue of optimizing the heater's power when applying viscous compositions at low temperatures, the issue of determining heat losses in the process of heating structural elements of the pressure tank and in the process of moving the heated composition along the hose.

The possibility of using low-voltage heating elements for direct heating of the viscous protective composition from the electricity of the generator, excluding the voltage inverter, has not been studied.

The distribution of hydraulic resistances on the sections of the composition supply line from the pressure tank to the nozzle of the spray gun, including in the presence of an electric spiral, has not been studied.

Without carrying out scientific research aimed at solving the issues, it is impossible to determine the rational parameters of mobile equipment for applying viscous protective compounds under conditions of low temperatures.

The lack of scientifically based proposals for the development of an effective protective composition and a mobile technical means for its application negatively affects the quality of anti-corrosion protection of agricultural machinery, including machines that spread fat.

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