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ANALYSIS OF MAIN DIRECTIONS OF INCREASE OF OPERATIONAL RELIABILITY OF SUGAR BEET HARVESTERS

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The main task of the science of reliability is to find the most efficient ways of improving the reliability and durability of machines. Three general directions, combining different methods to improve the reliability of the machines.

The first direction. The resilience of the machine external influences. This will include methods for creating durable, hard, wear-resistant nodes due to their rational design and application of materials with high strength, wear resistance, anti corrosion, heat resistance, etc. This field combines all those latest achievements in the field of design and technology, which allow to increase the durability of assemblies and mechanisms to the impacts, typical for this type of equipment.

However, the possibility of resistance to the harmful processes is not unlimited. There is absolutely materials, it is practically impossible to provide all the mechanisms, only fluid friction, no material that is not deformed and would not change their dimensions during temperature fluctuations, etc.

If we add to this that the sources of external and internal influences on the combine remain, and that the requirements for its output parameters all the time increase, we can say that these methods of dealing with the harmful effects of necessary but not sufficient. They are limited by the level of development of a

particular area of technology. Insulation of machines against the harmful effects by installing them on the Foundation for vibration isolation, protection against dust and contamination of surfaces, the creation of special temperature conditions and humidity, application of anticorrosive coatings, etc.

In all these cases, the nodes and elements of the machine are insulated from the harmful processes and created more favorable conditions for machine operation. There are rational methods of repair, maintenance and storage machines through preventive measures and restoration of the health of the machine reduce the effect of impact on combine harmful processes. The isolation of the machine from external impacts and increase efficiency, however, these opportunities are also limited. Remain internal sources of disturbances, the complete isolation from external sources is also difficult because of their uncertainty. Therefore, the principle of isolation from external disturbances is limited to improve the reliability of the machines.

The application of the principle of self-regulation when the machine with the help of special devices to automatically restore the lost functions and responds to external perturbations, is a new direction in creating reliable machinery for complex systems and assemblies.

This business has virtually unlimited opportunities for improving reliability and durability, since, based on the principles of cybernetics, it is possible for a machine of any complexity to provide it with the necessary efficiency. Research on these issues is not enough to make concrete recommendations to industry and producers. In connection with this expedient, a deep scientific study of the totality of tasks which will provide a significant increase in the effectiveness of sugar beet harvesting machines. Currently widely used two ways to improve the reliability associated with the main stages of life of technical devices. The first stage is the stage of design and production, the second – stage operation. Improving the reliability at the design stage is considered fundamental, when it laid all the possibilities to quality performance technology of its basic functions safe operation within a defined time characteristics. The second stage is to ensure that potentially inherent reliability in the design. However, certain events in the process of operation can increase the reliability and exceed the level inherent in the design and manufacture. This is achieved by modifications of the apparatus and improvement of the initial technological and organizational measures in the process of its operation at the bilateral relations of production and of the operator. The main methods of increase of reliability at the stage of design and production include the following.

1. The use of highly reliable components. To accomplish this, carry out either selective or complete a preliminary test and the test items in conditions close to operating conditions.

2. Design, perhaps a more simple technique is the application of known and well-proven components, assemblies and circuitry.

3. Reducing possible overloads in work products.

4. Automation design, in which optimized design of the facility subject to the requirements of the standards and specifically excludes structural errors in the transfer of information on technological and industrial base.

5. Redundancy of critical components, blocks, operations in the software.