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ANALYSIS OF THE PERFORMANCE OF A CLASS 1.4 TRACTOR WITH A TECHNOLOGICAL MODULE

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On the basis of the energy module with a technological module and an agricultural tool, an improved MTA parameter recording system has been developed. The system has the following main components:

- analog-digital converter;
- destination data recorder
- voltage sources and converters;
- induction sensors;
- loading elements;
- fuel consumption sensor;
- data transfer interfaces.

The developed measuring complex allowed recording in digital form on the end device in real time without prior analog filtering with a high sampling frequency, reaching 2000 Hz, which increases the efficiency of data post-processing. The rationale for using the developed measuring complex is the need to filter data at the processing stage, not at the recording stage. This allows you to study in more detail all the frequency components of the signal and conduct a statistical analysis based on the state of the solved problem.

A National Instruments analog-to-digital converter was used to record data from the sensors, which is a modular system with a DaQ-9172 bearing chassis with seven slots for NI 9401 digital I/O modules, NI 9219 data connection, load cell connection NI 9237 and load cells NI 9237 25-pin ni 9934, as well as a USB connector for connecting to notes.

The main parameters of the ADC are the resolution depending on the bit depth and the determination of the minimum recorded change in the value of the analog signal, as well as the sampling rate. The DAQ-9172 chassis has a bit depth of 24 bits and a resolution of 0.0000596 mV with an input signal range of ± 0.5 V. For on-board MTA devices, the impact limit is extremely important, which for the daq-9172 leaves 30g. Replacement and automatic recognition of input-output modules. Signals and sensors are connected directly to the modules.

Wire strain gauges type 2PKB-30-200GB were used to measure the studied traction forces and torque. An adhesive based on cyanoacrylate was used for gluing the strain gauges. For

protection against mechanical damage, protection against moisture and protection against petroleum products, the sensors were wrapped with zipper tape, which was impregnated with nitro paint.

The traction resistance of the energy and technological modules was measured by measuring the longitudinal forces parallel to the direction of movement acting on the lower axis of the nozzles.

At the same time, the assessment of the forces acting on the lower axis of the hinge was carried out by measuring the deformations from the bending moments of the axis in the horizontal plane. For this, grooves were made on the axis, on which platforms were made in a vertical plane for gluing wire resistors. The sticker of the latter made it possible to measure the component forces with which the lower drawbars of the coupling are loaded in the horizontal plane, regardless of the angle of inclination of the rods to the track plane. Scheme of connection of loading elements. The layout of the loading elements and their connection to the measurement scheme is shown in Fig. 2.

The measurement of the torque on the rear drive wheels of the tractor and the technological module was carried out by loaders glued on their semi-axis and connected in bridge circuits. United Mercury through TRAK-12 were used for continuous accommodation.

To measure the amount of fuel consumed during the experiment, a DTT-5 rotary-pulse type diesel fuel flow meter was used, which was included in the fuel supply line in the area between the pump and the filter for cleaning coarse fuel. The rotary-impulse dispersion meter allows you to record fuel consumption with a discreteness of 5 grams and a sin of less than 1%.

The sensors are connected to the chassis modules according to the purpose of the specific module according to the technical documentation. The NI 9219, a universal analog input module for connecting thermistors, thermocouples, load cell sensors, current collectors, etc., which has eight channels of various devices with a range of 24 bits and a recording frequency of up to 100 kHz per channel, it was used to rotation of loading elements. The NI 9401, a module with eight digital output channels recording frequencies up to 10 MHz, was used to connect the inductive sensors and the DRT-5.

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