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LABORATORY STANDS FOR TESTING POWER EQUIPMENT

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ABSTRACT

This work is devoted to the analysis of the technical requirements for power equipment and stands for their testing, as well as the technical data on laboratory stands for the study of alternative energy sources, especially wind energy. Provides information about the temperature regime, taking into account the cooling medium. Standards for hydrogenerators are analyzed.

Keywords: standard, source, laboratory stand, alternative energy.

Over the past 5-10 years, the possibilities of information technology have become widely used for a more detailed examination of the structure and parameters of a water source with reference to the terrain. This made it possible to visualize the data. For analysis, they began to use the capabilities of IT and space surveying of the relief.

Much attention is paid to the side of the government towards the development of hydropower. The main attention is paid to the following points: reduction of the number of peak loads, efficient use of water resources, creation of an operational reserve in the provision of electricity. It is proposed to create a cascade of various types of HPPs, the full use of all water sources through the creation of HPPs of very small capacities.

In the field of hydropower, aspects related to micro- and mini hydropower plants are the least studied . Theoretical developments have not been prepared for them. Parameters are not given in the standards for power equipment. In addition, issues are considered regarding the calculation of the parameters of hydropower facilities in relation to the cost of power plants. There are only a few works on this issue.

Calculation and analysis of the state of hydropower in Uzbekistan were considered by the scientists of our country. They paid great attention to the development of various types of alternative sources of electricity, but the issues of using micro hydroelectric power plants were not sufficiently considered and they cover the period up to 2020.

Problems with the provision of electricity over the past 3-5 years have forced many countries to reconsider their views on alternative sources of electricity. Now it is not the cost of 1 kWh ·of electricity that is important, but its availability in the energy network, since this factor has become the most important. Only after it the question is raised about the period of full return on invested funds (usually for mini-micro HPPs it is 5-8 years). Therefore, much attention has been paid to this problem by the government.

The use of technical devices, their adjustment and technical use requires the implementation of many mandatory standards and regulations. Even when creating laboratory stands, it is necessary to take into account the requirements for electrical protection values, noise indicators, technical skills of personnel, requirements for the power supply system, type and equipment.

The following are considered the main problem :

- the complexity of bench equipment (it is difficult to change the components of a bench to measure parameters of a different type);
- too large dimensions with low weight of bench equipment (length up to 10 meters and 3-4 meters in height);
- bench equipment does not have the function of mobility and portability (their operation requires a constant source of water and power).

Based on the above, the main task is to study the principles of operation of portable stands for conducting research on the parameters of energy equipment operating on the basis of renewable energy sources.

Consider the parameters for the hydrogenerator. A hydro generator usually has a common shaft with a hydraulic turbine. The hydroelectric generator converts the mechanical energy of the hydraulic turbine into electrical energy. There are many types - low-speed (speed up to 100 rpm) and medium (speed from 100 to 200 rpm), high-speed (speed over 200 rpm) [2].

The choice of the type and parameters of generators is based on [1]. Its action extends to Uzbekistan (Uzgostandart). It is used instead of GOST 5616-81 and GOST 17525-81.

Taking into account the temporal characteristics, the noise can be divided into the following :

- constant (here the noise level for a working day (8 hours) changes no more than 5 dB),
- intermittent (here the noise level during the working day (8 hours) changes by more than 5 dB.

In real conditions, short-term overloads take place. This is taken into account during the operation of the hydrogenerator through accounting for indirect and direct cooling (air and water) [3].

The parameters obtained in practice and modeled are considered in [7]. Here the main attention is paid to energy parameters and new technical solutions in the direction of increasing efficiency.

For preliminary analysis, laboratory stands are used. Here we provide information about some of them.

There are developments in the field of wind energy. The above complex controls such system operation parameters as voltage, current, current electricity consumption, power consumed from the network, power generated by a wind generator .

Provides an opportunity for practical demonstration, explanation of the principle of operation of alternative energy sources (wind generator) in energy-efficient autonomous

power supply systems, as well as practical and laboratory classes focused on the use of alternative energy sources [8] .

Laboratory bench designed by Spectro Lab ”(Ukraine) is also aimed at studying the possibilities of wind energy [9]. It is portable and can be used in the educational process in relevant specialties and areas.

Sampling and analysis in the pipeline are considered in [10]. This factor is taken into account when operating a laboratory stand for hydropower devices. The work of electrical equipment is considered in [11]. This laboratory stand was developed at the Verkhnekamsk Electromechanical Plant (Republic of Belarus).

With it, you can carry out the following work: measure the characteristics of an electric motor at idle, obtain readings at rated load and short-term overcurrent, and characteristics of case insulation by increasing the power frequency voltage.

From the above, the following conclusions can be drawn:

- placement and operation of hydrogenerators should be carried out in compliance with the necessary requirements [1, 5-6,10].

In conclusion, it should be noted that the standardization of equipment, the conduct of the experiment and the use of laboratory stands require compliance with the necessary conditions, which allows you to quickly resolve issues with the consideration of procedural issues.

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