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Research Of Energy Efficiency of Microhydroelectric Power Plants Based on Asynchronous Generator

Ma'murjon Akhmedov, Bakhodir Erkinov, Abbos Mannonov

PhD student, "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University, Tashkent,Uzbekistan.
Doctor of Philosophy of Technical Sciences, Senior Scientist, "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University, Tashkent,Uzbekistan.
Junior researcher, Institute of Energy Problems, Academy of Sciences of the Republic of Uzbekistan, Yashnobod, Tashkent, Uzbekistan.

ABSTRACT: The analysis of current state of microhydroelectric power stations and the advantages of new types of generators in improving the energy efficiency of microhydroelectric power stations based on asynchronous generators is highlighted. The operation of micro-hydroelectric power stations and its mechanisms, i.e., the influence of the types of hydro-turbines on water flow, have been studied.

I. INTRODUCTION

Currently, many scientists and engineers around the world are working on the effective use of unconventional energy sources. Among them, the most notable roads are the use of flowing waters and winds, the rise and fall of water in the ocean, waves in it, heat in the bosom of the Earth, sunlight.

Let's take a look at the energy sources that exist in the nature of our country: the oceans are far away, there are few winds, the heat of the Earth is at an instantaneous depth. But, in contrast to the above, in our country there is a lot of sunlight, rivers and canals. Despite the fact that a lot of research work has been carried out on the use of solar energy, the production of electricity from it is an anchayin expensive.

So it is possible to agree that now the opportunity to get the most favorable energy for us is associated only with rivers and canals. It is known that the most favorable energy for the population and the ring farm industries is electricity. So our rivers can be dammed as needed to build Hesses and get electricity.

The simplest and cheapest way to obtain flowing water energy is to use mechanical devices, namely generators. If they are used by creating rational and affordable structures of generators that carry and transmit energy from wastewater, suitable for our conditions, it is no doubt that the population, organizations and enterprises, farms located on the banks of wastewater, canals, rivers in our country will have much cheaper and uninterrupted electricity.

The action carrier of microhydroelectrstants, that is, they will need to be structurally, kinematically and dynamically taxable in order to ensure the operational competence, reliable operation of their mechanisms.

II. LITERATURE SURVEY

These results are then used to calculate details to strength, base and design dimensions.

Since the working parracks are not skidding compared to the Val they are mounted on, they all rotate with the same angular velocity.

Therefore, it will be enough to describe one parrak in each wall. When calculating the power that can be obtained from the flow of water, all parcels must be taken into account.

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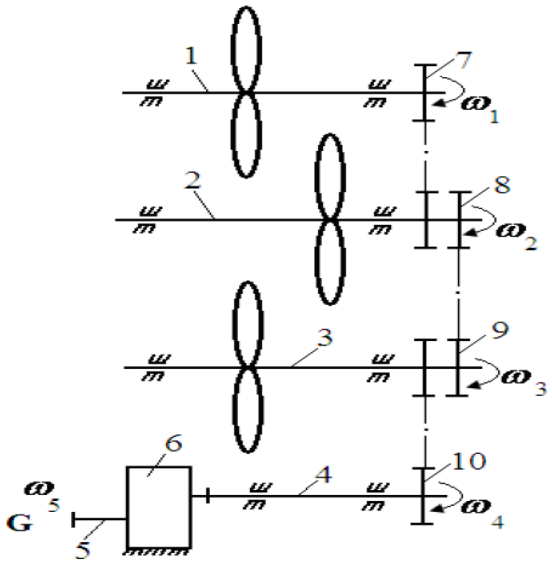
Structural analysis was carried out in order to determine whether the engine mechanisms should be capable of operation, reliable operation, be formed from what zvenos and kinematic Pairs (Figure 1) [1].

III. METHODOLOGY

The carcass is an excitable zveno. The area intended for the installation of a Generator or pump is also not excitable, since it is maximized on the carcass. A multiplier will also be installed on this platform. It has been suggested that the power-up shaft can increase the rate of revolutions by several tens of times, e.g. n=2000 eels to 3000 ayl/min.



1,2,3-working shafts; 4-power-taking shafts; 5-generator or pump-connecting output shafts; 6-multiplier; 7,8,9,10-chain transmission asterisks [3].

Figure 1-kinematic scheme of the engine

The main indicators of the quality of the power supply include the output voltage parameters described by the nominal value and frequency [3].

Micro-hydroelectric power station contains such mandatory elements as a converter of water energy into mechanical energy of the rotational motion of the shaft of an electric generator, an electric machine generator, an output voltage stabilization system and a number of elements, the presence and design of which depends on the type and characteristics of the station: certain hydraulic structures, shut-off valves, ballast loads, etc. [4].

As a result of the study of the existing functional circuits of electrical equipment, an optimal functional circuit consisting of a hydraulic turbine, an asynchronous generator, excitation capacitors, an auto-ballast load and a load block was selected Studies of the process of capacitor self-excitation of an asynchronous generator, taking into account the characteristics of the electric power stabilization system, have been carried out, showing that the linear voltage and current frequency are inversely proportional to the capacitance of the excitation capacitors. When varying the ballast resistance, the system behaves differently. The voltage varies in direct proportion to the magnitude of the ballast resistance, and the frequency is inversely proportional. As a recommendation, it should be suggested to carry out additional regulation of the capacitance of the capacitors in order to improve frequency stabilization [5].

Therefore, the most important element of the power plant is the stabilization system, which ensures the stabilization of the static stable operating mode of the hydraulic unit and its output voltage. Based on the study of the literature, the first

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section determined the parameters of the electricity generated by the asynchronous micro-hydroelectric generator for the power supply of agricultural facilities. The analysis showed that the optimal way to stabilize the parameters of the generated electricity is to regulate the balance on the basis of thyristor converters with phase control.

Fig. 2. Block diagram of the device transfer to the load via the controller [6].

The asynchronous generator was connected to a rectifier, and the rectifier was used to charge the battery through the output of the AC voltage regulator from the asynchronous generator. The rectifier is connected to the controller. A battery,

a ballast loader and an inverter went through the controller. Electricity is transmitted to consumers through an inverter. The inverter is used to convert DC voltage to AC voltage. The above schemes are now widely used [6].

IV. CONCLUSION AND FUTURE WORK

Of great importance is the use of micro hydro stations to provide electricity to consumers. It is distinguished by its simple and reliable operation, the presence of electricity produced at an affordable price.
The choice of a generator is of great importance for the effective operation of micro-gears. When choosing a generator, it should be reliable and inexpensive. Studying the existing functional schemes of electrical equipment, it is possible to use a hydraulic turbine, with an optimal automated functional circuit consisting of an asynchronous generator.

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