EFFICIENCY OF INTRODUCTION OF ASYNCHRONOUS GENERATORS IN SMALL HYDROPOWER PLANTS.

Xalikova Xurshida Abdullayevna
teacher
Tog'ayev Axror Ikrom o'g'li
student
Karshi Engineering and Economic Institute

Annotation - *The article presents the prerequisites for the creation of low-power hydroelectric power plants consisting of an asynchronous generator, due to their high reliability, relative cheapness and ease of maintenance in operation, more resistant to short circuits and overloads.*

Key words - *autonomous; asynchronous generator; static source of reactive power.*

At present, the problem of using renewable sources of electrical energy has attracted wide attention of foreign and domestic specialists due to the increase in the cost of fossil fuel due to the difficulties of its extraction and transportation. A promising direction in this matter is the use of the energy of small rivers and watercourses as a result of the construction of small hydroelectric power plants (SHPP) on them.

Small HPPs include plants with an installed capacity of up to 30 MW.

SHPP equipment should be simple and reliable in operation, provide full automation of the station, and without maintenance personnel. As studies conducted in some developed countries in this direction show, the use of asynchronous generators (AG) at SHPPs, which can be used as commercially available asynchronous motors with power from several to 8-10 MW, with nominal speeds of 350-3000 rpm and with sufficiently high energy performance: Efficiency 90-95%, power factor 0.85-0.92. Obviously, in this case, the efficiency of the stations increases dramatically, since capital investments and maintenance costs for generating equipment and their control devices are significantly reduced, and AGs are distinguished by high reliability, relative cheapness and ease of maintenance in operation, they are easily switched on for parallel operation with electric system, even with relatively large mismatches of angular velocities, i.e. there is no question of synchronization and regulation, the shape of the AG voltage curve is closer to sinusoidal than that of synchronous generators (SG) when operating on the same load, it is more resistant to short circuits and overloads.

Depending on the location, SHPPs can operate on an autonomous load or in parallel with an electrical system. In the first case, they must be supplied with static reactive power sources (SRPS) to cover the reactive power. Their speed is 2-4 periods, they allow you to regulate the voltage phase by phase, solve a number of tasks of a regime nature and, according to experts, are 1.5-2 times cheaper than synchronous compensators of the same power.

The AG can be switched on for parallel operation with the electrical system by the synchronization method, in which the multiplicity of the emerging shock electromagnetic moments and currents in the stator windings is approximately 2 times less than the similar parameters of the SG of the same power. Thus, in view of the simplicity of design, relatively low cost, the possibility of full automation of technological processes, as well as the widespread introduction of modern SIRMs, show the expediency of configuring SHPPs with asynchronous generators.

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