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Receiving Electric Power with Water

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Abstract: *The article discusses the issues of generating electric energy and the optimal method of controlling hydroelectric power plants. The workflow of hydro turbine installations and reducing the efficiency in hydro turbines. An analysis was made of increasing the productivity of a hydroelectric power station and a turbulent flow of water, which can increase the coefficient of productivity of hydroelectric power stations.*

Keywords: Hydroelectric power station, power station, generator, dam, coal, gravity, propeller.

Introduction

In fact, hydropower and coal-fired power plants produce electricity in a similar way [1]. In both cases, an energy source is used to rotate a part similar to a propeller, called a turbine, which then rotates a metal shaft in an electric generator, which is an electric motor. A coal-fired power plant uses steam to rotate the turbine blades [2]. While a hydropower plant uses falling water to rotate a turbine. The results are the same [3].

The theory is to build a dam on a large river with a large elevation difference. The dam stores a lot of water behind it in the reservoir. At the base of the dam wall there is a water intake [4]. Gravity causes it to fall through a fence inside the dam. At the end of the plug is a turbine screw that rotates with moving water. The shaft from the turbine goes up into the generator, which generates energy.

Materials and methods

Power lines are connected to a generator that conducts electricity to your home. Water continues the propeller through the tail into the river past the dam.

Regarding the operation of this generator, the engineering building explains it this way: “A hydraulic turbine converts the energy of flowing water into mechanical energy. A hydroelectric generator converts this mechanical energy into electricity. The operation of the generator is based on the principles discovered by Faraday. He found that when a magnet passes by a conductor, it causes electricity.

In a large generator, electromagnets are created by circulating direct current through loops of wire wound around stacks of magnetic steel laminated layers. This is called the pole field, and is installed around the perimeter of the rotor. The rotor is attached to the turbine shaft and rotates at a fixed speed. When the rotor rotates, it causes the poles of the field (electromagnets) to move past the conductors installed in the stator. This, in turn, causes electricity current and voltage at the output terminals of the generator. Pump storage reuse of water for peak electricity consumption. Demand for electricity is not "flat", but constant. Demand is growing and increasing throughout the day, and overnight, the need for electricity in homes, enterprises and other facilities decreases. For example, here in Atlanta, Georgia, at 5 p.m. on a hot August day off, you can bet that there is a huge need for electricity to run millions of air conditioners. But after 12 hours at 5 in the morning there are not so many.

Result and discussion

Hydroelectric power plants are more efficient in meeting peak electricity needs for short periods than fossil fuel and nuclear power plants, and one way to do this is to use a “pumping facility” that reuses the same water more than once.

Pump storage is a method of storing water in reserve for peak energy needs by pumping water that has already flowed through the turbines back to the storage pool above the power plant at a time when consumer demand for energy is low, for example, in the middle of the night. Water is then allowed to flow back through the turbine generators during periods when demand is high and a large load is placed on the system.

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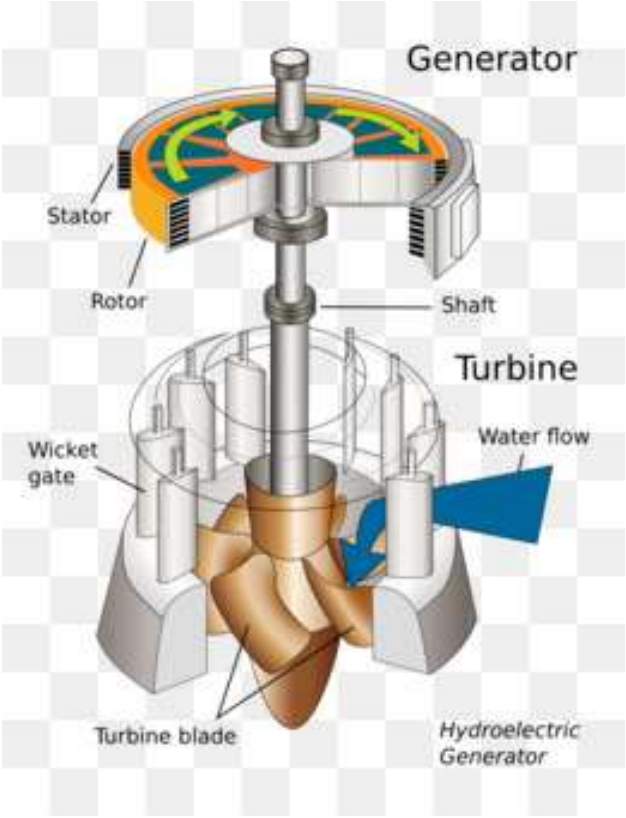

Fig. 1. Daytime: water flows down through the turbines, generating electricity

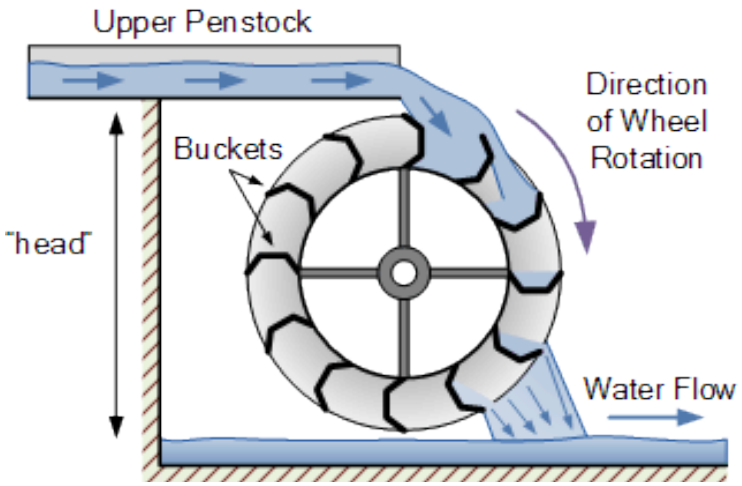

Fig. 2. Night: water is pumped uphill into the tank for tomorrow's use

Pump storage: reuse of water for peak energy consumption. The reservoir acts like a battery, storing energy in the form of water when needs are low, and generating maximum power during daytime and seasonal peak periods.

Conclusion

The advantage of storage is that the hydraulic units are able to quickly start and quickly regulate performance. They work efficiently when used for one hour or several hours. Since pump storage tanks are relatively small, construction costs are generally low compared to conventional hydropower facilities.

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