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A MICRO-HYDROPOWER STATION FOR THE CONVERSION OF FLOWING WATER KINETIC ENERGY

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Abstract

An efficient conversion of kinetic energy of river waters into mechanical or electrical energy without building barrages is provided by micro-hydropower stations. Increased efficiency is achieved by an optimum position of the blades with hydrodynamic profile. The formulation used to compute the hydrodynamic forces is an inviscid - boundary layer model. Micro-hydropower station provides kinetic energy conversion of river water into mechanical or electrical energy without building barrages. Increased efficiency is provided by blades aerodynamic profile and their optimum position for efficient conversion of water kinetic energy. Two industrial prototypes are fabricated. The efficiency of the micro-hydro power stations as conversion systems of renewable energy sources kinetic energy of flowing rivers depends mostly on profiles of the hydrofoils used in the rotor's construction for interaction with fluid. The main goal of this paper consists in the elaboration of the modified hydrofoils, and based on them of the turbines with increased conversion efficiency. The following objectives were established: Elaboration of the transient computational models of the hydrodynamic turbine with 3 and 5 hydrofoils for extensive simulations in the framework of computational fluid dynamics (CFD) using software applications ICEM CFD, CFX, TurboGrid and ANSYS, that will allow a variation of the attack angle for each individual blade during a full rotor's revolution. The expected results address the elaboration of the technical and technological documentations, manufacturing and testing of the hydrodynamic rotor for the micro-hydro power station.

Key words: hydrodynamic profile, micro-hydropower station, water wheel

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