

블레이드 형상 변화에 따른 마이크로 튜블러 수차의 CFD 성능해석

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CFD Performance analysis of Micro Tubular-type hydro turbine by blade shape.

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Recently, various developments in the area of small hydropower have being made and small hydro turbines are suitable for domestic use because it is a clean and renewable energy source. A small hydropower generator produces power by using the different water pressure levels in pipe lines and energy which was initially wasted by use of a reducing valve at the end of the pipeline is instead collected by a tubular-type hydro turbine in the generator. In this study, in order to acquire the performance of tubular-type hydro turbine applied, the output power, head, efficiency characteristics due to the different guide vane and runner vane angle are examined in detail. Moreover, influences of pressure and velocity distributions with the variation of guide vane and runner vane angle on turbine performance are investigated by using a commercial CFD code.

Key words : small hydropower(소수력), performance characteristics(성능특성), tubular-type turbine(튜블러 수차), efficiency(효율), CFD(전산유체역학)

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소수력 발전설비 성능평가 시스템 구축

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Construction of small hydropower facilities performance evaluation system

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Domestic hydroelectric power plants has been manufactured as the design condition by the demand. Hydraulic turbine power plants operating at appointed load shall be operate stable in terms of pressure, discharge, rotational speed and torque. A performance guarantees for hydro turbines shall be contain, as a minimum, guarantees covering power, discharge and specific hydraulic energy, efficiency, maximum momentary overspeed and maximum momentary pressure and maximum steady-state runaway speed, as well as guarantees related to cavitation.

But, present in Korea, the absence of testing laboratories and technical criteria for the performance test of small hydropower degrades the efficiency of the domestic hydropower machines, and makes it difficult to objectively evaluate the performance of hydro turbine.

Therefore We planned making a basis of performance test of small hydropower turbine by using our flowmeter calibration system the largest one in Korea. We planned the maximum measurable power of hydro turbine will be 200 kW in our system.

Key words : small hydropower(소수력 발전), turbine(수차), performance evaluation(성능평가), dynamometer(동력계)

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