عنوان مقاله:

Modification of pump as turbine as a soft pressure reduction systems (SPRS) for utilization in municipal water network

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خلاصه مقاله:

Pressure Reducing Valves (PRV) are being used for decreasing the existing extra pressure in the water distribution network. however, they dissipate a considerable amount of energy. Therefore, the idea of application of Soft Pressure Reducing Systems (SPRS) is proposed, where a PRV is replaced by a hydropower station. The heart of An SPRS is the turbo-generator. One of the advantages of this type of hydropower plants is the opportunity of application of reverse pumps as the turbine. The performance of PATs is very susceptible to the flow amount and geometrical parameters. Therefore, the performance optimization of PATs is essential. In this research study, the performance of a PAT is investigated using computational fluid dynamics and four geometrical modifications are applied in order to improve its performance. The investigated geometrical parameters are volute type and diameter, beveling the impeller blade tip, deviation of the blade inlet angle. Results indicated that the utilization of radial volutes would be suitable when the flow is less than its BEP value most of the time and tangential volutes are suitable for the opposite situation. Decreasing the diameter would increase both the produced power and the efficiency but its influence is more significant for flows less than BEP. moreover, the results indicate that at a forward deviation equal to 5 degrees, the optimum performance of the turbine will be achieved.

کلمات کلیدی:

Pump as Turbine, Geometrical Modification, Hydropower Plant, CFD

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