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Analysis of Influence of Geometrical Set of Nozzles on Aerodynamic Drag Level of a Hero's Based Steam Turbine

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Abstract : High temperature waste energy offers a number of management options. The most common energy recuperation systems, that are actually used to utilize energy from the high temperature sources are steam turbines working in a high pressure and temperature closed cycles. Due to the high costs of production of energy recuperation systems, especially rotary turbine discs equipped with blades, currently used solutions are limited in use with waste energy sources of temperature below 100 °C. This study presents the results of simulating the flow of the water vapor in various configurations of flow ducts in a reaction steam turbine based on Hero's steam turbine. The simulation was performed using a numerical model and the ANSYS Fluent software. Simulation computations were conducted with use of the water vapor as an internal agent powering the turbine, which is fully safe for an environment in case of a device failure. The conclusions resulting from the conducted numerical computations should allow for optimization of the flow ducts geometries, in order to achieve the greatest possible efficiency of the turbine. It is expected that the obtained results should be useful for further works related to the development of the final version of a low drag steam turbine dedicated for low cost energy recuperation systems.

Keywords : energy recuperation, CFD analysis, waste energy, steam turbine
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