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HYDRO DYNAMIC PERFORMANCE OF FRANCIS RUNNER

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ABSTRACT

This Analysis describes a methodology which predicts the performance and behavior of Francis turbine runner in terms of the absolute pressure variation from inlet to outlet of the runner in the meridional view. Hydro turbines are generally tailor-made to suit different site conditions for various sites. A Francis type hydro turbine consists of five components which are volute, stay vanes, guide vanes, runner and draft tube. The performance of the turbine depends on the geometry of the components; as the runner is the main component involved in energy conversion. The flow phenomenon in hydro-turbines is simple incompressible, single phase, turbulent except that the geometry is complex and the flow is three-dimensional. The Runner geometry is more complex than the other parts of the turbine. Hence model test in laboratory is a must. Model manufacturing and testing is quite expensive and time consuming. Therefore, it is necessary to reduce the number of variants of the turbines for laboratory tests. CFD approach may be helpful in improvement of the existing efficiency measuring techniques and evaluation of the performance of hydro turbines. CFD analysis helps in reducing the number of variants with the help of computers having high speed computing ability and CFD software tools, which come under affordable prices.

KEYWORDS: Francis Turbine, Runner, CFD, Hydrodynamic Performance