

CFD-Study on the Replacement of an Old Low-Head Francis Turbine by a Kaplan Turbine

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Abstract

Within the refurbishment process of run-of-river power plants, the replacement of old low-head Francis turbines by Kaplan turbines is able to upgrade the plant performance to a major extent. A significant rise of the efficiency level over a wider operating range makes such projects economically promising. Typical challenges to meet are related to the existing building – e.g. limitations in space for the draft tube and cavitation limitations due to a given setting level.

Encouraged by the success of applying numerical flow simulation (CFD) on refurbishment of existing hydro power plants, CFD is applied for the replacement of a Francis-type turbine by a Kaplan-type turbine (5-bladed runner) in a Hydro Power Plant dating back to the 1920ies.