

SEDIMENT EROSION IN HYDRAULIC TURBINES

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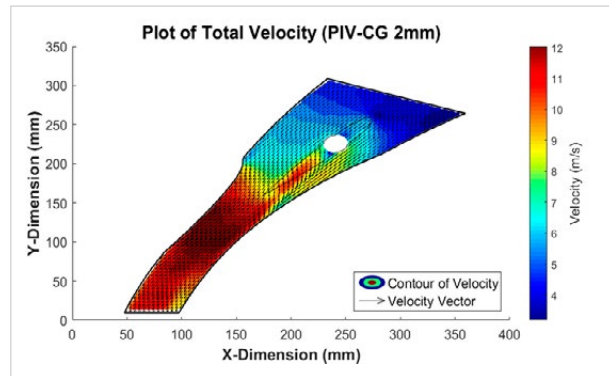


Background

Sediment erosion of turbine components has been a challenge for the hydro power plants under Himalayan and Andes basins. In Francis turbines, sediment erosion also causes increase of clearance between guide vanes and facing plates and cross flow occurs from the increased gap. This cross flow together with other secondary flows disturbs the velocity profile at the runner inlet. Change in velocity profile at the inlet causes additional erosion damage and other undesired effects in turbine runner. Examination of effects of increased cross flow from guide vanes on the flow conditions at the runner inlet will be main aim of this study.

Objectives

- I. Develop a laboratory setup to analyze velocity and pressure distributions in guide vane cascade of a low specific speed Francis turbine.
- II. Investigate characteristics of leakage flow from guide vanes clearance gap in a low specific speed Francis turbine.
- III. Identify effects of the guide vane clearance gap on runner inlet flow conditions in a low specific speed Francis turbine.



Sediment erosion in Francis turbine components.

