

M.Sc THESIS

ANALYSIS OF HYDRAULIC TRANSIENTS IN PENSTOCK
(A case study of Kohala Hydropower Project)



Submitted By

SHERAZ ASLAM
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ABSTRACT

The Kohala Hydropower project is runoff river project, located in District Muzaffarabad of Azad State of Jammu & Kashmir on Jhelum River. The main project components under the proposed scheme include a 52 m concrete gravity dam, a horizontal intake type structure leading to the twin headrace tunnel, through desander chambers. The twin headrace tunnel recombines into single tunnel and connected to surge tunnel, a vertical pressure shaft, pressure tunnel steel penstock and an under ground Powerhouse complex located on east side of Jhelum River valley.

Hydraulic transients are flow and pressure disturbances within closed-conduit systems when the system undergoes a change from one steady-state condition to another. When velocity changes rapidly because a flow control component changes status (for example, a valve closing or pump turning off), the change moves through the system as a pressure wave. If the magnitude of this pressure wave is great enough and adequate transient control measures are not in place, a transient can cause hydraulic components to fail.

The Hydraulic Transient Analysis was carried out for the case study. For this purpose, the relevant data was collected from the drawings and main report of the Kohala Hydropower Project. AFT Impulse software was used for the preparation of case study model to achieve the objectives.

The case study models was run against different scenarios i.e. with surge tunnel, without surge tunnel, load rejection and load acceptance by varying the control transient data. Various graphs were plotted for the modeled cases. The maximum upsurge and minimum downsurge were computed from the plots as 65.3 m and 21.3 m respectively.