

THESIS

**OPTIMUM DESIGN & OPERATIONAL ANALYSIS OF DESILTING
CHAMBERS IN HYDROELECTRIC SCHEME**

(A Case Study of Kohala Hydropower Project)



Submitted By

ENGR. SHOAIB AHMAD
(2006-PG-HPE-03)

**For the Degree of
MASTER OF SCIENCE
IN
HYDROPOWER ENGINEERING**

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING,
University of Engineering and Technology, Lahore-Pakistan

2009

ABSTRACT

Suspended matter in the Jhelum river is high. The main purpose of the desilting chambers is to remove suspended sediment from the water so as to protect the turbines and valves from abrasion by hard suspended matter such as quartz sand. Desilting Chambers are required at hydropower plants to remove sand particles of size $\sim \geq 0.2$ mm, which are damaging to turbine blades. This study deals with the design and operational analysis of underground desilting chambers of Kohala hydroelectric project.

The total annual sediment inflow to the reservoir is 3.84 M ton and life of the Kohala Reservoir without flushing would be just 11 years. So, implementation of hydraulic methods for desiltation of the reservoir is essential. On these bases a desilting basin was designed having four chambers for an inflow discharge of $106.25\text{m}^3/\text{s}$ each. The Particle size of 0.2 mm was selected to be settled down. Final design was selected with specification of total length 420m excluding 55m transition zones and 15.90m wide, settling basin with downward bottom hopper. Each chamber contains three trenches. These trenches are used for flushing of any one of the chamber. One stoplog is envisaged to isolate the downstream end of any chamber. To this end, slots will be provided at the downstream end of each chamber for the installation of stoplog. Overhead traveling cranes will be used to transport the stoplog between chambers. Gates will be installed on each trench for flushing. Flushing of silt from each chamber will be done through electrically operated flushing gate i.e. slide gate will be provided for each chamber. Water and silt flushed from a chamber will be transported back into the Jhelum river.