

THESIS

OPTIMIZATION OF DIVERSION WORK FOR THE
KOHALA HYDROPOWER DAM



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Submitted By

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ABSTRACT

Construction of the hydro-power plant is normally done in the river stream. For creating dry working conditions the river flow is temporarily diverted by construction of a diversion weir or diversion dam across the main river course. The choice of diversion through cofferdam, diversion channel or diversion tunnel depends upon the geological, topographical, hydrological conditions of the area, if these conditions are not favorable for off channel diversion, part of the main stream/river can also be used as a diversion channel for phased construction.

Diversion scheme/arrangement plays vital role in construction schedule planning and overall safety of the hydropower project in rivers where frequent flash floods and perennial flows of sufficient magnitude can occur. Failure of a diversion scheme results in major damages to the project in terms of manpower, machinery, loss of time and increase in project cost.

The main objectives of this research work are to study the possible diversion facilities for the construction of Kohala Hydropower Dam and to recommend the best solution for the diversion facility.

The project area lies in Muzaffarabad district of Azad Jammu Kashmir (AJK). The area of interest for the study lies between Chakothi and about three kilometers downstream of Kohala bridge on the Jhelum river between Longitude $73^{\circ}25'$ to $73^{\circ}50'$ East and Longitude $34^{\circ}00'$ to $34^{\circ}25'$ North.

Different diversion alternatives which may be applied to this project were as: diversion through temporary flume and pipe line, diversion through conduits through

or under the body of dam, diversion through multiple stages, diversion through impounding of flow behind the dam, diversion through temporary channel through the dam and diversion through tunnel through the abutments.

The inflow $4765 \text{ m}^3/\text{s}$ in 100 years return period and $575 \text{ m}^3/\text{s}$ in 30 years return period be selected as the river diversion criteria during the first dry season. By considering the hydrological, topographical and geological conditions of site, provision of diversion tunnel through the abutment with u/s and d/s coffer dams is an optimum solution for the Kohala Hydropower Dam Project. The concrete lined diversion tunnel with 7.5 m diameter on right bank is a better choice. The invert level of the tunnel is at 857 m with bell mouth transition at entrance for smooth entry of flow. The crest levels of U/S and two D/S cofferdams are 869 m, 859.5 m and 856 m respectively are determined.