THESIS

APPROXIMATION OF FLOWS AND POWER POTENTIAL FOR THE DAM SITE

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ABSTRACT

The design of any hydraulic structure ranging from small reservoir to large dams mainly depends on good estimation of flood. There are different approaches available for its estimation e.g. unit hydrograph, past flood marks, flood discharge formulae and flood frequency analysis.

The main objective of this study is to calculate the flow, maximum probable flow and power potential at proposed Kot Fateh Khan Dam site. The proposed dam area is located on the Dotal River (Dotal Kas) in Pindi Gheb tehsil of Attock district. Flow, maximum probable flow and power potential for the proposed dam site were estimated in the present study

Data regarding the catchment area, reservoir area, daily and monthly inflows, topography and geology were acquired for the period of twenty four years (1966-1988). Average watershed slopes, length and catchments areas were considered as the major factors affecting the discharge to calculate the maximum probable flows. Maximum flows at the proposed dam site were estimated by frequency analysis. Other input data including slopes and watershed area were determined using GIS software ARC/INFO.

Maximum flows at Kot Fateh dam were estimated using empirical relationships for preliminary design. A number of factors affect the availability of flows in the natural stream e.g. amount of rainfall, intensity of rainfall, nature of catchments area, soil of catchments area, temperature, humidity, moisture content, vegetation etc. Therefore empirical relationships were adopted due to the availability of limited reliable data.

The construction design flood was computed by carrying out the frequency analysis of the rainfall data of the Pindi Gheb rain-guaging station with 24 years data (1966 to 1989). The results showed that shows that temporal distribution of the precipitation for the study area was bi-modular. The lower peak was observed in February and higher peak in August.

Annual Average flows were calculated by different approaches such as Rainfall-Runoff coefficient, Barlow's percentage and empirical methods. Peak flows were calculated by different approaches such as SCS curve, rational and empirical methods. The comparison of results showed that the SCS curve method gave the highest peak flows at proposed Kot Fateh Khan Dam. On the basis of the results of present study it was recommended that flow measurement gauge should be installed at the proposed dam site for daily recording of the flow depth.