

THESIS

EVALUATION OF STABILITY FOR KOTLI CONCRETE DAM UNDER VARIOUS LOADING CONDITIONS, USING COMPUTER SOFTWARE CADAM



6799

Submitted by

Engr. Waseem Ahmad
(2003-PG-WRE-39)

For the Degree of

MASTER OF PHILOSOPHY

IN

WATER RESOURCES ENGINEERING

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

2006

ABSTRACT

Dams and reservoirs are the integral part of the irrigation system in the modern world, especially for such meteorological region like Pakistan where about 80-85% of annual runoff is generated within three months i.e. from mid of June to mid of the September. Thus the excess water during the wet period can be stored in a reservoir that can be used during low flow periods to meet the potential demands. This fact clearly indicates the importance of storage dams in Pakistan for efficient and economical use of water resources.

Water is one of the most important natural resources for human being, agriculture, power generation and industry. Pakistan lies in arid and semi arid zones. Almost 80% of the annual flow occurs during summer season, and 20% during the winter season. Indus Basin receives less than 15" rainfall during the year with 30% area receiving even less than 10" rainfall over the year. The country's weather and climate is typically tropical during summer and low temperature during winter. There are two sources of precipitation, namely monsoon during summer and western disturbances during winter. The monsoon spreads over June to September and western disturbances affect Pakistan from December to March. These are largely responsible for the flooding of the rivers of northern area of Pakistan.

Stream discharges and flood flows have long been monitored, which can be used by the engineers for the stable design of various hydraulic structures such as dams and flood protection works etc. Assessment of water yield/water availability depends upon the accurate stream flow data at the proposed dam site for a long period of records that are rarely available. If data of adequate time length are not available at dam site,

then the flow data at dam site may be extended by known hydrologic/statistical procedure.

For planning of dam/reservoir on any river needs assessment of quantum of flow of water for successful operation. A truly efficient design will be achieved only if the results of studies incorporate stability analysis and cost of risk. The availability and dependability of flows is crucial for the successful function and economic success of the reservoir project.

An inadequately designed hydraulic structure may come up with regrettable results causing failure of structure due to instability. Therefore, screening of hydrologic data is a pre requisite for successful design and implementation of water resources development schemes.

A gravity dam may fail by sliding along a horizontal plane, by rotation about the toe or by the failure of the material. Gravity dams are so designed, that its own weight resists the all external forces. This type of dam requires little maintenance and is more durable.

The aim of this study is to supply the information about the structural behavior of concrete gravity dam and also to analyze the sliding and overturning response of the dam.