THESIS

FLOOD INUNDATION DUE TO ASSUMED BREACHING OF PROPOSED RAISED MANGLA DAM

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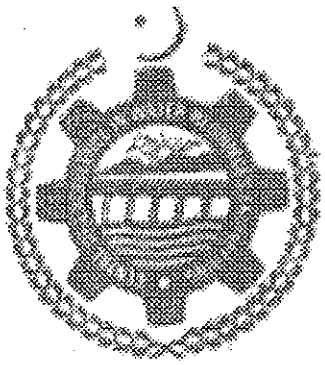

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ABSTRACT

The National Weather Service (NWS) Flood Wave Model Program is used for Dam Break study of a Raised Mangla Dam. Dam break studies of the large dams are very much important for planning disaster prevention and evacuation strategies. Mangla Dam is one of the world's largest earth and rock filled dam, built across the Jhelum River, Pakistan. After exceptionally high flood of 1992, causing about one thousand casualties and an estimated loss of about US$ 2.2 billion, and present day further raising of the Dam necessitates the need of a dam-break analysis for Raised Mangla Dam. No one explored this site before, with raised Dam Scenario.

This study is done mainly to predict the peak discharge and water level at Jhelum Bridge near Jhelum city in case of assumed failure of Raised Mangla Dam. The study is confined to a reach of 65 Km between Mangla Dam and Rasul Barrage. The hydrological data is mainly collected from Punjab Irrigation Department and data about Mangla Dam is obtained from National Engineering Services (Pvt.) Ltd. Pakistan.

The study has been accomplished by using The National Weather Service Flood Wave (NWS FLDWAV) Model. Fully dynamic Saint-Venant equations are used for flood routing. In this case Jhelum River is considered as compound channel for flood routing. The gauging station at Mangla Dam , Jhelum Railway bridge and Rasul Barrage are considered as upstream boundary, calibration point, and downstream boundary, respectively, for calibration of the model. The model calibration is done by using the flood flow data measured during the period of September 1992. The results of calibration

are found to be very satisfactory. For Dam-Break computations four different scenarios of breach triggering and breach shape are considered.

The down stream boundary for dam-break case is taken to be a looped rating curve generated by FLDWAV Model at chainage 60 Km, a few kilometers upstream of Rasul Barrage.

The results show that the shape of breach and mode of triggering of breach has major effect on resulting peak discharge and time of peak. At the Jhelum bridge a maximum water level of 243.43 m above msl with a peak discharge of 279,673 m^3/sec was observed due to trapezoidal dam break case with a compound channel.

The study can be used for developing the evacuation plan for the Jhelum city located down stream of Mangla Dam. This will also help in planning the flood protection schemes in the area.