

**FLOOD STUDY AND FIXATION OF ROAD PROFILE GRADE
LEVEL (PGL) FOR A SECTION OF NATIONAL HIGHWAY N-95
FROM BAHRAIN TO KALAM**



7302

Advisor

DR. SAJID MEHMOOD

Submitted By:

ZAFAR IQBAL
2010-PG-WRE-01

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

2015

ABSTRACT

Flood hazards are the significant threat to the human life as well as their property. Recent example of such destruction is 2010 flash flood. Therefore, river modeling on rivers prone to floods is very important. In this research river modeling was performed on Swat River from Kalam to Madyan using Hydraulic Modeling software (HEC-RAS). HEC-RAS is software that allows the user to perform steady and unsteady flow river hydraulics calculations.

The research focus was on the fixation of road profile grade level (PGL) for the study reach based on inundation extents and water levels. In design flood computation procedure, selection of appropriate design flood is necessary. If a hydraulic structure is under-designed, the floods may cause serious damages to the structures. On the other hand, if in case of over-designed structures, the cost of the project may increase substantially. Floods for different year return periods at Kalam were computed by the flood frequency analysis of flow data recorded. Floods of lateral tributaries of Swat River were computed by HEC-HMS rainfall runoff model with help of available rainfall data at Kalam and catchment characteristics of the study area. Stream flow data and rainfall data of Kalam station was collected from Surface Water Hydrology Project (SWHP) WAPDA and Pakistan Metrological Department (PMD). Steady flow simulations were carried out in HEC-RAS and water surface profiles were computed for different return period floods. Model geometry was extracted from stereo pairs based Digital Elevation Model (DEM) on resolution of 2m calibrated with Ground Control Points (GCPs) collected from the study area with the help of HEC-GeoRAS. The computed water surface profiles were processed in HEC-GeoRAS (an extension of Arc GIS) and inundation extents were marked.

Finally, the inundation extents and water surface profiles were utilized for finalization of safe road profile grade level (PGL) for the study reach.