

THESIS

**SENSITIVITY ANALYSIS OF SEDIMENT TRANSPORT
FUNCTIONS FOR RESERVOIR SEDIMENT SIMULATION**



By

Mazhar Ali
(2003-PG-WRE-38)

For the Degree of

MASTER OF SCIENCE

IN

WATER RESOURCES ENGINEERING

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

2005

ABSTRACT

Numerical modelling has been used as a tool for reservoir sediment simulation. Many numerical models have been developed like RESSASS, Gstar, Fluvial, HEC-6 etc. for reservoir sediment simulation which based on several sediment transport functions. But the main problem of the Engineer is to select a suitable model and sediment transport function as well. The basic idea of the research is to emphasize on selection of the suitable sediment transport function for reservoir sediment simulation in future projects.

Most of the sedimentation studies which were carried out in Pakistan have been used Acker & White sediment transport function for reservoir sediment simulation on the basis of Kalabagh Consultants Studies. Kalabagh Consultants developed a model HEC – 6KC for reservoir sediment simulation of Kalabagh dam and used Acker & White sediment transport function. In current study, sensitivity of the each sediment transport function for the sediment simulation have been checked and its effect on life of the reservoir be also evaluated.

Acker & White, Copeland, Duboys, Maddens and Yangs sediment transport functions have been considered for the sediment simulation of Mangla Reservoir. Three steps have been adopted to check the sensitivity of each sediment transport function.

These steps are:

- Delta Profile Comparison
- Reservoir Capacity Comparison

- Parameter Sensitivity Analysis
 - Stream Bed Particle Size
 - Specific Gravity of Sand Particle
 - Specific Gravity of Fluid

On the basis of the results of current study, Duboys function found very poor because it most of time under estimate the results. Yang's and Copeland functions less sensitive than the Duboy's function but they also overestimate the results. Madden's and Acker & White functions show better results. Madden's function found suitable for the sediment simulation study of the Mangla Reservoir but its sensitivity be checked on the other sites with in or outside the country.