Dam Overtopping risk using probabilistic concepts - Case Study: The Meijaran Dam, Iran.

ABSTRACT

Hydrologic risk assessment and uncertainty analysis by mathematical and statistical methods provide useful information for decision makers. This study presents the application of risk and uncertainty analysis to dam overtopping due to various inflows and wind speeds for the Meijaran Dam in the north of Iran. The procedure includes univariate flood and wind speed frequency analyses, reservoir routing, and integration of wind set-up and run-up to calculate the reservoir water elevation. Afterwards, the probability of overtopping was assessed by applying two uncertainty analysis methods (Monte Carlo simulation and Latin hypercube sampling), and considering the quantile of flood peak discharge, initial depth of water in the reservoir, and spillway discharge coefficient as uncertain variables. The results revealed that rising water level in the reservoir is the most important factor in overtopping risk analysis and that wind speed also has a considerable impact on reservoirs that are placed in windy areas.

Keyword: Dam safety; overtopping prabability; frequency analysis; Monte Carlo simulation; Latin hypercube sampling