

PROBABILISTIC ANALYSIS OF MANGLA
RESERVOIR STORAGE

4970

Thesis by

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ABSTRACT

The purpose of this study is to find out the relation of probability of failure versus annual demand, and to determine appropriate release patterns for the existing Mangla Reservoir capacity. For this, Modified Gould's Probability Matrix Method has been applied to Mangla Reservoir storage. Historical data of 42 years [1941-42 to 1982-83] has been used for this study. Transition Probability Matrices and Monthly Failure Matrices have been prepared. Steady state probabilities have been, then, computed from the transition probability matrices. Thus the probability of the reservoir being in any zone has been computed for each release pattern. Probabilities of failure in any month for a particular zone have been computed from the failure matrices. The sum of the product of the steady state probability values and the conditional probability of failure in any month gives the overall probability of failure of the reservoir for particular release pattern.

By programming the Modified Gould's probability matrix method on the pocket/micro computer (ZAM-3, Appendix A), it was possible to make many trials for various release patterns to find out the relation of probability of failure versus annual releases.

By averaging the monthly probabilities of failure, probability of failure and spilling in each month has also been computed, for various release patterns separately. A simple computer program has also been developed in BASIC language (ZAM - 5, Appendix A) for this purpose.

Results based on this study indicate that, at the present reservoir capacity of Mangla Dam (5.34 MAF), annual release of 20 MAF is much reliable and feasible at a probability of failure of 9%.

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