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Application Reliability Method for the Analysis of the Stability Limit States of Large Concrete Dams

Authors : Mustapha Kamel Mihoubi, Essadik Kerkar, Abdelhamid Hebbouche

Abstract : According to the randomness of most of the factors affecting the stability of a gravity dam, probability theory is generally used to TESTING the risk of failure and there is a confusing logical transition from the state of stability failed state, so the stability failure process is considered as a probable event. The control of risk of product failures is of capital importance for the control from a cross analysis of the gravity of the consequences and effects of the probability of occurrence of identified major accidents and can incur a significant risk to the concrete dam structures. Probabilistic risk analysis models are used to provide a better understanding the reliability and structural failure of the works, including when calculating stability of large structures to a major risk in the event of an accident or breakdown. This work is interested in the study of the probability of failure of concrete dams through the application of the reliability analysis methods including the methods used in engineering. It is in our case of the use of level II methods via the study limit state. Hence, the probability of product failures is estimated by analytical methods of the type FORM (First Order Reliability Method), SORM (Second Order Reliability Method). By way of comparison, a second level III method was used which generates a full analysis of the problem and involving an integration of the probability density function of, random variables are extended to the field of security by using of the method of Mont-Carlo simulations. Taking into account the change in stress following load combinations: normal, exceptional and extreme the acting on the dam, calculation results obtained have provided acceptable failure probability values which largely corroborate the theory, in fact, the probability of failure tends to increase with increasing load intensities thus causing a significant decrease in strength, especially in the presence of combinations of unique and extreme loads. Shear forces then induce a shift threatens the reliability of the structure by intolerable values of the probability of product failures. Especially, in case THE increase of uplift in a hypothetical default of the drainage system.

Keywords : dam, failure, limit state, monte-carlo, reliability, probability, sliding, Taylor
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