

ESTIMATION OF BREAKING RISKS OF ZHINVALI EARTH DAM TAKING INTO CONSIDERATION THE “CAPRA”

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Introduction. The survey object located on the territory of Georgia is a Zhinvali Reservoir. Selected area – Zhinvali Hydraulic Complex is located 35 km from Tbilisi entrance (Avchala district), 49 km from Tbilisi centre (Baratashvili Bridge). The Zhinvali Reservoir, which is fed by four water courses: Tetri (Mtiuleti), Shavi (Gudamaqari), Khevsureti and Pshavi Aragvi rivers, is of the capacity of 520 million m³, while the area of the water surface is 733 million m².

Materials and Methods. The CAPRA method is implemented for the purpose for analysing the Critical Assets and Portfolio Risks for Zhinvali Earth Dam. In general, the CAPRA provides a quantitative approach for all-hazards risk analysis. CAPRA is a five-phase process that identifies hazard scenarios that are relevant to the region or asset of interest, assesses the losses for each of these scenarios given they were to occur, allows for consequence-based screening, assesses the annual rate occurrence for each scenario, and provides results suitable for benefit-cost analysis. CAPRA produces risk assessments that can form the basis for identifying alternative risk mitigation strategies and evaluating them for their cost-effectiveness, affordability, and ability to meet risk reduction objectives. The work breakdown structure as shown for a Zhinvali Earth Dam is a hierarchy that defines the hardware, software, processes, and services of a system.

Results and Discussion. Taking into account the results of theoretical and field studies, as well as considering the Critical Asset and Portfolio Risk Analysis (CAPRA) method, which provides for the quantitative assessment, testing and implementation of all expected risks, we can draw the following general conclusions: The positive and the sensitive aspects of the CAPRA method are reviewed and evaluated. The essence of risks presented in the CAPRA method and the directions of their management are considered taking the main defining parameters of the CAPRA model. The areas for identifying risks and their analysis, measures for risk management and response to them, as well as directions for quality assessment are presented;

Conclusion. A general risk assessment of a Zhinvali Earth Dam was considered taking into account the likelihood of hazardous geological processes and hydrological disasters. The criteria for determining the likelihood of accidental situations and the expected negative consequences in case of breaking the Zhinvali Earth Dam are presented.

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