

Tolerability of Risk For Dams and Levees

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ABSTRACT

Tolerable risk guidelines are used to guide the process of examining and judging the significance of risk that is estimated using risk analysis. The outcomes of risk evaluation step are inputs to the decision process; although they should not prescribe safety decisions. ICOLD Bulletin 130 on "Risk Assessment in Dam Safety Management" states the following: The topic of risk evaluation is not an easy one, especially for a technically-minded person who may be looking for straightforward and purely quantitative approaches. There is little in the literature that provides a coherent exposition of the principles of public safety policy formulation. To grapple with this topic requires that we cross the boundary from the technical world of dam safety engineering into the far more subjective world of values and value judgements. Yet this is the reality. All technological systems, dams included, exist within that broader world and today, in many countries, society expects that it will dictate to the technological community the safety and other goals that should be met by technological systems, rather than the opposite, as has often been the case in the past. Risk assessment provides an opportunity to manage dam safety using a framework of risk evaluation that is common to other types of hazardous facilities. Therefore this paper contains presentation of risk evaluation from a general perspective with comments on its applicability to dam safety. The distinction between tolerable and acceptable risk and the question of who should define them are discussed. The common distinction between individual and societal concerns in tolerable risk evaluation is introduced. Some general principles for individual and societal tolerable risk guidelines are presented, including equity, efficiency and liability. The generalized framework for the tolerability of risk developed by the UK Health and Safety Executive (UKHSE) is summarized. The "as-low-as-reasonably-possible principle" (ALARP), cost effectiveness and uncertainty in risk evaluation are also discussed. The fundamental difference between risk evaluation under common law and Napoleonic legal systems is summarized. Some examples are provided of risk evaluation frameworks for the US Bureau of Reclamation, the Australian National Committee on Large Dams and the UKHSE.

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