US Army Corps of Engineers®
Engineer Research and Development Center

Risk Analysis for Dam Safety

Problem

Almost 65 percent of the dams managed by the U.S. Army Corps of Engineers are over 30 years old, and 28 percent have reached or exceeded their 50-year design life. Many are in need of major repair or rehabilitation to ensure their continued safety for future generations. The potential hazard of a dam failure or faulty operation is of great concern to the responsible agencies, lawmakers, and the public. The Corps is responsible for managing these risks for its dams and protecting the public against the devastation caused by such catastrophes.

Bluestone Lock and Dam, WV

Description

Recognizing the Corps' responsibilities to the Nation as good stewards of public resources, Corps personnel must make decisions to prioritize site-specific dam safety investigations and dam safety improvement investments. The Risk Analysis for Dam Safety Program was initiated to aid in allocating investments to improve the safety of the approximately 569 dams for which the Corps is responsible.

Expected Products

The Risk Analysis for Dam Safety Research Program is providing the methodology and tools necessary to accomplish this goal. In addition to developing site-specific risk analysis methods and procedures, the R&D program is investigating the use of portfolio risk assessment (PRA). In a PRA, all dams in the portfolio are evaluated and ranked in terms of existing risk and the cost effectiveness of risk-reducing investments. The goal is to determine the most efficient allocation of investments in dam safety improvements for a group of dams. Two levels of PRA are being investigated:

- The initial level, the Screening Portfolio Risk Analysis (SPRA), relies on knowledgeable individuals to assess the relative risk of dams in terms of several criteria based on available information. This screening level will be applied to the entire Corps portfolio with systematic updating from supplemental assessments provided during the periodic inspection of the project.
- The second level, the PRA, is more rigorous than the SPRA. It assesses actual risk, while looking at alternative risk investments. More engineering and economic information is required.

Potential Users

All Federal and State agencies responsible for the design, construction, operation, or regulation of water resource projects have recognized the need for making sound investment decisions regarding dam safety. With the increasing demand on available resources, government agencies have searched for a systematic method for prioritizing needed repairs to their dams.

The Screening Toolbox, which includes the database, single-dam analysis spreadsheets, and rollup reports, will be available only to the three Corps national teams who do the screenings and to the reviewers at Headquarters, U.S. Army Corps of Engineers.

Projected Benefits

The development and implementation of risk analysis methods enable the Corps to:

- Prioritize dams requiring initial investigations and subsequent analyses.
- Prioritize funding for critical repairs, rehabilitation, or modifications.
- Select and justify the optimal plan to protect human life, reduce property damage, and mitigate environmental damage.
- Minimize the disruptions of service.
- Maximize effectiveness of infrastructure investments.

Program Manager

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