

ICOLD2026 Guadalajara, Mexico, International Symposium
Theme | Water, Energy, and Society: The Evolving Role of Dams in a Changing World
ABSTRACT TEMPLATE

PAPER TITLE (Capitalize the first letter of all major words)

Standardizing System Response and Consequence Modeling in the Dam Screening Tool

Relevant Topic: (Highlight Selected Topic in Bold font)

- *Water Planning, Water Management, and Climate Resilience*
- *Dam Safety Policy and Governance*
- *Dam Construction and Rehabilitation: Innovation and Lifecycle Extension*
- *Dam Performance Monitoring*
- *Flood Resiliency in Developed and Developing Countries*
- *Sedimentation Management and Reservoir Longevity*
- *Fish Passage, Biodiversity & Environmental Integration*
- *Community Engagement in Dam Development*
- *Tailings Dam Safety*
- *Dam Decommissioning & Removal*

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ABSTRACT: Abstract shall be no more than 300 words and cannot include figures, tables, drawings, references, or equations. Abstracts should provide a brief overview of the paper, highlighting relevance to the selected topic, key findings/conclusions, and significance to the industry. Provide Spanish translation of abstract in the provided space to aid in review and selection.

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ENGLISH VERSION OF ABSTRACT:

The United States Army Corps of Engineers (USACE) has developed the Dam Screening Tool (DST), a modular web-based platform designed to support consistent, screening-level risk assessments for dams where life safety is the primary driver of decision making. The DST integrates three core modules (Hazard, Performance, and Consequences) to estimate risk by combining information on hydrologic and seismic hazards, system performance under load, and potential consequences of both failure and non-failure scenarios. The Consequence module, currently operational, provides advanced consequence modeling through an accessible web interface. Users can develop inundation scenarios to estimate population at risk, simulate warnings and evacuation, and calculate life loss and economic damages. By implementing state-of-the-art methods into a simplified workflow, the DST supports consistent consequence estimates across large portfolios, making it easier to prioritize risk reduction actions and identify needs for more detailed studies. Building on this foundation, USACE is advancing the Performance module to identify potential failure modes and produce a system response for each failure mode. This module will estimate the probability of failure across a range of loading conditions for key failure modes such as overtopping, concentrated leak erosion, and backward erosion piping, while requiring minimal user input. The DST will translate complex performance concepts into practical output through a user-friendly web interface. This paper highlights the current application of the DST for consequence modeling and outlines the methods under development for the system response probability. These advancements demonstrate USACE's commitment to advancing risk assessments practices, ultimately supporting better informed dam safety decisions worldwide.

SPANISH TRANSLATION OF ABSTRACT:

El Cuerpo de Ingenieros del Ejército de los Estados Unidos (USACE) ha desarrollado la Herramienta de Cribado de Presas (DST), una plataforma web modular diseñada para realizar evaluaciones de riesgo consistentes en presas donde la seguridad humana es el principal factor determinante en la toma de decisiones. La DST integra tres módulos principales (Riesgo, Rendimiento y Consecuencias) para estimar el riesgo combinando información sobre eventos hidrológicos y sísmicos, el rendimiento del sistema bajo carga y las posibles consecuencias de escenarios de falla y no falla. El módulo de Consecuencias, actualmente operativo, proporciona modelado avanzado de consecuencias a través de una interfaz web accesible. Los usuarios pueden desarrollar escenarios de inundación para estimar la población en riesgo, simular alertas y evacuaciones, y calcular las pérdidas de vidas y los daños económicos. Al implementar métodos de vanguardia en un flujo de trabajo simplificado, la DST permite estimaciones consistentes de consecuencias en grandes portafolios de proyectos, lo que facilita la priorización de las acciones de reducción de riesgos y la identificación de la necesidad de estudios más detallados. Sobre esta base, el USACE está desarrollando el módulo de rendimiento para identificar posibles modos de falla y generar una respuesta del sistema para cada uno. Este módulo estimará la probabilidad de falla en diversas condiciones de carga para modos de falla clave, como el rebosamiento, la erosión por flujo concentrado y la erosión retrógrada, con una mínima intervención del usuario. El DST traducirá conceptos complejos de rendimiento en resultados prácticos mediante una interfaz web intuitiva. Este documento destaca la aplicación actual del DST para el modelado de consecuencias y describe los métodos en desarrollo para la probabilidad de respuesta del sistema. Estos avances demuestran el compromiso del Cuerpo de Ingenieros del Ejército de Estados Unidos (USACE) con el desarrollo de prácticas de evaluación de riesgos, lo que en última instancia contribuye a la toma de decisiones mejor informadas sobre seguridad de presas en todo el mundo.