

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

PAPER TITLE

Digital Transformation of State Dams in Spain: From BIM Methodology to an Integrated Safety Management Platform

Relevant Topic:

- *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.

PUBLISHED PAPER

or

PRESENTATION ONLY

(Both options are highlighted, as we intend to publish the paper and give an oral presentation at the conference)

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ENGLISH VERSION OF ABSTRACT:

In recent years, the General Directorate for Water (DGA) of Spain has promoted a digital transformation process for state-owned dams, aimed at improving their management, operation, and safety through the Building Information Modeling (BIM) methodology and the development of associated technological tools. This process is structured around two successive and complementary contracts.

The first contract, “Development, coordination, implementation and training of the BIM methodology in state-owned dams”, laid the foundations for the digitalization of dams under state ownership. Its main objectives were the creation of BIM models of the dams, the structured organization of existing technical information, and the training of staff from the different River Basin Authorities. As a result, digital models were developed integrating geometric, structural, and operational information, standardized and aligned with interoperability and data traceability requirements.

The second contract, “Implementation of an integrated platform for the management of the safety of state-owned dams facilitating the use of BIM technology”, represents the operational continuation of this transformation. Its objective is to deploy a unified web platform that integrates the developed BIM models and all safety-related information — monitoring, maintenance, emergency plans, technical archives, among others — enabling centralized and homogeneous management of hydraulic assets.

The complementarity of both contracts consolidates a comprehensive digital infrastructure supporting the safety and sustainability of Spain’s state-owned dams. This approach standardizes criteria, improves traceability, and facilitates continuous data updating. Furthermore, it enhances analytical and decision-making capacity, optimizes maintenance and operation processes, and enables progress towards more efficient, proactive, and information-driven management of hydraulic infrastructures.

SPANISH TRANSLATION OF ABSTRACT:

En los últimos años, la Dirección General del Agua (DGA) de España ha impulsado un proceso de transformación digital de las presas estatales, orientado a mejorar su gestión, explotación y seguridad mediante la metodología Building Information Modeling (BIM) y el desarrollo de herramientas tecnológicas asociadas. Este proceso se estructura en torno a dos contratos sucesivos y complementarios.

El primer contrato, “Desarrollo, coordinación, implementación y formación de la metodología BIM en las presas estatales”, estableció las bases para la digitalización de las presas de titularidad estatal. Sus principales objetivos fueron la generación de modelos BIM de las presas, la organización estructurada de la información técnica existente y la capacitación del personal de las distintas Confederaciones Hidrográficas. Como resultado, se desarrollaron modelos digitales que integran información geométrica, estructural y de explotación, normalizados y alineados con los requisitos de interoperabilidad y trazabilidad de datos.

El segundo contrato, “Implantación de una plataforma integral de gestión de la seguridad de las presas estatales que facilite el uso de la tecnología BIM”, representa la continuidad operativa de esta transformación. Su objetivo es poner en marcha una plataforma web unificada que integre los modelos BIM desarrollados y toda la información relacionada con la seguridad de las presas — auscultación, mantenimiento, planes de emergencia, archivo técnico, entre otros—, permitiendo una gestión centralizada y homogénea de los activos hidráulicos.

La complementariedad de ambos contratos consolida una infraestructura digital integral al servicio de la seguridad y sostenibilidad de las presas estatales de España. Este enfoque unifica criterios, mejora la trazabilidad y facilita la actualización continua de los datos. Además, refuerza la capacidad de análisis y decisión, optimiza los procesos de mantenimiento y explotación y permite avanzar hacia una gestión más eficiente, proactiva y basada en la información de las infraestructuras hidráulicas.