



**PROCEEDINGS OF THE 11TH WORLD  
CONGRESS  
ON CIVIL, STRUCTURAL, AND  
ENVIRONMENTAL ENGINEERING (CSEE 2026)**

**APRIL 16 - 18, 2026 | PARIS, FRANCE**

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# WELCOME MESSAGE FROM THE CONFERENCE CHAIR

**On behalf of the International Academy of Science, Engineering and Technology (International ASET Inc.), the organizing committee would like to welcome you to the 11<sup>th</sup> World Congress on Civil, Structural, and Environmental Engineering (CSEE 2026).**

CSEE is aimed to become one of the leading international annual congresses in the fields of civil, structural, and environmental engineering. This congress will provide excellent opportunities to scientists, researchers, industrial experts, and university students to present their research achievements and to develop new collaborations and partnerships with experts in the field.

At the eleventh edition of this Congress, seven plenary speakers and three keynote speakers will present their expertise across a broad range of fields and applications. In addition, approximately 118 papers will be delivered by professors, students, and researchers from around the world.

We thank you for your participation and contribution to the 11<sup>th</sup> World Congress on Civil, Structural, and Environmental Engineering (CSEE 2026). We wish you a very successful and enjoyable experience.

**Dr. Hany El Naggar**  
*Congress Chair and Proceedings Editor*  
*Dalhousie University, Canada*  
*CSEE 2026*

**Dr. Chunjiang An**  
*Congress Chair*  
*Concordia University, Canada*  
*CSEE 2026*

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# ABOUT CSEE'26

**CSEE is aimed to become one of the leading international annual congresses in the fields of civil, structural, and environmental engineering.** This congress will provide excellent opportunities to the scientists, researchers, industrial engineers, and university students to present their research achievements and to develop new collaborations and partnerships with experts in the field.

There are 3 conferences included in the CSEE Congress:

**ICGRE'26** - 11<sup>th</sup> International Conference on Geotechnical Research and Engineering

**ICSECT'26** - 11<sup>th</sup> International conference on Structural Engineering and Concrete Technology

**ICEPTP'26** - 11<sup>th</sup> International Conference on Environmental Pollution, Treatment and Protection

While each conference consists of an individual and separate theme, the 3 conferences share considerable overlap, which prompted the organization of this congress. The goal of this undertaking is to bring together experts in each of the specialized fields, and at the same time allow for cross pollinations and sharing of ideas from the other closely related research areas.

- **CSEE** is an acronym for **C**ivil, **S**tructural, and **E**nvironmental Engineering.
- The proceedings is published in Ottawa, Canada.
- All papers were peer-reviewed
- The congress proceedings is published under an ISSN and ISBN number
- Each paper is assigned a unique DOI number by [Crossref](#)
- The conference proceedings is indexed by [Scopus](#) and [Google Scholar](#)
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**We would like to thank the following for accepting to act as a member of the Scientific Committee for the CSEE'26 Congress:**

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- **Dr. Keisuke Watanabe**, Tokai University, Japan
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# Portfolio-Scale Screening of Conditional Life-Loss Consequences from Tailings-Dam Failure Using Open Global Data

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## Extended Abstract

Tailings storage facilities (TSFs) continue to expand globally, and documented failures have produced catastrophic downstream consequences [1], [3], [4]. This motivates portfolio-scale consequence screening methods that are transparent, reproducible, and fast enough to apply across many sites where detailed breach hydraulics and evacuation modelling are not feasible as a first pass [2]. This study presents a screening-level framework to estimate conditional Potential Loss of Life (PLL; expected fatalities given failure) using open global datasets and a standardized scenario-set logic implemented in Google Earth Engine (GEE).

The workflow integrates (1) DEM-derived dam geometry, (2) a regression-based release proxy, (3) simplified downstream routing, and (4) population-based loss estimation. For each site, dam height and stored tailings volume are estimated using DEM cut-and-fill on Copernicus DEM GLO-30, and a cap-aware release set is generated via an external Excel regression model [3], [4]. Routing follows an analyst-traced centerline guided by MERIT Hydro drainage structure. Released volume is mapped to a longitudinal thickness field that decays exponentially with distance and is trimmed at a minimum threshold. Exposure is evaluated on the native WorldPop 100 m grid by reprojecting depth to the population grid prior to any counts (population is not resampled), applying a depth-fatality step relationship per cell, and summing expected fatalities across the corridor [5], [6].

We demonstrate the approach for a 17-site TSF portfolio using a deterministic scenario set of 144 runs per site, formed by the cross-product of four release fractions and corridor-parameter grids (decay length, minimum thickness, and half-width), with equal weights as a screening assumption. Site-level outcomes are summarized using exceedance-probability behaviour and upper-tail metrics (VaR95 and ES95). Across the portfolio, upper-tail PLL varies by multiple orders of magnitude, yielding clear separation into a small high-consequence subset, an intermediate group, and a majority low-consequence group. Scenario distributions differ substantially in shape. Several sites show a concentrated bulk with a pronounced long tail, where typical scenarios produce negligible losses but a small fraction of combinations generate severe outcomes. Cross-site comparisons indicate that tail severity is more strongly associated with downstream exposed population than with stored-volume proxies, consistent with exposure dominating conditional life-loss magnitude under a common routing parameterization. The workflow outputs site-ranked consequence metrics and EP-style summaries suitable for rapid prioritization and targeting of detailed site investigations.

The framework is intended to support standardized ranking and prioritization for follow-up studies, while detailed breach hydraulics and evacuation analyses remain necessary for site-specific assessment. Results should be interpreted within screening assumptions (regression-based releases, corridor routing, transferable depth-fatality mapping, population uncertainty, and equal scenario weights), and they represent conditional consequences given failure, not annualized risk.

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