iPresas
Risk Analysis

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Adrián Morales Torres holds a degree as **Civil Engineer**, a **MSc in Hydraulic Engineering and Environment** and a **PhD in Civil Engineering** from the Polytechnic University of Valencia (UPV, Spain) . He currently has more than 10 years of experience in the field of **dam safety management**, working on the application of a **risk analysis methodology** for dam safety management for **more than 80 national and international dams**, among which we can mention the large dams of the Drini river in Albania, Cerros Colorados system in Argentina, Salto Grande dam in Uruguay-Argentina, the large hydropower dams of Porce, Salvajina, Hidroprado and Sogamoso in Colombia, or the Chira-Soria system in Gran Canaria (Spain), among others. Over these years, he has carried out inspections of **more than 170 dams** worldwide.

Since 2021, he is the technical leader of the project for the implementation of **risk governance and climate change adaptation of state-owned dams** in Spain for the General Water Directorate of the Ministry for Ecological Transition and Demographic Challenge (MITERD). Moreover, he is also coordinating the implementation of this methodology for Tenaga Nasional Berhard (TNB) hydroelectrical dams in Malaysia.

Since 2023, he facilitates practical cases and promotes implementation of risk procedures for the mining industry in compliance with the Global Industry Standard on Tailings Management.

As a researcher and consultant, he is author or co-author of more than **80 publications**, including indexed journals papers, books, chapters, conference papers, and guidelines for dam safety and sustainable water management. He has also taught **multiple courses** on Risk Analysis applied to civil infrastructures for institutions such as the Inter-American Development Bank (IDB) and the Spanish Committee for Large Dams (SPANCOLD).

In addition, he is responsible for **software development at iPresas**, and he has worked on developing other Decision Support Tools for water infrastructures. He is a member of SPANCOLD and **Spanish representative in the ICOLD T-Committee** on New Challenges for Dams in the 21st century.

MAIN PROJECTS

- Semi-quantitative risk analysis of 3 tailing dams (Tanzania)
  Barrick Gold
- Qualitative risk analysis of the Reventazon Hydroelectric Dam (Costa Rica)
  Inter-American Development Bank (IDB)and Instituto Costarricense de Electricidad (ICE)
- Semi-quantitative risk analysis of 2 tailing dams (Chile)
  Barrick Gold
- Numerical modelling of time dependent behaviour of El Atazar Dam (Spain)
  Canal de Isabel II
- Re-evaluation of the flood study for the installation of a photovoltaic solar plant in Biar (Alicante)
  Hive Energy Ltd (Beneixama)

2023

- Consulting Service for Basin wide Reference Dam Safety Regulatory Framework and implementation Strategy to Support Member States to develop own National Framework
  Eastern Nile Technical Regional Office (ENTRO)
- Risk-informed Dam Safety Governance, Climate Change adaptation and investment prioritisation of Spanish state-owned dams, DGA (Spain)
  Dirección General del Agua (DGA)
- Development of a Methodological Guide for Failure Mode Identification Workshops
  Inter-American Development Bank (IDB)

Risk analysis of the 55 dams of the Guadalquivir River Basin Authority (Spain)
Confederación del Guadalquivir

Risk analysis of the Alcalá and Puente Porto dams (Spain)
Grupo ENEL - Endesa

Development of a Screening Tool for assessing disaster and climate change risks in dams
Inter-American Development Bank (IDB)

Intermediate safety review of San Francisco and Cameguadua dams (Colombia)
CHEC (Central Hidroeléctrica de Caldas) - EPM (Empresas Públicas de Medellín)

Development of a risk management platform for TNB dams (Malaysia)
Tenaga Nasional Berhad (TNB) in a contract to Universiti Tenaga Nasional (UNITEN)

Comprehensive safety review and quantitative risk analysis of Playas dam (Colombia)
Empresas Públicas de Medellín (EPM)

Qualitative risk analysis of 5 MiRiego dams (Bolivia)
Inter-American Development Bank (IDB)

Update of Porce II and Porce III hydrological-hydraulic studies (Colombia)
EPM (Empresas Públicas de Medellín)

Potential risk classification of Soria and Lumbreras dams (Spain)
Consejo Insular de Aguas de Gran Canarias

Study of the hydraulic capacity of the Playas, Riogrande II and Quebradona spillways using CFD models (Colombia).
EPM (Empresas Públicas de Medellín)

Safety Review of Pedrezuela, La Aceña and Manzanares Dams (Spain)
Canal de Isabel II

Qualitative risk analysis of Khotia Khota and Taypichaca dams (Bolivia)
Inter-American Development Bank (IDB)

Guidelines for Dam Monitoring of Corani dam (Bolivia)
ENDE Corani

2022

Hydrological and hydraulic assessment of the spillway of Ríogrande II and Playas dams (Colombia)
Empresas Públicas de Medellín (EPM)

Dam Safety Review of Calima dam (Colombia)
Celsia

Dam Safety Review of La Fe dam and update of flood maps (Colombia)
Empresas Públicas de Medellín (EPM)

Qualitative Disaster and Climate Change Risk Analysis for roads (Peru)
Inter-American Development Bank (IDB)

Risk-informed Dam Safety Program (Malaysia)
Tenaga Nasional Berhad (TNB) in a contract to Universiti Tenaga Nasional (UNITEN)

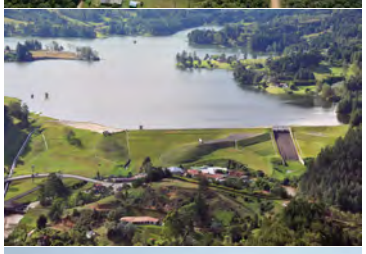
Update of the Operation Rules of Salvajina dam (Colombia)
Celsia

Defining Flood Control and Mitigation Works in the Sula Valley (Honduras)
Inter-American Development Bank (IDB)

Numerical Modelling of Béznar and Rules dams (Spain)
Agencia Andaluza del Agua (in a contract to SANDO y HCC)





Qualitative Disaster and Climate Change Risk Analysis of a bridge (Argentina)
Inter-American Development Bank (IDB)

Study to enhance the resilience of the energy system in The Bahamas after Hurrican Dorian
Inter-American Development Bank (IDB)

2021

Numerical modelling of six dams of the Insular Water Council of Gran Canaria
Insular Water Council of Gran Canaria (Spain)

Review and definition of flood control works at Ulua and Chamelecón rivers (Honduras) after Hurrican IOTA
Inter-American Development Bank (IDB)

Comprehensive safety review and Risk Analysis of dams of Salvajina, Alto Anchicayá and Prado (Colombia)
Celsia Colombia

Technical report on recommendations to integrate Disaster Risk Management and Climate Change Adaptation into the Public Investment
Inter-American Development Bank (IDB)

Intermediate safety review of dams of Quebradona and El Buey (Colombia)
EPM (Medellin Public Company)

Risk analysis of Rio Hondo, Escaba and Batiruana Dams (Argentina)
Dam Safety Regulatory Agency of Argentina (ORSEP)

Review and update of the designs for flood control at Walter Thilo Deininger park (El Salvador)
Inter-American Development Bank (IDB)

Technical inspection and development of risk-based screening tool for dams in Bolivia
Inter-American Development Bank (IDB)

2020

Intermediate safety review of dams of Porce II, Porce III, Santa Rita and Playas (Colombia)
EPM (Medellin Public Company)

Analysis of risk reduction measures for Valencian ports against climate change
AVI (Valencian Agency for Innovation) in collaboration with UPV

Support to develop a dam safety program for EPSAS (Bolivia)
EPSAS (urban water supply company for La Paz)

Technical support to implement risk analysis in Salto Grande dam (Uruguay – Argentina)
Inter-American Development Bank (IDB) in collaboration with ORSEP and CHSG

Dam break analysis and monitoring system review for Mtkvari HPP (Georgia)
Mtkvari HPP

2019

Comprehensive safety review of hydropower dams of ISAGEN (Colombia)
ISAGEN

Risk-informed quality control of flood protection measures under the programme "Argentina: resilient to natural risks"
Inter-American Development Bank (IDB)

Failure modes identification and risk analysis of road RN5 (Haiti) considering climate change
Inter-American Development Bank (IDB)

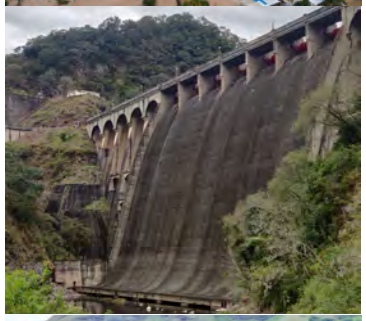
Development on Guidelines for Assessing and Managing Risks Associated with Dams
EGIS EAU (under a contract for CWC, Ministry of Water Resources of India)

2018

Consultancy for the review and strengthening of the methodology of disaster risk analysis and climate change in IDB projects
Inter-American Development Bank (IDB)

Risk-informed dam safety management of Pretura del Molino, Carrascalejo and las Majadillas dams
Regional Government of Extremadura (Spain)






Technical assistance for numerical modelling of Chira and Soria dams
Insular Water Council of Gran Canaria (Spain)

Project DAMSAFE: Enhancing Dam Safety and Water Management in Karnataka (India)
Funded by Netherlands Enterprise Agency (project leaded by Deltares)

Support to dam safety and risk management in Brazil. Development of a tool to prioritize risk reduction actions in 163 dams. Dam technical inspection of 31 dams
Gas Natural Fenosa (under a contract for the Brazilian Ministry of National Integration)

Technical assistance to introduce risk analysis techniques as a tool to support dam safety management in Argentina. Risk Analysis of Cerros Colorados dams system
Dam Safety Regulatory Agency of Argentina (ORSEP)

2017

Risk analysis of San Marcos dam
Regional Government of Extremadura (Spain)

Quality control from a risk analysis perspective of the flood risk control measures at the Choluteca river in Tegucigalpa (Honduras)
Inter-American Development Bank (IDB)

Pilot project to define procedures for quantitative estimation of spillway gate functionality and evaluate its impact on dam safety risk management
Gas Natural Fenosa (Spain)

Analysis of potential failure of Paso Severino dam (owned by OSE). "Water for Uruguay" Programme. Pillar 3: Regulatory framework for Dam Safety in Uruguay
World Bank

2016

Risk analysis of Jaime Ozores dam
Regional Government of Extremadura (Spain)

Risk analysis consultancy services for the portfolio of dams owned by Grupo Gas Natural Fenosa
Gas Natural Fenosa (Spain)

Risk analysis study for supporting safety management in "El Vado" dam
Canal de Isabel II (Spain)

2015

Risk analysis of Membrío dam
Regional Government of Extremadura (Spain)

Risk analysis for Fierze, Komani and Vau I Dejes dams (Albania), including quantitative risk modelling and prioritization of risk reduction actions
Gas Natural Fenosa (under a contract for KESH, Albanian Power Corporation)

2014

Risk analysis of "El Horcajo" dam
Regional Government of Extremadura (Spain)

E^2STORMED project: Improvement of energy efficiency in the water cycle by the use of innovative storm water management in smart Mediterranean cities (www.e2stormed.eu)
MED Programme European Union

2013

IPRESARA project: Incorporating manmade threats into dam safety risk management
Spanish Ministry of Science and Innovation (MICINN)

2012

Risk analysis of a portfolio of 27 dams owned by the Duero River Authority in Spain, including evaluation and prioritization of investments for risk reduction
Ofiteco (a contract for the Duero River Authority in Spain)

2011

Comprehensive and quantitative risk analysis model for St. Ponç dam, including evaluation and prioritization of safety measures
Agencia Catalana del Agua (Catalan Water Agency, Spain)

SUFRI project: Sustainable strategies for Urban Flood RIsk management to cope with the residual risk
CRUE ERA-Net

2010

Comprehensive and quantitative risk analysis model for a dam owned by Iberdrola, including evaluation and prioritization of safety measures
Iberdrola

Water resources survey for irrigation development in Ouissiga (Burkina Faso)
ASFES

2009



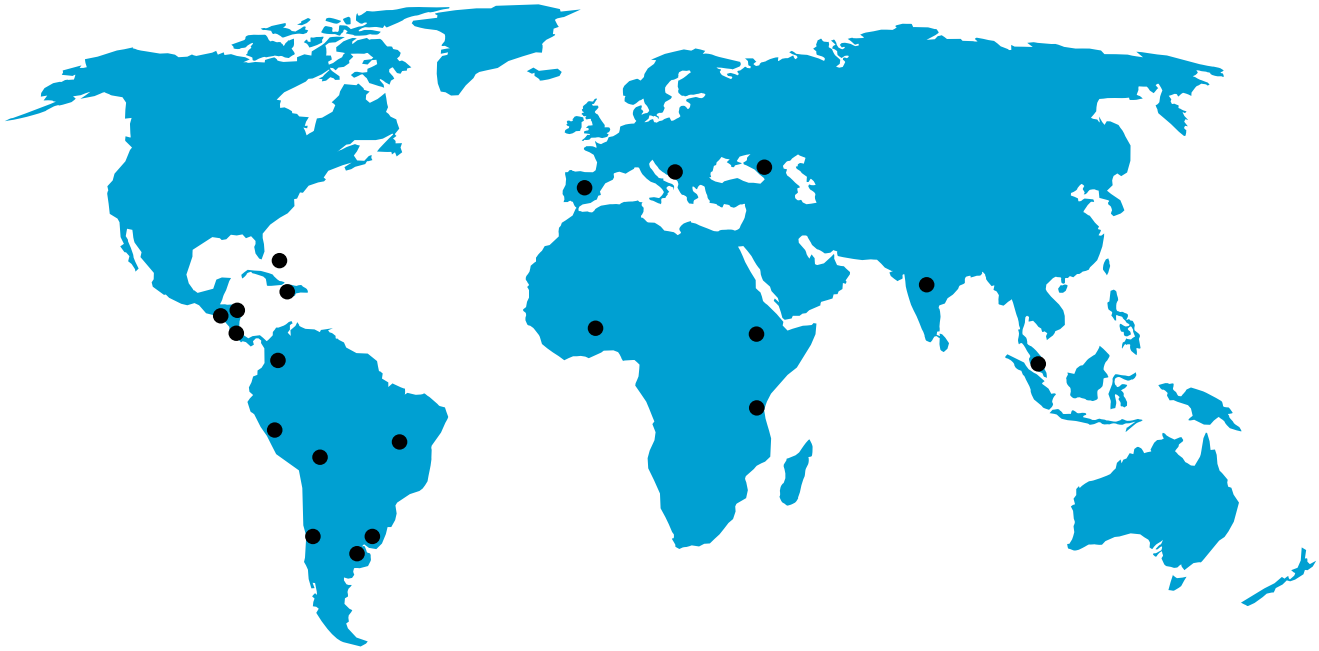






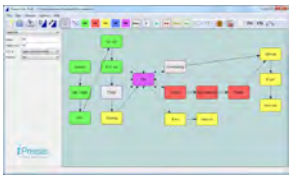
INTERNATIONAL EXPERIENCE

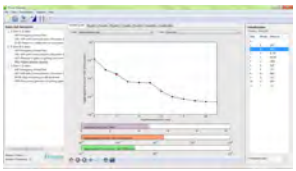
Adrián has experience worldwide having lead projects in **more than 15 countries**.



PROFESSIONAL SKILLS

- Risk analysis ●●●●●
- Dam safety ●●●●●
- Software development ●●●●○
- Urban flood risk analysis ●●●●○
- Hydraulic modelling ●●●●○





SELECTED PUBLICATIONS

- Fluixá-Sanmartín, J., Escuder-Bueno, I., Morales-Torres, A. and Castillo-Rodríguez, J.T. Comprehensive decision-making approach for managing time dependent dam risks. Reliability Engineering and System Safety 203 (November). Elsevier. 2020. https://www.sciencedirect.com/science/article/pii/S0951832020306013

- Guidelines for assessing and managing risks associated with dams. Central Water Commission. Ministry of Water Resources, Government of India. 2019.

- Morales-Torres, A., Escuder-Bueno, I., Serrano-Lombillo, A. and Castillo-Rodríguez, J.T. Dealing with Epistemic Uncertainty in Risk-Informed Decision Making for Dam Safety Management. Reliability Engineering and System Safety 191 (November). Elsevier. 2019. https://doi.org/10.1016/j.ress.2019.106562.

- Fluixá-Sanmartín, J., Morales-Torres, A., Escuder-Bueno, I. and Paredes-Arquiola, J. Quantification of Climate Change Impact on Dam Failure Risk under Hydrological Scenarios: A Case Study from a Spanish Dam. Natural Hazards and Earth System Sciences 19 (10): 2117–39. 2019. https://doi.org/10.5194/nhess-19-2117-2019.

- Fluixá-Sanmartín, J., Altarejos-García, L., Morales-Torres, A., Escuder-Bueno, I. "Climate Change Impacts on Dam Safety." Natural Hazards and Earth System Sciences 18:2471–88. 2018.

- J. Fluixá-Sanmartín, I. Escuder-Bueno, A. Morales-Torres, and J.T. Castillo-Rodríguez, Accounting for Climate Change Uncertainty in Long-Term Dam Risk Management. Journal of Water Resources Planning and Management, 147(4), 04021012. 2021.

- Castillo-Rodríguez, J.T., Needham, J.T., Morales-Torres, A., and Escuder-Bueno, I.: A combined risk analysis approach for complex dam–levee systems, Structure and Infrastructure Engineering, 2017. DOI: 10.1080/15732479.2017.1314514.

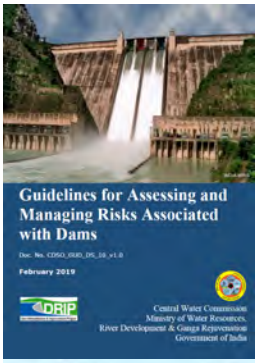
- Computational Aspects of Dam Risk Analysis: Findings and Challenges. Escuder-Bueno, I., Mazzà, G., Morales-Torres, A., & Castillo-Rodríguez, J. T. Engineering 2 (3), 319–324. 2016.

- A new risk reduction indicator for dam safety management combining efficiency and equity principles. Serrano-Lombillo, A., Morales-Torres, A., Escuder-Bueno, I., & Altarejos-García, L. Structure and Infrastructure Engineering. 2016.

- The suitability of risk reduction indicators to inform dam safety management. Morales-Torres, A., Serrano-Lombillo, A., Escuder-Bueno, I., & Altarejos-García, L. Structure and Infrastructure Engineering, 12(11), 1465–1476. 2016.

- Building fragility curves of sliding failure of concrete gravity dams integrating natural and epistemic uncertainties. Morales-Torres, A., Escuder-Bueno, I., Altarejos-García, L., & Serrano-Lombillo, A. Engineering Structures, 125(2016), 227-235. 2016.

- Advances on the Failure Analysis of the Dam—Foundation Interface of Concrete Dams. Altarejos-García, L., Escuder-Bueno, I., & Morales-Torres, A. Materials, 8(12), 8255–8278. 2015.



COURSES

- Main tutor of the course: Disaster Risk Analysis and Climate Change in infrastructure projects, both in the 5 SPOC (Private Online Course) and the MOOC (Open Online Course) editions. Organised by the Inter-American Development Bank (IDB). 2020.

- Course on Risk Analysis applied to Dam Safety Management for EPM (Empresas Públicas de Medellín) in Colombia. 2018.

- 5 editions of the Course on Risk Analysis applied to Dam Safety Management - Basic and Advance Level, conducted in English and Spanish, organized by the Spanish National Committee on Large Dams (SPANCOLD). 2013-2016.

- 3 editions of the Course on Urban stormwater management using Sustainable Drainage Systems, organized by the Polytechnic University of Valencia. 2015-2016.

OTHER MERITS AND ACTIVITIES

- Spanish member of ICOLD Committee T: Prospective and new challenges for dams and reservoirs in the 21st Century since 2018.
- Member of the Spanish National Committee on Large Dams (SPANCOLD) in the dam safety commitee since 2017. Coordinator of the working group about risk analysis applied to dam safety.
- 2017 Prize to the most outstanding Professional Civil Engineer under 35 years old, awarded by the Professional Association of Civil Engineers (Valencian Region).
- Pioneer in the Pioneers into Practice 2015 programme within the European Climate KIC Community.
- Problem formulator of Theme B: "Probability of failure of an embankment dam due to slope instability and overtopping" during the 13th ICOLD International Benchmark Workshop on Numerical Analysis of Dams. Lausanne. 2015.
- 2nd award "Valencia IDEA 2014" organized by the Valencia City Council, under the Energy and Environment category (in collaboration with Prof. Ignacio Escuder Bueno in the framework of the E2STORMED project).
- 2010 Prize to the most outstanding graduate in Civil Engineering, awarded by the Professional Association of Civil Engineers (Valencian Region).