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Fifth Charles C. Ladd Memorial Lecture



Liquefaction Failure of Tailings Dams

Antonio Gens, PhD, FEng

Professor of Geotechnical Engineering

Universidad Politècnica de Catalunya - BarcelonaTech

Thursday, May 2, 2024

Registration and Social: 5:00 PM at Tufts Alumnae Lounge, 40 Talbot Ave, Medford, MA 02155

Presentation: 6:30 PM at Cohen Auditorium

The occurrence of a number of catastrophic failures of tailings dams involving liquefaction has led to a closer examination of the behavior of this type of geostructures and of the phenomena underlying the collapses. After a brief account of historical failures, the lecture reviews the current understanding of flow liquefaction, based on concepts of critical state and state parameter. The issues involved in the liquefaction failure of tailings dams are explored with reference to a detailed investigation of the collapse of Brumadinho Dam in Brazil, a catastrophic event that caused 270 fatalities and massive environmental damage. A detailed forensic investigation is described that includes the review of pre-failure information, an extensive site investigation, laboratory testing and advanced numerical analysis. The study of the events leading to the dam failure helps to elucidate the underlying reasons for the vulnerability of the dam to liquefaction. Also, a range of potential triggering events are examined to try to identify the most likely one. With the perspective provided by this case history, a number of lessons are derived applicable to legacy and operating tailings dams.

Speaker

Dr. Antonio Gens is a professor at the Technical University of Catalonia in Barcelona. He is a civil engineer graduate of the Technical University of Madrid and received M.Sc. and Ph.D. degrees from Imperial College, London. He has been involved in geotechnical research, consulting and education for over 40 years. He has made significant contributions in a number of areas including soil behavior, constitutive and numerical modelling, in-situ characterization of soils, water and tailings dams, deep excavations, tunnelling and nuclear waste disposal. He has provided advice in a wide range of national and international geotechnical projects and landmark forensic investigations. He was ISSMGE Vice-President for Europe in the period 2013-2017 and he is the current president of the Spanish Society for SMGE. He is a Fellow of the UK Royal Academy of Engineering and holds Doctorates Honoris Causa by the University of Grenoble and by the Technical University of Bucharest. He has received numerous awards such as the UK ICE's Telford Medal (twice) and the George Stephenson Medal (twice) and the R.M. Quigley Award by the Canadian Geotechnical Society. He was awarded the Kevin Nash Gold Medal from the ISSMGE and he has been named Laureate Engineer by the Royal Academy of Engineering of Spain. He was the 2007 Rankine Lecturer and, in 2022, he delivered the 10th Terzaghi Oration at the International Conference of SMGE.

Registration Deadline: Thursday, April 25, 2024

Free to Members, Students, and Non-Members

Register to attend this lecture in-person [here](#), or [click here](#) to register to participate via Zoom. For questions regarding this event, contact Lucy Jen at Lucy.Jen@Tufts.edu or 617-642-0502.