



Seismic Response in Tunnels

Dr. Antonio Bobet
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WEDNESDAY, April 9th at NOON in BB 125
- lunch provided -

There is enough field evidence to conclude that underground structures are vulnerable to seismic deformations, and thus they must be designed to accommodate the ground motions imposed by the earthquake. If the structure is far from the epicenter of the earthquake, a static analysis may be sufficient to approximate the dynamic response of the structure. The free-field method may produce erroneous results because it does not consider soil-structure interaction. A structure that is stiffer than the soil it replaces will have smaller deformations than those predicted by the free-field method, while a softer structure will have larger deformations. Any seismic analysis must include ground-structure interaction and the design should incorporate sufficient ductility in the structure to accommodate the deformations imposed by the earthquake. Simple solutions are provided to estimate seismically-induced deformations on deep underground structures with circular or rectangular cross sections assuming a drained response. Differences between drained and undrained analyses are discussed.



Dr. Bobet is a Professor of Civil Engineering at Purdue University. He holds a bachelor's degree in Civil Engineering from Technical University of Madrid in Spain and a Doctor of Science degree from Massachusetts Institute of Technology, MA. Dr. Bobet's areas of interest include rock mechanics, underground structures, soil-structure interaction during seismic events and problem soils.

He has authored or co-authored more than one hundred technical publications. He serves or has served on the Editorial Board of ASCE Journal of Geotechnical and Geoenvironmental Engineering, ASTM Geotechnical Testing Journal, Rock Mechanics and Rock Engineering Journal, Tunnelling and Underground Space Technology Journal and International Journal for Analytical and Numerical Methods in Geomechanics. He is a member and past chair of the ASCE rock mechanics committee, a Director of the Board of Directors of the American Rock Mechanics Association (ARMA), the Chair of the 2012 U.S. Rock Mechanics/Geomechanics

Symposium and is a member of the Geotechnical Advisory Board (GAB) of the Panama Canal. He is also the President of the American Rock Mechanics Association.

Dr. Bobet has received a number of awards, including the ASCE 2011 Ralph B. Peck Award, the 2012 National Award for Significant Contributions in Science and Technology - SENACYT Panama, and the 2012 ARMA Research Award.



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