

Short Course:
Static and Seismic Stability of Solid-Waste Landfills

Jonathan Bray, *University of California at Berkeley*
Edward Kavazanjian, *Arizona State University*
Ellen Rathje, *University of Texas at Austin*

- AGENDA -

8:00-8:30	Registration		
8:30-8:50	Introduction		<i>Bray</i>
	Objectives/scope of workshop	Recent experiences of waste fill performance	
	Solid-waste landfills		
8:50-9:05	Stability Criteria		<i>Kavazanjian</i>
	Subtitle D regulations		
9:05-10:00	Static and Dynamic Properties		<i>Kavazanjian</i>
	Soil properties	Waste properties	
	Interface properties	Property evaluation techniques	
10:00-10:15	Break		
10:15-11:15	Static Stability Analyses		<i>Rathje</i>
	Failure modes	Interim & final filling conditions	
	Critical cross-sections	Stability analysis methods	
11:15-12:15	Seismic Hazard Assessment		
	Characteristics of earthquakes	Probabilistic seismic hazard	<i>Rathje</i>
	Ground motion characteristics	Developing rock motions	<i>Bray</i>
12:15-1:30	Lunch		
1:30-2:40	Dynamic Analyses		<i>Bray</i>
	Seismic response of waste fills	Pseudostatic procedures	
	Waste fills vs. embankments	Deformation procedures	
2:40-3:00	Advanced Analyses		<i>Rathje</i>
	Two-dimensional analysis	Coupled stick-slip analysis	
3:00-3:15	Break		
3:15-4:15	Design Example		<i>Kavazanjian</i>
	Seismic hazard assessment	Design considerations	
	Material properties	Common design deficiencies	
	Dynamic analyses	Discussion	
4:15-4:45	Discussion		<i>All</i>
4:45-5:00	Summary and Other Issues		<i>Rathje</i>

When:	Sunday January 23, 2005	Registration fee:	\$300.00
Where:	Hilton Austin 500 East 4th Street Austin, TX 78701	Special registration fee for <u>full-Conference registrants:</u>	per person \$ 50.00 per person
http://www.asce.org/conferences/geofrontiers05/		<ul style="list-style-type: none"> • Registration includes refreshments, lunch, handouts • Participants receive 7 PDHs 	

ABOUT THE COURSE

Static and Seismic Stability of Solid-Waste Landfills. This short course focuses on the analyses required to evaluate the static and seismic stability of municipal solid-waste landfills. Landfills are complex engineered systems with a multitude of components. Municipal waste is extremely heterogeneous and its properties involve significant uncertainties. Waste fills are built with sophisticated liner systems that involve compacted clay, geosynthetics, and drainage layers. The interfaces between these materials can create slip surfaces that jeopardize static or seismic slope stability. In this course, the regulatory framework that drives some aspects of design is reviewed, and emphasis is placed on developing sound estimates of the static and dynamic properties of waste and landfill containment materials. Static analytical procedures are discussed. Critical aspects of a seismic hazard assessment are reviewed, and analytical procedures for evaluating the seismic stability of a solid-waste landfill are presented. A design example is presented to illustrate the primary issues involved in evaluating the stability of landfills. This is followed by a question and answer session. Each attendee will be given course notes that support the lectures. A similar course has been offered around the United States, and it has been well received by government regulators, landfill owners, and practicing engineers.

ABOUT THE INSTRUCTORS

Jonathan D. Bray, Ph.D., P.E. is a Professor of Civil and Environmental Engineering at the University of California, Berkeley. He earned engineering degrees from West Point (B.S.), Stanford University (M.S.), and the University of California, Berkeley (Ph.D.). Dr. Bray has been a registered professional civil engineer since 1985, and he has served as a consultant on several engineering projects and has served as an expert geotechnical engineer in several legal cases. Professor Bray has authored more than 170 research publications. His expertise includes the seismic performance of earth and waste fills, earthquake fault rupture propagation, seismic site response, liquefaction, and ground failure. He has received several honors, including the Shamsheer Prakash Research Award, ASCE Huber Research Prize, Packard Foundation Fellowship, NSF Presidential Young Investigator Award, and two NAGS awards.

Edward Kavazanjian, Jr., Ph.D., P.E., is Associate Professor of Civil Engineering at Arizona State University. He has Bachelor and Master of Science Degrees in Civil Engineering from the Massachusetts Institute of Technology and earned his Ph.D. degree in Geotechnical Engineering at the University of California at Berkeley. Prior to joining the ASU faculty in August 2004, Dr. Kavazanjian's spent 19 years in consulting practice, where his experience included permitting, design, and construction quality assurance for over 50 solid and hazardous waste landfills throughout the United States. He is co-author of the US EPA guidance document on seismic design of municipal solid waste landfills has authored or co-authored numerous articles in refereed journals and conference proceedings on the static and dynamic behavior of solid and hazardous waste landfills.

Ellen M. Rathje, Ph.D. is Associate Professor of Civil Engineering at the University of Texas at Austin. She received her B.S. degree from Cornell University and her M.S. and Ph.D. degrees from the University of California at Berkeley. Dr. Rathje's research interests include the seismic performance of earth structures and waste fills, liquefaction evaluation, strong ground motion, site response, and remote sensing. Her awards include the National Science Foundation CAREER Award and the 2002 Arthur Casagrande Award from ASCE.

ABOUT THE SPONSOR

This course is conducted on behalf of the Geo-Institute of ASCE, the premier organization for a wide range of geo-professionals. Additional information on the Geo-Institute is found at: <http://www.geoinstitute.org/>