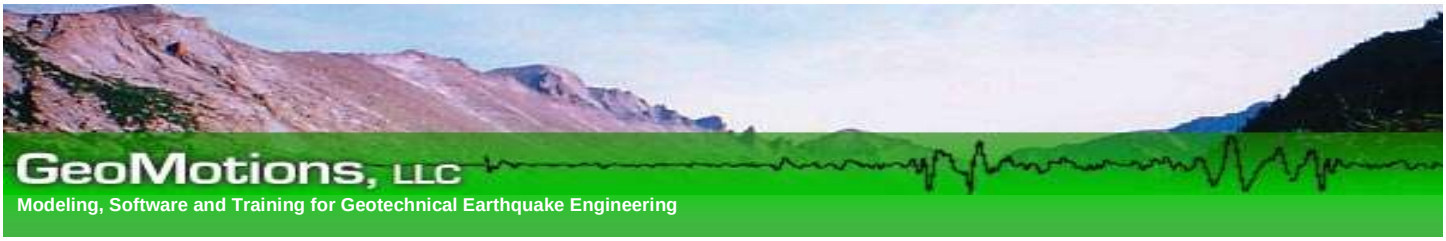


Seismic Site Response Analysis with *GeoMotions Suite*

Friday, October 14 & Saturday, October 15, 2011

San Francisco, California

Course Overview

This short course is designed to teach 21st century professionals how to evaluate seismic hazard and perform time history site response analyses using *GeoMotions Suite*. This software suite includes our flagship equivalent-linear and nonlinear effective-stress site response analysis programs SHAKE2000 and D-MOD2000 respectively; and, RspMatchEDT, a pre- & post-processor for RspMatch 2005/2009, a program for generation of spectrum-compatible ground motions. Hands-on training in the use of the *GeoMotions Suite* programs is an essential part of this short course.

What will you learn?

You will learn from practicing professionals how to apply SHAKE2000 and D-MOD2000 to solve common earthquake engineering problems. Topics addressed during this short course include:

- The limitations of various types of site response analyses.
- Evaluation of seismic hazard parameters (probabilistic and deterministic) and development of design ground motions.
- Principles of dynamic modeling (1-D, 2-D, and 3-D).
- Evaluation of dynamic material properties and dynamic model parameters.
- Generic (i.e., published) sets of material parameters for site response analyses.
- Fundamentals of Newmark-type seismic deformation analysis.
- Soil liquefaction and slope stability analyses using the site response analysis results.
- How to interpret and document the results of nonlinear and effective-stress analyses.
- Calibration of 2D models using D-MOD2000.
- Documentation of results to aid in the regulatory approval of site response and seismic deformation analyses.

Assistance with installation and running of *GeoMotions Suite* programs will be provided.

Course Level

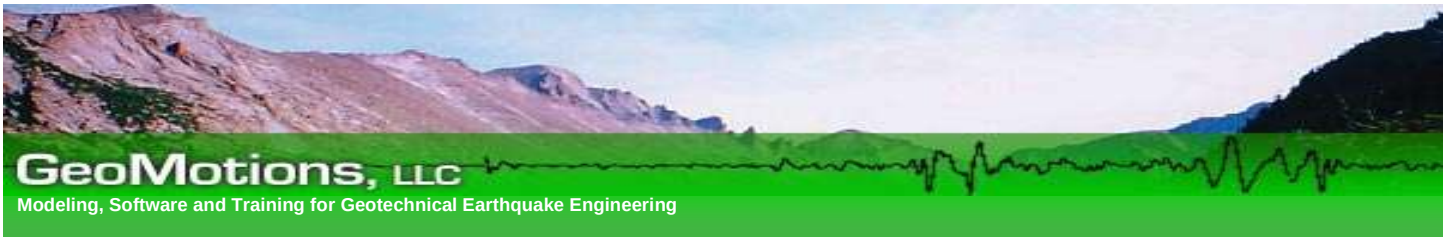
This short course is designed for practicing professionals with formal education in engineering and/or earth sciences.

Instructors

Neven Matasovic, Ph.D., P.E., G.E. is an Associate with Geosyntec Consultants. He holds a Ph.D. in Geotechnical Earthquake Engineering (UCLA) and M.S. degree in Structural (Foundation) Engineering. He is co-developer of D-MOD2000, recipient of the 2001 Prakash Foundation Award for Excellence in Practice of Geotechnical Earthquake Engineering, and author/co-author of over 80 technical publications including the Federal Highway Administration (FHWA) guidance document on geotechnical earthquake engineering for highway facilities and of the US Environmental Protection Agency (EPA) guidance document for seismic design of landfills.

Gustavo A. Ordonez, P.E., received his B.S. in Civil Engineering from the University of San Carlos of Guatemala and his M.S. degree in Geotechnical Engineering from Oregon State University. He has 20 years of professional experience with emphasis on the field inspection of existing dams and on the evaluation of their static and seismic adequacy under current engineering standards. He is co-developer of D-MOD2000; and, developer of SHAKE2000 and RspMatchEDT.

Invited Speaker: Jonathan D. Bray, Ph.D., P.E. is a Professor of Geo-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, including as a peer reviewer. He has authored more than 200 research publications. His expertise includes seismic site response, dynamic soil properties, earthquake ground motions including near-fault effects, liquefaction and ground failure, seismic performance of earth and waste fills, and earthquake fault rupture propagation. He has received several honors, including ASCE Fellow, Shamsher Prakash Research Award, ASCE Huber Research Prize, Packard Foundation Fellowship, NSF Presidential Young Investigator Award, and two NAGS awards.



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San Francisco, California

Registration Information

- Advance registration and payment are required. Registration will be on a first-come/first-served basis. Space is limited to 20 participants.
- To pre-register, send an e-mail to: **training@geomotions.com**
- The registration fee for NEW USERS is $1,100.00 USD for payment by check/bank wire or $1,175.00 USD for credit card payment. For current registered users, the fee is $550.00 USD. Please contact us for credit card and bank wire payments.
- **One full license of the software suite, one USB hardware key, and technical support are included with the registration fee for NEW USERS only.**
- Cancellations accepted and partial refunds provided on/or before September 30, 2011. A $100.00 handling fee will be deducted from refunds. After that date, either: 1) no refunds will be offered, instead another person(s) may substitute those unable to attend; or, 2) the software will be shipped to the registered participant.
- **Short course participants are required to bring their own laptops.**
- The short course will be held at:

Embassy Suites Hotel
San Francisco Airport - Waterfront
150 Anza Boulevard
Burlingame, CA 94010

Tel.: (650) 342-4600
www.embassysuites.com

- 12 PDH-s will be awarded for successful completion of the short course.
- In the event the course is cancelled by GeoMotions due to insufficient enrollment, the registration fee will be refunded in full. GeoMotions is not responsible for any other expenses associated with a cancellation.
- For additional information please contact GeoMotions at:

Tel: **(360) 491-5397**
(GMT -08:00 - Pacific Time USA)

E-mail: **training@geomotions.com**

Agenda
Friday, October 14th

Registration **7:30**

1. Introduction and Objectives **8:15**

2. Seismic Hazard Parameters and Development of Design Ground Motions **8:30**

- Introduction and Basic Definitions
- Source Identification and Characterization
- Source and Path Parameters
- Use of Common Attenuation and Duration Models
- Evaluation of Seismic Hazard Parameters
- Development of Design Ground Motions
- Comparison of Various Methods
- Discussion/Questions

Coffee Break **9:45**

3. Site Response Models and Dynamic Soil Properties **10:15**

- Site Characterization
- Representative Soil Profile
- Soil and Bedrock Parameters for Site Response Analysis
- Shear Wave Velocity Profile
- Unit Weight Profile
- Shear Modulus, Modulus Reduction and Damping
- Material Parameters for Nonlinear Analyses (Poisson's Ratio and Hydraulic Conductivity)
- Sensitivity of Site Response Analysis to Input Parameters
- Example Problem – Turkey Flat Site Response Case History
- Discussion/Questions

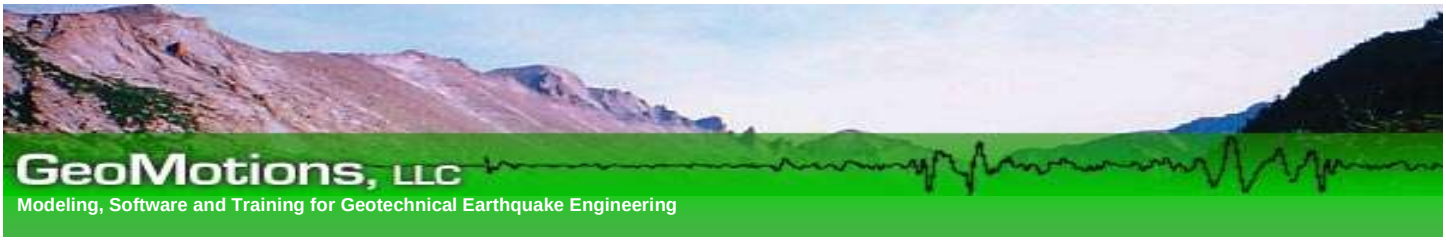
4. Evaluation of Ground Motions – Advanced Topics **11:00**

- Characteristics of Near-Fault Ground Motions (Directivity and Fling Step)
- Near-Fault Ground Motion Parameters, Predictive Relations
- Selection of Near-Fault Design Ground Motions
- Estimating Rock Motions for Design Purposes

Lunch (on your own) **12:00**

5. Site Response Analysis (SHAKE2000) Hands-on Training **1:00**

- Software Features
- Training Objectives & Outline



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Friday, October 14 & Saturday, October 15, 2011

San Francisco, California

SHAKE2000 Hands-on Training (cont.)

- Assignment of Input Motion
- Example Model/Problem
- Acceleration & Shear Stress Time Histories
- Response Spectra

Coffee Break **3:00**

6. Newmark Type Analyses **3:15**
(SHAKE2000 Hands-on Training)

Questions/Answers **4:45**

Saturday, October 15th

7. Role of Advanced Analyses in Geotechnical Earthquake Engineering **8:15**

- Basic Definitions
- Why and When is Nonlinear Analysis Required?
- Why and when is Effective-Stress Analysis Required?
- When are 2-D and 3-D Analyses required?
- When Soil-Structure Interaction Effects Should not be Ignored?
- What are the Limitations of 1-D Nonlinear (and Effective-Stress) Models?
- How to analyze 2-D and 3-D problems with 1-D models

Coffee Break **9:45**

8. Nonlinear and Effective-Stress Analyses - Theoretical Background **10:15**

- Total-Stress Analysis
  - Dynamic Response Model
  - Viscous Damping Model
  - Stress-Strain Model
  - Irregular Stress-Strain Behavior Rules
- Pore Water Pressure (PWP) Generation Models (Sand and Clay)
- Degradation Models (Sand and Clay)
- Redistribution Model for PWP (Sand) and Degradation Index (Clay)
- PWP Dissipation Model (Sand, Clay, and Composite Soil Deposits)

Lunch (on your own) **12:00**

9. Hands-on Modeling **1:00**

- Layer Thickness
- Transmitting vs. Rigid Boundary
- Evaluation of the Rayleigh Damping Model Parameters
- Use of Generic Model Parameters
- Generation of Nonlinear Model Parameters from Published Data
- Generation of Model Parameters from Laboratory Testing Results
- Interpretation of D-MOD2000 Output
- Modeling Tips
- "Independent" Validation of D-MOD2000

10. D-MOD2000 Hands-on Training **2:00**

- Problem Definition
- Problem Definition
  - How to Import SHAKE2000 Input Data into D-MOD2000
  - Nonlinear Model Building and Representative Soil Profile
  - Assignment of Input Ground Motions
  - Dynamic Soil Properties and Model Parameters
  - Analysis Control (Total-Stress/Effective Stress)
- Input of Rayleigh Damping Model Parameters

Coffee Break **3:00**

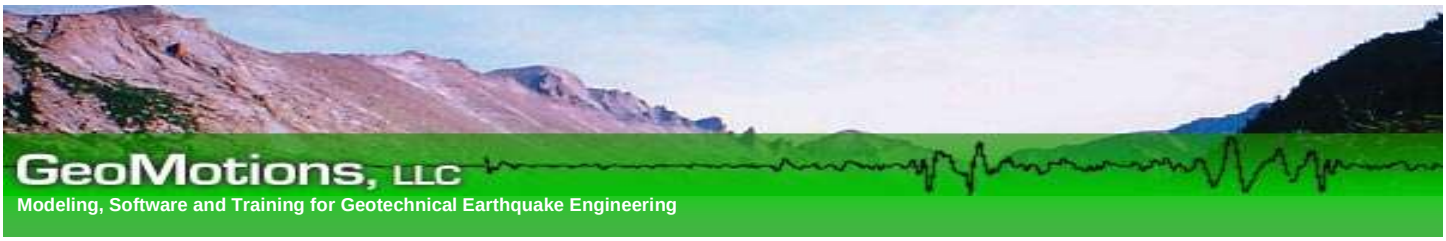
- Site Specific Response Analysis with D-MOD2000
  - Acceleration and Shear Stress Time Histories
  - Tracing of Stress-Strain Time History
  - PWP Time Histories
  - Response Spectra
  - Plotting
  - Reporting

11. Example Problems **4:00**

- Total-Stress Analysis (Comparison with Equivalent Linear Analysis: SHAKE)
- Effective-Stress Analysis (Wildlife Site Soil Liquefaction Case History)
- Composite Soil Deposit with PWP Dissipation in Sand and Clay

Closure **4:30**

- Questions/Answers
- PDH Certificates



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San Francisco, California

Contact Information:

Name of Firm, Organization or Individual: _____

Mailing Address: _____
Street Address

_____
City State Zip Code

_____
Telephone E-mail

Registration ($1,100.00 USD check/wire; $1,175.00 USD credit card; $550.00 Registered User):

	Name of Attendee	E-mail	Fee
1.	_____	_____	$ _____
2.	_____	_____	$ _____
3.	_____	_____	$ _____
		Subtotal:	$ _____
	Group Discount: Firms or organizations registering 2 or more attendees deduct $50.00 per attendee	_____ x 50.00	- $ _____
		Total:	$ _____

Payment Information:

Please, make check payable to: **GeoMotions, LLC** - Mail this form and payment to: **GeoMotions, LLC**
Attn: SFO 10/11
3640 Arbor Dr. SE
Lacey, WA 98503
USA