



CENTER FOR TRANSPORTATION INFRASTRUCTURE AND SAFETY

GeoMO 2008 - Geotechnical Earthquake Engineering – Site Response

by

Dr. Ronaldo Luna



**NUTC
ETT217**

**A National University Transportation Center
at Missouri University of Science & Technology**

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16. Abstract The theme of GeoMO2008 has recently become of more interest to the Midwest civil engineering community due to the perceived earthquake risks and new code requirements. The constant seismic reminder for the New Madrid Seismic Zone and new USGS hazard mapping underway in St. Louis make this lecture very timely. The short-course will provide answers to questions that frequently arise in new or retrofit engineering projects as it relates to site response.			
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**Center for Transportation Infrastructure and Safety
A National University Transportation Center (NUTC) at Missouri S&T**

PROJECT REPORT

Event Date: May 2, 2008

The GeoMO registered 100+ professional and academic attendees from Missouri and the neighboring states. The speakers arrived to Rolla, Missouri on time and ready to deliver 6 hours of instruction. The event was hosted at the Havener Center of Missouri S&T. Certificates of completion were issued for each participant with the corresponding PDH credits. Registration was administered and advertised online at <http://geommo.mst.edu>. A list of the registered participants is enclosed at the end of this report.

THE SUBJECT AND SEMINAR/WORKSHOP:

GeoMo 2008
Geotechnical Earthquake Engineering – Site Response
May 2, 2008

The theme of GeoMO2008 has recently become of more interest to the Midwest civil engineering community due to the perceived earthquake risks and new code requirements. The constant seismic reminder for the New Madrid Seismic Zone and new USGS hazard mapping underway in St. Louis make this lecture very timely. The short-course will provide answers to questions that frequently arise in new or retrofit engineering projects as it relates to site response.

Schedule:

8:15am Check-in and final registration

9:00 am Introduction to site effects - case histories, site classification, amplification factors

10:00am Ground motions and hazard analyses - DSHA, PSHA, ground motion selection and scaling

11:00am Wave propagation and site response analysis - basics, boundary effects, transfer function concept

Noon Luncheon – *provided*

1:30pm Dynamic soil properties - equivalent linear, nonlinear

2:30pm 1-D analyses - equivalent linear, nonlinear, comparison

3:30pm 2-D analyses - equivalent linear, nonlinear, comparison, SFSI

4:15pm Site response in the future - performance-based earthquake engineering.

Course participants will gain familiarity with the concepts and related topics for use in geotechnical and structural engineering. The course includes a full day of lectures, extensive references, notes and pictorial examples of up to date methods in site response.

The Lecturers:

Dr. Steven L. Kramer, P.E., is Professor of Civil and Environmental Engineering at the University of Washington. He specializes in geotechnical earthquake engineering, and is author of the textbook, *Geotechnical Earthquake Engineering* (Prentice-Hall, 1996). Professor Kramer has been involved in site response research, has written programs for equivalent linear and nonlinear site response, and consulted on site response and ground failure projects in the U.S. and abroad. Professor Kramer is the recipient of the Casagrande Award and Huber Prize from ASCE, chaired the 1998 ASCE Specialty Conference on Geotechnical Earthquake Engineering and Soil Dynamics, and is a keynote speaker at the 2008 version of the same conference.

Dr. Pedro Arduino is a Professor of Civil and Environmental Engineering at the University of Washington. He specializes in computational geomechanics with emphasis in constitutive modeling of soils, coupled formulations, contact mechanics, and general finite element solutions for geotechnical problems. He has also been involved in the development of a variety of computer-based instructional tools for geotechnical courses. Professor Arduino is author and co-author of many journal publications and reports and is very active in the professional practice. He has been involved in site response analysis and performance based evaluation of large bridge structures, reinforced walls, and wharf structures. His current interests concentrate on the development of a framework for fluid-soil mixtures using distinct phases, and the use of 3-D finite element solutions for the analysis of soil-foundation interaction problems.

List of attendees:

No.	Last Name	First Name	Title	Middle Initial	Suffix	Company Affiliation
1	Abkemeier	Tom	Mr.			Shannon & Wilson, Inc.
2	Applegate	Kermit	Mr.	N.		Missouri S&T
3	Arduino	Pedro	Dr.			University of Washington
4	Belk	Justin	Mr.	R.		Missouri S&T
5	Bertel	Jeff	Mr.	D		Reitz & Jens, Inc.
6	Bettger	Kurt	Mr.			Jacobs
7	Bilello	Jake	Mr.			Shannon & Wilson, Inc.
8	Boll	Dennis	Mr.			Geotechnology, Inc.
9	Brockhaus	Douglas	Mr.	A.		consultant
10	Cambio	Domenica	Ms.			Missouri S&T
11	Cauble	Doug	Dr.			URS
12	Chepkait	Kipkoech	Dr.	K.	Ph.D., P.E.	Jacobs
13	Chung	Jae-won	Dr.			Missouri S & T
14	Coffman	Richard	Mr.		PE, PLS	University of Missouri-Columbia
15	Cook	Christopher	Mr.	W.		Reitz and Jens
16	Craven	Ronald	Mr.	W.		Geotechnics
17	Cunningham	Shari	Ms.			Midwest Testing
18	Dawson	Bruce	Mr.		PE	Engineering Surveys and Services
19	DiMartino	Jonathan	Mr.			Missouri S&T
20	Duehning	James	Mr.			Kleinfelder
21	Duncan	Brent	Mr.	R		Geopier Foundation Company
22	Erter	Shawna	Ms.	L	P.E.	SCI Engineering, Inc.
23	Fennessey	Thomas	Mr.	W		MoDOT - Geotechnical Section
24	Finke	John	Mr.			Jacobs Engineering
25	Frueh	Richard	Mr.	H.		Shannon & Wilson, Inc.
26	Ge	Louis	Prof.			Missouri S&T
27	Graham	William	Mr.			TSI Engineering, Inc.
28	Greenwood	Daniel	Mr.	W.		Hayward-Baker
29	Gunter	J. Dale	Mr.			Arkansas Game & Fish Commission
30	Harms	Mark	Mr.	A	P.E.	SCI Engineering, Inc.
31	Hartley	Josh	Mr.	W.		Missouri S&T
32	Hempfen	Greg	Dr.			URS Corporation
33	Hernandez	Oscar	Mr.	R.		Missouri S&T

34	Hodnett	Derek	Mr.	L.		Tri-State Geosciences, LLC
35	Hollabough	Eric	Mr.	M.		Terracon
36	Hotz	Robert	Mr.	D		Missouri S&T
37	Huaco	Daniel	Mr.			University of Missouri-Columbia
38	Hungerford	Elizabeth	Ms.			Kleinfelder
39	Hunn	Owen	Mr.	C.		Tensar
40	Israel, P.E.	Dan	Mr.			Terracon Consultants, Inc.
41	Jacobi	Carl	Mr.			Jacobi Geotechnical Engineering, Inc.
42	Jones	Daniel	Mr.	L.		US Army Corps of Engineers
43	Kaibel	Craig	Mr.	K		Geotechnology, Inc.
44	Karadeniz	Ece	Ms.			Missouri S & T
45	Kerns	Dan	Mr.			
46	Kizzee	Andrew	Mr.	C		The University of Memphis
47	Klein	Jamie	Mr.	M.		Terracon
48	Knutelski	Jim	Mr.			Hanson Professional Services, Inc.
49	Kocher	Kyle	Mr.	E		Reitz & Jens, Inc
50	Koirala	Amod	Mr.			University of Columbia
51	Kottemann	John	Mr.	S	PE	Shively Geotechnical, Inc.
52	Kramer	Steve	Dr.			University of Washington
53	Krauch	Amy	Ms.	L.		Missouri S&T
54	Lawrence	Bill	Mr.			Stantec Consulting Services, Inc.
55	Lee	Randall	Mr.	A.		Engineering Surveys & Services
56	Li	Peng	Mr.			University of Missouri-Columbia
57	Lie	Jianhua				University of Missouri-Columbia
58	Luna	Ronaldo	Prof.			Missouri S & T
59	Mangram	Jacob	Mr.	A.		
60	McCartney	John	Dr.			University of Arkansas
61	McCaskie	Stephen	Mr.	L.		Hanson Professional Services, Inc.
62	McLain	Kevin	Mr.	W		MoDOT - Geotechnical Section
63	Mehnert	James	Mr.	F.		US Army Corps of Engineers
64	Miller	Alan	Mr.	D		MoDOT - Geotechnical Section
65	Minks	Allen	Mr.	G.	P.E.	Geopier Foundation Company
66	Moronkeji	Adedotun	Mr.			Missouri S&T
67	Morrison	April	Ms.	D.		St. Louis Community College
68	Neuner, P.E.	Eric	Mr.	J		Geotechnology, Inc.
69	Ordonez	Gustavo	Mr.	A.		GeoMotions, LLC
70	Pearman-Green	Veniecy	Ms.		P.E.	Illinois Department of Transportation
71	Riggs	Charles	Mr.			Shannon & Wilson, Inc.
72	Robison	Jonathan	Mr.	L		GeoEngineers, Inc.
73	Rogers	J. David	Prof.			Missouri S & T
74	Rolsing	Richard	Mr.	J.		Engineering Surveys & Services
75	Rosenblad	Brent	Dr.	L		University of Missouri
76	Roth	Nicholas	Mr.	J		PSI
77	Shahbazian	Ali	Mr.			University of Memphis

78	Sick	Brian	Mr.	J.		Geotechnics
79	Simonton	Lyle	Mr.			Subsurface Constructors, Inc.
80	Sparks	Andrew	Mr.			GeoEngineers, Inc.
81	Stephenson	Richard	Dr.	W.		Missouri S&T
82	Stock	Sarah	Ms.		P.E.	SCI Engineering, Inc.
83	Stohl	Melbourne	Mr.			U.S. Army Corps of Engineer's
84	Stovall	Scott	Mr.	P.		The University of Memphis
85	Stribling	Gregory	Mr.	M		MS&T
86	Taqieddin	Salah	Prof.			Missouri S&T
87	Tyler	Andrea	Ms.	M		Missouri S&T
88	Voss	Stefanie	Ms.			URS Corporation
89	Wang	Shuying	Mr.			Graduate Student
90	Watkins	Conor	Mr.	M.		USGA / Missouri S&T
91	Weidinger	David	Mr.			Missouri S&T
92	Witt	Emitt	Mr.	C.	III	U.S Geological Survey
93	Wu	Yong	Mr.			Stantec Consulting Services, Inc.
94	Zandieh	Arash	Mr.			University of Memphis
95	Zarrabi	Morteza	Dr.			University of Memphis

Note: Additional participants registered on-site.