



## ASSOCIATION OF ENGINEERING GEOLOGISTS

Southern California Section  
"Serving Professionals in Engineering, Environmental,  
and Groundwater Geology Since 1957"

### NEWSLETTER – NOVEMBER 2002

#### MONTHLY DINNER MEETING

**Date:** Tuesday, November 12, 2002  
**Location:** Stevens Steakhouse, 5332 Stevens Place, Commerce, CA  
**Time:** 5:30 p.m. - Social Hour; 7:00 p.m. – Dinner; – 8:00 p.m.  
Presentation  
**Reservations:** Call (949) 253-5924 ext. 564 by 5:00 p.m., Friday,  
*October 4, 2002*  
**Cost:** \$25.00 per person with advanced reservations, \$30.00 at  
the door, and \$10.00 for students w/ valid I.D., "No-  
shows" will be billed \$10.00

**SPEAKER:** E. D. Michael

**TITLE:** Reducing The Mudflow Risk

**ABSTRACT:** Consultant reports for the development of hillside properties commonly address the mudflow risk by noting surface drainage requirements in local building codes and by presenting an "infinite slope analysis," the latter deemed either appropriate or required by local public agencies since the early 1970s. Apparently, it is tacitly assumed that if infinite slope analysis produces a safety factor of 1.5, there is no risk of a mudflow developing; however, that is not true. As currently applied, infinite slope analysis is erroneous, misleading, dangerous, and an open invitation to litigation for negligence.

Infinite slope analysis applies to masses of surficial materials the safety factor calculation commonly used for existing or critical deep-seated surfaces of weakness. Such surficial materials generally consist of loosely consolidated composite sections of weathered bedrock, alluvium or colluvium, and soil, or some combination thereof, with total thicknesses of less than about 5 feet. The determination of friction angle and cohesion in the soils engineering laboratory, most commonly by the drained direct shear test, produces values higher than those that exist when surficial materials fail. Furthermore, the driving force assumed to exist does not include the increment of force due to the seepage; moreover, porosity is not taken into account. (cont.)

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Generally, it is assumed that the Mohr-Coulomb failure criterion, modified for effective stress, has application to the analysis of surficial materials. However, that is erroneous because: [i] at the low ranges of stress involved there is no basis for assuming linearity between normal stress and shear stress; and [ii] porosity, significant because shear strength resides solely in the solids, is ignored.

The transformation of a section of surficial materials to a mudflow is caused by a loss of shear strength; hence, it is a form of liquefaction. It has long been known that when a densely packed saturated non-cohesive granular mass is deformed, the result is a positive dilation, *i.e.*, an increase in volume without a significant change in shape, and hence, necessarily, the creation of voids into which excess water enters, thus imparting to the mass a plastic or even a liquid condition. Therefore, it is hypothesized that mudflows are initiated by a translational failure, commonly called a "soil slip," in densely packed saturated sections of surficial materials where there is excess ground water.

Initiation of the soil slip depends upon a certain degree of effective stress. Theoretically then, infinite slope analysis has relevance to the process. The correct form of the infinite slope safety factor equation is:

$$SF(stress) = \frac{C' + z(\gamma - m\gamma_w)(1 - n) \cos^2 \alpha \tan \phi'}{z \sin \alpha \cos \alpha (m\gamma_w \cos \alpha^{-1} + \gamma)}$$

in which  $C'$  and  $\phi'$  are effective parameters necessarily less than those determined from the drained direct shear test,  $\gamma$  and  $\gamma_w$  are the dry unit weight of the granular mass and the unit weight of water, respectively,  $z$  is the vertical height of a model saturated slice of surficial material,  $m$  is the ratio of the saturated volume to the total volume, and  $n$  is the porosity. The product of  $z$  and a unit weight is a volume. The denominator, which expresses the total driving force, includes the seepage force and a component of the total solids body force. It does not include the water body force because, the pressure at any given elevation being constant, there can be no net horizontal force due solely to a hydrostatic pressure field. Therefore, any component of force acting on any mass, *e.g.*, a grain of sand, no matter how irregular its shape, must be opposed by a force of equal magnitude acting in direct opposition. This negates the possibility of a net force in any horizontal direction and hence, by definition, any net component of such a force. In other words, there can be no net force acting along any critical or existing surface of shear due solely to the mass of the water.

In any event, *as a practical matter*,  $C'$ ,  $\phi'$ , and  $n$ , can neither be determined by testing nor even estimated with any reasonable degree of confidence, and  $m$  is simply a matter of surmise. Consequently, the only professionally responsible position for the consultant regarding the risk of mudflow is one that recommends drainage devices that prevent the development of a critical level of effective stress in sections of surficial materials

Mr. Michael holds an A.B. and M.A. in Geology, as well as a J.D., and is an R.G., C.E.G. and C.H.G. Mr. Michael is a geologist specializing in engineering geology, hydrogeology, and forensic geology. A sampling of his professional experience includes work with the California Division of Water Resources, the California Division of Highways, the Monolith Portland Cement Company of Los Angeles, and as a private consultant, E.D. Michael and Associates, of Malibu, California.

Mr. Michael has an extensive list of publications, the subjects of which include the Big Rock Mesa Landslide, Calle del Barco Landslide, and groundwater resources.

### CHAIR'S COLUMN

By Tania Gonzalez

It has been extremely gratifying to receive calls and e-mails from several members volunteering ideas and expressing their support for the association. As a result of these very helpful individuals, we are making progress in two areas: 1) developing new publications that will provide revenue for the section, and 2) finding new meeting locations in both northern Los Angeles and Orange counties. We hope to rotate our meetings among a more geographically distributed area, which I hope will increase attendance. Please keep those calls and e-mails coming! Any suggestions, comments, and even complaints, are welcome.

As a result of increased advertisements in the newsletter, and reduced printing and mailing costs (thank you to all of you who have signed up for the e-newsletter!), the Section's financial situation has improved in the last year. We also have received financial support from corporate sponsors, and some of our dinner costs have been offset by the very generous gifts, in the form of publications, from Larry Cann, Buzz Spellman and Paul Davis. These books, many of them classics, have been raffled at our meetings, so if you have not been to one of our meetings lately, you have lost the opportunity to win and improve your personal library. If you have any books, maps or other publications that you would like to donate for (cont.)

these raffles, please contact me, or better yet, bring them to the meetings.

Please mark December 10<sup>th</sup> on your calendars. Scott Burns, President of AEG, will be visiting the Section. He will present information regarding the current financial and organizational state of the AEG. Then he will share with us some of his landslide case studies. Scott is known to be a dynamic speaker. I hope to see you there.

Matt Hawley, Section Vice-Chair, is putting together our calendar for 2003. If you have any suggestions for future speakers or topics, please call or e-mail him. Our Section will be hosting the Annual meeting in 2007, which also happens to be the AEG's 50<sup>th</sup> Anniversary. Even though it seems like a long time away, these events take years of planning, and Julie Keaton is therefore already preparing for it. She will sporadically give us an update on the 2007 meeting; her first presentation will be at the upcoming meeting.

If you have any comments or comments regarding the AEG, both at the National or southern California level, please give me a call or drop me an e-mail. As usual, we are always looking for volunteers. For example, it has been several years since the Southern California Section has put together a field trip. I would like to start holding these again on a regular (yearly or every other year, at least). If you have ideas, do give me a call.

Do not forget to check out the AEG web page at <http://www.aegweb.org>. If you use your membership ID and password (on the membership card we each get annually from National), you can access several different member services, including the more recent member directory. In the next month or two, we should also be able to order publications and pay our annual dues online.

See you soon!

#### **Electronic Newsletter and Website**

Please consider receiving the newsletter electronically if you have an email account. Contact Jeff Kofoed.

### **AEG/ASCE, CGS Special Publication 117 Landslide Workshop**

This two-day workshop, presented by the members of the slope stability committee, is intended to summarize and explain the recommended procedures, and provide time for interaction with the authors. The workshop is intended for both managing and practicing engineers and geologists. Speakers will include T. Blake, R. Hollingsworth, R. Jibson, R. Masuda, D. Pradel, C. Real, N. Sathialingam, and J. Stewart. Participants will receive a notebook containing printed copies of the speakers' presentations and a CD-ROM of the presentations as PowerPoint files. The CD will also include an Excel spreadsheet that can be used to calculate earthquake-induced displacements by a committee-recommended simplified procedure and a Windows computer program developed by R. Jibson (USGS) to perform rigid-block Newmark-type

### 2003 MEMBERSHIP RENEWAL

You probably received your 2003 dues statement from AEG National by now. If you have not received it, or are unsure about your membership status, please contact AEG Headquarters [aegweb.org](http://aegweb.org), or Tania Gonzalez. We are currently looking for a new Membership Chair. Please contact Tania Gonzalez you wish to volunteer.

### YEAR 2002 CONTRIBUTORS

Our special thanks to:

**Earth Consultants International  
Robertson Geotechnical, Inc.**

### YEAR 2002-3 CONTRIBUTORS NEEDED

Contributions from corporations and individual members for 2002 are greatly appreciated. Contributors will be listed in our newsletter throughout the year and can post their logo or business card in the newsletter if so desired. Please mail contributions made out to **AEG** to our section chair, Tania Gonzalez.

### YEAR 2002 MEETING SCHEDULE

<u>Date</u>	<u>Speaker</u>	<u>Location</u>
October	Mark Olsen	Steven's Steakhouse
November (Joint w/ IGS)	E.D. Michael	TBA
December	NO MEETING	

### ADVERTISING IN THE NEWSLETTER

Business Card	\$10/month	\$100/year
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½ page	\$35/month	\$350/year
Full page	\$50/month	\$500/year

seismically induced displacement integration analyses. Workshop materials also will include worked examples of seismically induced slope deformation calculations. Continuing Education units will be available to attendees through the Association of Engineering Geologists. Please see the enclosed registration form and the website for additional details. [www.scec.org/resources/landslide.html](http://www.scec.org/resources/landslide.html)

#### EMPLOYMENT OPPORTUNITIES

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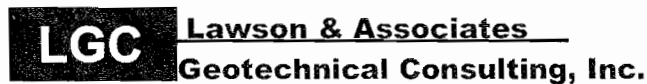


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LGC is looking for dynamic individuals to join our team and work on some of Orange County's most interesting and technically challenging projects. If you are an experienced geotechnical professional, or just starting your career, please do not hesitate to contact us. All inquires will be considered in the utmost confidence. We look forward to hearing from you.



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TITLE / DESCRIPTION	PRICE	QTY	TOTAL
Baldwin, J.E. and Sitar, N., 1991, <b><u>Loma Prieta Earthquake: engineering geologic perspectives</u></b> , AEG Special Publication No. 1, 170p	\$10.00		
Bishop, K, and Tandy, 1995, <b><u>Ground Failure during the January 17, 1994 Northridge earthquake</u></b> : Association of Engineering Geologists, Southern California Section, Annual Field Trip Guidebook, November 11, 1995, 106p.	\$20.00		
Briggs, R.P. and Parke, C.D., 1990, <b><u>Guide to Field Trips in Pennsylvania, Ohio, and West Virginia</u></b> , AEG 33 <sup>rd</sup> Annual Meeting, October 1-5	\$15.00		
<b><u>Highway and Railroad Slope Maintenance</u></b> : AEG, 34 <sup>th</sup> annual meeting, September 29 <sup>th</sup> – October 4 <sup>th</sup> , 1991	\$10.00		
Leighton, F.B. <b><u>Mitigation of geotechnical litigation in California</u></b> : Munson Book Associates, Huntington Beach, California, 274p.	\$20.00		
Sieh, K.E., and Matti, J.C., 1992, <b><u>Earthquake geology, San Andreas fault system, Palm Springs to Palmdale</u></b> : AEG, 35 <sup>th</sup> Annual Meeting, Field Trip Guidebook, October 3-4, 1992	\$10.00		
Stout, M.L., ed., 1992, <b><u>Proceedings of the 35<sup>th</sup> annual meeting, Association of Engineering Geologists</u></b> , October 2-9, 1992: 740p.	\$5.00		
Tepel, R, 1995, <b><u>Professional Licensure for Geologists, an Exploration of Issues</u></b> , Association of Engineering Geologists Special Publication No. 7, 1995	\$12.00		
Cann, L.R., Cobarrubias, Hollingsworth, B., 1992, <b><u>Engineering Geology Field Trips Orange County, Santa Monica Mountains, and Malibu</u></b> : AEG 35 <sup>th</sup> Annual Meeting, Field Trip Guidebook, October 2-9, 1992	\$10.00		
<b><u>Los Angeles Metro Rail System Field Trip Guidebook</u></b> , Association of Engineering Geologists, 35 <sup>th</sup> Annual Meeting October 2-9, 1992 Long Beach, California	\$10.00		

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**The Southern California Earthquake Center (SCEC) Presents a Workshop on:**

**Recommended Procedures for Implementation of DMG Special Publication 117: Guidelines for Analyzing and Mitigating Landslide Hazards in California**

Thursday and Friday, February 20-21, 2003 at the USC Davidson Conference Center, Los Angeles

**Background:** In August 1998, a group of geotechnical engineers and engineering geologists with academic, practicing, and regulatory backgrounds was assembled to form a committee (chaired by Thomas Blake) to develop specific slope stability analysis implementation procedures to aid local Southern California city and county agencies in their compliance with review requirements of the state's Seismic Hazard Mapping Act. The work of that committee resulted in the development of a relatively detailed set of procedures for analyzing and mitigating landslide hazards in California initiated by T. Blake, R. Hollingsworth, and J. Stewart), which was recently published and is available on the Southern California Earthquake Center's (SCEC) web site (<http://www.scec.org/resources>). Workshop attendees are urged to download a free copy of this document and to read prior to attending, so that they can prepare questions in advance.

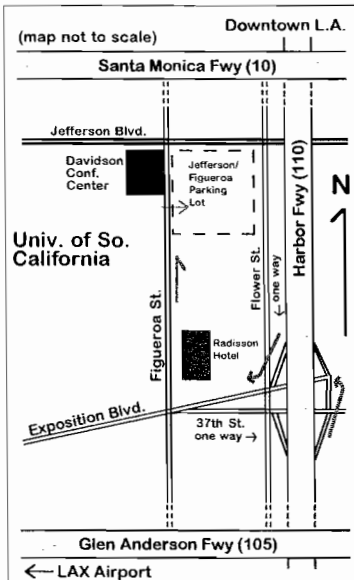
**Workshop Details:** This two-day workshop, presented by the members of the committee, is intended to summarize and explain the recommended procedures, and provide time for interaction with the authors. The workshop is intended for both managing and practicing engineers and geologists. Speakers will include T. Blake, R. Hollingsworth, R. Jibson, R. Masuda, D. Pradel, C. Real, N. Chalingam, and J. Stewart. Participants will receive a notebook containing printed copies of the speakers' presentations and a CD-ROM of the presentations as PowerPoint files. The CD will also include an Excel spreadsheet that can be used to calculate earthquake-induced displacements by a committee-recommended simplified procedure and a Windows computer program developed by R. Jibson (USGS) to perform rigid-block Newmark-type seismically induced displacement integration analyses. Workshop materials also will include worked examples of seismically induced slope deformation calculations.

**Continuing Education units** will be available to attendees through the Association of Engineering Geologists.

**Schedule:** On Thursday, February 20, registration and distribution of materials will begin at 7:30 A.M. The workshop will begin at 8:30 A.M. and conclude at 5:00 P.M. on both days. Also on both days, a continental breakfast will be available starting at 7:30 A.M. and lunch will be provided at approximately 12 noon.

**Location:** The workshop will be held at the Davidson Conference Center, 3415 S. Figueroa St., Los Angeles, on the University of Southern California campus.

**Directions:** From the Harbor Freeway (110), exit at Exposition Blvd. and head west towards USC. Turn right onto Figueroa Street and proceed north to the Jefferson/Figueroa parking lot on the right, just past the Radisson Hotel. Tell the parking attendant that you are attending a meeting at the Davidson Conference Center (DCC) sponsored by SCEC. DCC is on the west side of Figueroa St. at the intersection with Jefferson Blvd.



**Recommended Hotel:** Radisson Hotel, 3540 S. Figueroa St. (see map)  
Reserve your room at these rates by **January 19, 2003** by calling 213-748-4141.  
Request the "SCEC Landslide Workshop" rate: single: \$89 double: \$99

**Registration Fee:** \$250 due by **January 23, 2003**  
(Includes breakfast, lunch and snacks both days, printed materials, and CD-ROMs)

**To register, complete this form and fax or mail to:**

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University of Southern California  
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Los Angeles, CA 90089-0742      **Questions?** 213-740-5843

**SCEC Workshop on Landslide Analysis and Mitigation Procedures  
February 20-21, 2003 at the USC Davidson Conference Center**

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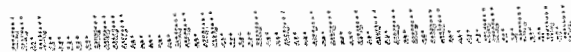
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