

# The Engineering Geologist



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NEWSLETTER OF THE ENGINEERING GEOLOGY DIVISION OF THE GEOLOGICAL SOCIETY OF AMERICA

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## WILL YOU HELP SAVE ENGINEERING GEOLOGY ABSTRACTS?

By ALLEN W. HATHEWAY  
Past Chairman  
Engineering Geology Division

Back in 1984, the American Geological Institute began production of a specialized quarterly publication, **ENGINEERING GEOLOGY ABSTRACTS**. This was done in cooperation with the Association of Engineering Geologists, the Engineering Geology Division of GSA, the Canadian Geotechnical Society (which has a separate engineering geology division), and the International Association of Engineering Geologists. Members of these cooperating societies were offered special subscription rates of \$16.50 per year (the regular rate is \$20.00 per year).

Now in its second year, after eight issues, **EG ABSTRACTS** is suffering from a thirty-percent shortfall in subscribers. Admittedly, some of that shortfall is due to the fact that AGI never properly marketed **EG ABSTRACTS** - as witnessed by AGI's neglect to approach the Geotechnical Engineers. However, I have told AGI this and they are considering my comments while evaluating continued production of **EG ABSTRACTS**.

You may ask, "Why do I need **EG ABSTRACTS**?" I'm pleased to answer that question. Basically, **EG ABSTRACTS** helps each of us face our own tremendous, personal challenge - the one that you should be keeping to support your own area of practice.

At \$16.50 per year, **EG ABSTRACTS** is a bargain you shouldn't pass up! And, if the price doesn't fit your budget, how about asking your firm or organization to add **EG ABSTRACTS** to your library? Ours is a very fluid profession; to neglect your own professional development is to invite personal disaster in the form of obsolescence. I'm not about to let that happen to me! So why not join me as a subscriber to **ENGINEERING GEOLOGY ABSTRACTS**? Contact:

American Geological Institute  
4220 King Street  
Alexandria, VA 22302  
(800) 336-4764 (outside of Virginia)

## ENGINEERING GEOLOGY AND SOILS ENGINEERING CALL FOR PAPERS

The 22nd (biennial) Symposium on Engineering Geology and Soils Engineering will be held on February 26, 27, and 28, 1986, in Boise, Idaho. Papers in engineering geology, geotechnical engineering, and engineering aspects of groundwater are invited. Both oral and poster sessions are scheduled.

Special sessions are planned on: waste disposal and toxic-waste cleanup operations in the soil and groundwater environment, and seismic considerations in geotechnical engineering.

The proceedings volume will be published before the meeting. Deadline for submitting abstracts (limit: one page) is October 30, 1985. Authors will be notified of acceptance by November 20. Final camera-ready manuscripts (limit: 20 pages) must be received by January 25, 1986, to be included in the proceedings volume. For further information, contact the symposium chairman:

Spencer H. Wood  
Department of Geology and Geophysics  
Boise State University  
Boise, Idaho 83725  
(208) 385-3629

## DEADLINE FOR NEXT ISSUE

The deadline for submitting articles, announcements of meetings, job opportunity bulletins, and similar material for the October 1985 issue of **THE ENGINEERING GEOLOGIST** is August 30 (submit your item early if possible). See the guidelines published in the April 1985 issue for suggestions and requirements. Send materials to:

Ted Smith  
California Division of Mines and Geology  
380 Civic Drive, Suite 100  
Pleasant Hill, CA 94523-1997  
(415) 671-4935

## WATCH FOR EGD ELECTION MATERIALS

Election time approacheth! Ballots for next EGD election should be mailed to members no later than about August 15. So, keep your "eyes peeled" for those ballots and VOTE!!!

## GLOSSES ON THE GLOSSARY

By DAVID M. CRUDEN  
Department of Civil Engineering  
University of Alberta

Should engineering geologists try to rely on the Glossary of Geology (Bates and Jackson, 1980)? One trial of mine started with a reference to the foot of a landslide. The Glossary commented, "the line of intersection (usually buried but inferred) between the surface of rupture and the original ground surface (Varnes, 1958)."

A new edition Varnes' paper appeared in 1978, after much review. Varnes (1978) defined the foot as, "That portion of the displaced material that lies downslope from the toe of the surface rupture." Thus, the foot now contained the toe of the landslide and was downslope of the main body - a reasonable anatomy. What had been called the foot was renamed the toe of the surface rupture.

The glossary now gives two definitions of the surface rupture:

- a. "the projection or extension of the major scarp surface under the disturbed material.
- b. "the surface of rock from which the material of a landslide or slump was removed."

Varnes (1958, 1978) did not define the surface of rupture and this may be the source of some of the Glossary's difficulties, so obvious in definition (b). Definition (a) is based on part of Varnes (1958) definition of the main scarp, but the Glossary has substituted "major" for "main." Obviously the differences were not considered to be important since "major scarp" and Varnes' terms ("main scarp" and "minor scarp") are not in cluded in the Glossary. The Glossary generously gives two definitions of scarp, Varnes' (1958) definitions of "main scarp" and "minor scarp", without acknowledging their sources. Varnes (1978) substituted "displaced" for "disturbed" in these definitions reasoning that material may be displaced by slope movement without being disturbed; neither term appears in the Glossary.

Indeed, none of the terms introduced by Varnes (1978) appear in the Glossary. Some of the terms, such as the zone of depletion and the zone of accumulation, recognized new tools for the analysis of slope movements; estimates of the accumulation and the depletion, for instance, lead to an estimate of a lower bound on the friction angle of the displaced material (Cruden 1980). The Glossary is silent on these new ideas.

In total, then, more than half of the seventeen-term nomenclature Varnes (1978) proposed for parts of slope movement is omitted or, worse, misleadingly defined.

An ad hoc committee from the Engineering Geology Division of GSA, the Association of Engineering Geologists, and the U.S. National Group of the International Association of Engineering Geologists, is currently considering revising parts of the Glossary, issuing the revisions as a separate "Glossary of Engineering Geology." If you have comments on the

current Glossary or would like to join a group reviewing terms in a particular subdiscipline of engineering geology, please write to:

Dr. David M. Cruden  
Department of Civil Engineering  
University of Alberta  
Edmonton, Alberta  
CANADA T6G 2G7

## References Cited

Bates, R.L., and Jackson, J.A., 1980, Glossary of Geology: American Geological Institute, Falls Church, VA, 749 p.

Cruden, D.M., 1980, The anatomy of landslides: Canadian Geotechnical Journal, v. 17, p. 295-300.

Varnes, D.J., 1958, Landslide types and processes, in Eckel, E.B. (editor), Landslides and engineering practice: Highway Research Board Special Report 29, p. 20-47.

Varnes, D.J., 1978, Slope movement types and processes, in Landslides: analysis and control: National Academy of Sciences, Transportation and Research Board Special Report 176, chapter 2.

## APPLICATION OF ROCK CHARACTERIZATION TECHNIQUES IN MINE DESIGN

An international symposium, "Application of Rock Characterization Techniques in Mine Design," will be held March 2 to 6, 1986, in New Orleans, Louisiana. Mining professionals and members of the academic community will gather to review state-of-the-art techniques in rock characterization.

The two-day symposium, sponsored by the Mining and Exploration Division of the Society of Mining Engineers (SME) of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME), is being held in conjunction with the Annual Meeting of SME.

About 20 papers will be presented during the four session symposium. Topics to be addressed include exploration and mine planning, selection of mining methods, ground control, and rock breakage. Case studies will be emphasized.

The proceedings will be available at the meeting. Registration for the Annual Meeting includes admittance to the symposium.

For more information, contact:

Meetings Department  
Society of Mining Engineers  
Caller No. D  
Littleton, CO 80127  
(303) 973-9550

## ARTICLES AND FILLERS WANTED

THE ENGINEERING GEOLOGIST needs short "newsy items" of interest to members. So, if an item in a newspaper or other periodical catches your eye, why not cut it out and send it to the editor along with a citation indicating the source of the article. Also include a note with your name and address.

**BOOK REVIEW:  
FUNDAMENTALS OF ENGINEERING GEOLOGY**

Reviewed by ALLEN W. HATHEWAY  
Professor of Geological Engineering, School of  
Metallurgy, University of Missouri-Rolla

One of the sure signs that engineering geology has matured is the increasing (yet still small) number of comprehensive manuals and summary volumes that attempt to treat the vast breadth and depth of our profession. Dr. Frederick Gladstone Bell, of Nottinghamshire, England, has produced one of the latest entries, **Fundamentals of Engineering Geology** (published by Butterworth, London, price \$89.95).

Bell's 648-page book is larger than the average one-course textbook, and the author is careful to point out that his audience is intended to be both student and practitioner. In addition, the book is aimed not only at engineering geologists, but at geologists, civil engineers, and mining engineers.

Every author of an engineering geology textbook faces the enormous task of selecting a meaningful menu while attempting not to exceed the good taste limits of weight and price. Bell approached this task by designing this volume as a companion to his **Engineering Geology and Geotechnics** (Butterworth, 1980) in which he placed the bulk of his treatment of the methods of applied engineering geology. Hence, Bell's new book is organized as a eight-chapter treatment of geologically based topics, followed by five chapters of geotechnically based subjects, and a final chapter dealing with photogeologic and engineering geologic mapping techniques.

The first eight chapters of **Fundamentals of Engineering Geology** will be most familiar to students who are just gaining an appreciation of a spectrum of applied geologic topics; the second half encapsulates the content of several traditional courses in soil mechanics and rock mechanics. The result is a source of subject material that will bring about a greater appreciation of the hows and whys of the importance of lithology, sedimentation, structural geology, stratigraphy, and geomorphology. At the same time, budding and established geologists have the benefit of a condensed treatise on soil and rock properties and behavior.

For the engineer, the first eight chapters of Bell's text provides insight on the properties and behavior of earth materials, as well as the general nature of geologic terranes. Thus, the textbook could be a good (although expensive) source of selected readings for the basic "geology for engineers" course.

Bell provides a good, historic selection and an appreciation of background literature. He also devotes a good deal of text to developing single topics through referenced benchmark works, many of which will be unfamiliar to younger members of the profession. If the book has any shortcomings, it is that the historical treatment of technological development consumes space in a book that is already quite large. This approach may appeal to some readers, but not to others.

Published in 1983, Bell adequately covers significant references published prior to 1979. Although the text is dominated by references from the United Kingdom, most are

available in better technical libraries.

A major advantage to specialty practitioners in engineering geology is that the text provides a moderately deep treatment of individual subjects, backing up the text with lists of references at the close of each chapter.

A second advantage lies in the British propensity (which appeals to this reviewer) to categorize and classify. Today's harried practitioners are faced with treating increasingly complex projects while remaining commercially competitive. Both of these aspects are, in turn, overridden by our concern for accuracy and clarity so as to minimize professional liability. **Fundamentals of Engineering Geology** offers some assistance in meeting these needs through its presentation of categorization and classification - both of which can and should be used to make our work more precise and easier to understand by engineers, contractors, and consumers.

This reviewer is genuinely delighted to see books of this quality. While critics might suggest that the book could have been split into two works (one appealing more to geologists and one more to engineers), I believe Bell has produced a good "suitcase book" -- appropriate for reading on the airplane while traveling to that next out-of-town or overseas project.

**SEISMICALLY INDUCED LANDSLIDE HAZARDS MAPPED**

The U.S. Geological Survey has released Miscellaneous Investigations Map I-1257E, "Map showing slope stability during earthquakes in San Mateo County, California," by G.F. Wieczorek, R.C. Wilson, and E.L. Harp. The map depicts relative susceptibility to seismic slope failures on a regional scale (1:62,500).

Criteria for evaluating seismic slope stability at the scale of this map were developed by combining a static slope-stability analysis with a dynamic numerical analysis developed by Nathan Newmark of the University of Illinois. The analysis utilizes regional geologic, hydrologic, and slope information to evaluate slope stability under static conditions. Strong-motion records from several California earthquakes were used to choose hypothetical (or "design") earthquakes large enough to trigger landslides in San Mateo County. These "design" earthquakes were used in the dynamic analysis to calculate movement of potential landslides. These calculated movements were then used to categorize the geologic map into four degrees of susceptibility (very low, low, moderate, and high).

The purpose of the map is to provide county officials and others with information that could be used to minimize loss of life and damage. Because the estimated susceptibility of each zone is based on limited data within each geologic unit, the map is not adequate or valid for determination of susceptibility at any specific site. However, the map does delineate areas where the probability of landsliding during an earthquake is greatest and where special attention is warranted in general land-use planning activities.

The 40" by 52" five-color map is available for \$3.10 from U.S. Geological Survey, Branch of Distribution, P.O. Box 25286, Federal Center, Denver, CO 80225.

## COMPUTER-ORIENTED GEOLOGISTS SOUGHT

The Computer Oriented Geological Society (COGS) is a professional organization which actively encourages the application of computers in the field of geology. The parent organization is based in Denver, Colorado. Local sections have been established or are starting in other areas.

COGS membership is diverse, including geologists who are merely curious about the use of computers as well as expert geologist/programmers who write and market commercial software. Most members own or have access to a computer, most often a microcomputer. As of March 1985, COGS had over 850 members in 15 countries.

COGS purpose is to act as a clearinghouse of information for geologists. It accomplishes this by:

- o Publishing a monthly newsletter.
- o Holding monthly technical meetings.
- o Publishing a catalog of available geological software.
- o Distributing disks of public domain geological programs.
- o Publishing a membership directory.
- o Co-sponsoring conferences on computers in geology.
- o Operating a remote bulletin board.

COGS is currently considering additional activities such as publishing a technical journal. COGS has just formed an Engineering Geology Applications Committee.

Currently, COGS has five disks of public domain programs available (one in Apple II format, and four in IBM-PC format), for \$10.00

per disk. Most programs are in BASIC, are listable, and can be modified. Space limitations preclude my listing all the programs available, but they include:

Water Well Drawdown  
Decline Curve  
Water Sat (Lotus 123)  
Synthetic Seismogram  
Trend Surface Analysis  
Well Data Base System  
Monte Carlo Risk  
Sorted Directory Utility  
Grid2Con contour map

COGS also has published proceedings of the two technical conferences it co-sponsored (\$5.00 for Geotech '83, \$7.00 for Geotech '84, \$10.00 for both).

COGS invites you to contribute a program. It should perform a task useful to geologists, but doesn't need to be fancy or complicated. COGS will edit the program to provide titles, menus, error trapping, and help screens.

COGS is also looking for volunteers to translate programs to other disk and computer formats.

And, now, what you've all been waiting for, the dues. Yes, this is, in my opinion, one of the all-time bargains. Dues are \$5.00 per year.

Join your editor in joining COGS. For more information, order forms, and membership applications, contact:

Computer Oriented Geological Society  
P.O. Box 1317  
Denver, CO 80201-1317



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