

ASSOCIATION OF ENGINEERING GEOLOGISTS

"Serving Professionals in Engineering, Environmental, and Ground-Water Geology"

THE ROCKY MOUNTAIN SECTION NEWSLETTER

www.aegrms.org

MEETING DATE

**THURSDAY
APRIL 11, 2002**

TIME

5:45 p.m. Social Hour
6:30 p.m. Dinner
7:30 p.m. Presentations

LOCATION

GEOLOGY MUSEUM
Colorado School of Mines
Golden, CO
See map below

COST

\$20 Members
\$22 Non-members
Free for Students

RESERVATIONS

c/o AEG Reservation Line
(303) 790-2161 x 243 or
meeting@aegrms.org
**BY NOON, FRIDAY
APRIL 5th**

ROCK MECHANICS: A COMMENTARY

Harry L. Siebert

Since 1958 rock mechanics has changed dramatically and is recognized in many fields from mining, petroleum exploitation, rock slopes for civil engineering projects, engineering geology, military geology, etc. Within this timeframe we have gone from a Frieden Calculator to the mainframe computer to the work station or PC. In the 50's rock slope failure was related to planar features. Borrowing from soil mechanics, mohr-coulomb and elasticity, equations were developed to provide stability computational formats. Stress strain, static and dynamic rock properties were determined for slopes, roof support and foundations. Kiersch summarized engineering in a 1955 CSM publication that did not discuss rock slopes or rock mechanics.

A conversation with Rosinski, a member of Werner von Braun's staff in 1959, touched on the development of rock mechanics in post WWII Germany. Some of the work dealt with military considerations or a hardened facility and fracture mechanics involving explosive energy. In the construction of rock tunnels and rock cuts for railroads, rock strength and planar features were considered. Now I wish the discussion could have continued and I kept notes. I had done some consulting relative to mine slopes and the information was limited to the USBOM station and the mining department.

In 1962, I suggested the re-design of rock slopes on a highway project in CT as a cost saving measure. The maximum cut height was 280'. This highway construction project was the first to utilize pre-splitting. In the mid-nineties a review indicated the re-design was successful and one problem that occurred during construction of a through cut that encountered a coarse crystal muscovite mica schist with a cross

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fault of gouge and graphite. The slope was laid back. One cut section encountered ground water and many times during the winter a lane or the entire southbound lane can be closed due to massive ice falls during the spring thaw.

Blasting and rock slopes have been a consideration since the 1950's and maybe the Niagara powerhouse and the adjacent St. Lawrence seaway project is a good example. Colorado has three projects that involved rock mechanics; NORAD facility at Cheyenne Mt., Morrow Point underground powerhouse and intake, and the 1800' flume north of Uravan.

The following rock mechanic practitioners that I have found useful are: Obert, in-situ stress; Clark, blasting and rock fragmentation; Langefors, rock quality and blasting; Muller, rock slope design; Coates, rock slope and analysis; Deere, underground, surface slope and RQD; Duvall, stress and blasting; Cook, rock failure; Terzaghi, rock quality and surface and underground; Bauer, rock fragmentation; Goodman, underground and artificial support; Jaeger, fracturing; Hoek, rock mass behavior; Maurer, drilling; Carstens, drilling and rock quality; Brawner, slopes and blasting; Pariseau, rock slopes; Abel, rock slopes and underground; Hustruid, rock slopes and blasting; Lane anything with slopes. There are others whose work I am familiar with, especially contractors. One person retired from Hercules introduced me to pre-splitting and how to reduce blast damage.

The Hyatt in Black Hawk with a 300 ft. cut and a number of innovative rock construction details was successful and cost effective only because of engineering geology during land acquisition. Richman Rd. was considered a utility corridor even though the city did not so consider it. No service interruptions occurred with over 800,000 cy of rock fragmented with explosives and removed.

A subject I became interested in was prompted by an incorrect analysis of why Threatening Rock failed in a book on Chaco Canyon. The use of quarried rock about 1000 yrs ago to construct structures up to four stories requires some additional research on my part. Threatening Rock was 97' high, 140' long and 34' thick weighing about 30,000 pounds. Buttresses were constructed of logs, stone, earth and masonry to slightly below the 3rd point. This type of stabilization is still used but is being replaced by other modern methods of artificial support. I have to give credit to the Anasazi for an artificial support system that lasted 1000 years more or less.

ENDING

Some areas I have observed that require an engineering geologist or geological to determine if anyone is interested:

1. The installation of drainage at the toe of a final slope requires a well thought out design and tight specifications where rock is to be fragmented to excavate a trench for the installation of a pipe. At Wolf Creek Pass last year, 3" boreholes 10' deep and four foot on center a few feet off the toe were utilized to fragment the rock for excavation. The amount of damage to the toe had to be substantial. I thought we stopped this practice in the 1960's. This is not the only cut in this state that I have seen a similar approach to rock fragmentation.
2. Coal Bed Methane extraction many times involves large amounts of water being removed from a natural gas well. Someone should be requiring that instrumentation be installed to monitor any loss of elevation of the original ground surface.
3. Rock slope design for above ground rock cuts must consider the material above the top of cut "catch point" even if it requires 2000' of slope to be analyzed. Some states and quarries are not doing this and it is a safety issue with both OSHA and MSHA.
4. Safety first and then aesthetics.

Spring 2002 Speakers and Locations

May 9th – CSM Museum – Vince Matthews, Colorado Geological Survey, Should We Be Concerned About Earthquakes in Colorado?

Please let Peggy Ganse or Tim Petz know if you or someone you know would be interested in giving a talk at an upcoming RMS meeting.

Vail 2003 Meeting Update

At the February, 2002 Section Meeting we held a vote for three themes for the meeting. "Engineering Geology with an Altitude" received the most votes with 43, "Elevating the Profession" won 27 votes, , and "Rocky Mountain High - Colorado Geology" won 17 votes. Most

likely we will chose the theme of "Engineering Geology with an Altitude".

The planning committee will have a meeting up in Vail in late April or early May. Also, the Rocky Mountain Section will have a booth at the Reno meeting in September, 2002. The Section needs volunteers to man the booth during the meeting. Contact Mike Hattel (303-665-1400 or mhattel@msn.com) if you would like to man the booth, if you want to help with the 2003 meeting, or if you want to be put on the Vail 2003 email list.

Call For Papers!

The deadline for submitting abstracts to be considered for the AEG Annual meeting in Reno, NV is May 1st, 2002. Please submit before this date to be considered. Get online at www.aegweb.org for more info.

Utah Geologists' Licensure Bill Passes!

House Bill 96 - for the licensure of geologists in the State of Utah – has passed and will be written into law. The bill passed March 6 at 10:42 pm, 73 minutes before the legislature adjourned for the year.

Utah now will require geologists practicing for the public to be registered. A proposed amendment to delete a grandfathering clause failed.

For more information about Utah HB 96, including a copy of the bill as passed, see <http://www.le.state.ut.us/~2002/htmdoc/hbillhtm/hb0096.htm>.

Informing Colorado AEG Delegation

AEG and AIPG are involved in getting geologists licensed in Colorado. There will be presentations and a symposium regarding this topic in Reno, NV, during the AEG Annual Meeting. Please attend to help our cause.

Symposium at Rocky Mountain GSA Meeting 2002

An engineering geology symposium entitled, "Hillslope and Mountain Slope Hazards in the Rocky Mountains" will be held at the 2002 Rocky Mountain Section meeting of the Geological Society of America on May 7-9, 2002 in Cedar City, Utah. The goal of the symposium is to gather those geologists and engineers in the region who are dealing with all varieties of slope issues to share experiences, research, and solutions. Information on the meeting can be found at <http://www.geosociety.org/sectdiv/rockymtn/02rmmtg.htm>. Abstracts are currently being accepted for the symposium, so if you are interested in speaking, please contact one of the symposium organizers (Paul Santi, psanti@mines.edu 303 273-3108 or Francis Ashland, fashland.nrugs@state.ut.us 801 537-3380).

Rocky Mountain Section Outreach Program

Attempts are being made to increase member participation in the outlying areas of the section. If you have ideas for an event, contact Ed Friend at webmaster@aegrms.org.

Tunneling Symposium at AEG 2002 Reno

Peggy Ganse will be chairing a half-day symposium on behalf of the AEG Tunneling Committee at the upcoming Annual Meeting in Reno this fall. The symposium content and speakers list is still under development, so any interested parties can contact Peggy pastchair@aegrms.org with input.

Geological Society of America National Meeting 2002

The 2002 GSA meeting will be held here in Denver this October 27-30. The Engineering Geology Division of GSA is beginning to assemble a program. General information on the meeting and the forms for submitting session

proposals is available at <http://www.geosociety.org>. If you have questions for which you cannot find the answer on the web page, please contact Judy Ehlenor jehlen@tec.army.mil or Bill Haneberg, bill@haneberg.com.

Below is the last deadline:

July 16, 2002 Abstracts due by midnight,
Mountain Daylight Time.

Summer Field Course in Neotectonics and Paleoseismology

For the second year, Dr. James P. McCalpin will teach a 2-week course on Field Methods in Neotectonics and Paleoseismology in the Rio Grande rift of south-central Colorado. Course emphasis is on mapping active faults (Week 1) and analyzing such faults in trench exposures (Week 2); there are abundant examples in the San Luis Valley. The course text is Paleoseismology (Academic Press, 1996) for which Dr. McCalpin received AEG's Claire Holdredge Award in 1999. However, this is primarily a field course that teaches GPS/GIS field mapping, trench placement, excavation strategies, shoring systems, trench logging techniques and computer retrodeformation analysis. For more detail, browse the GEO-HAZ website at www.geohaz.com and enter the Crestone Science Center pages.

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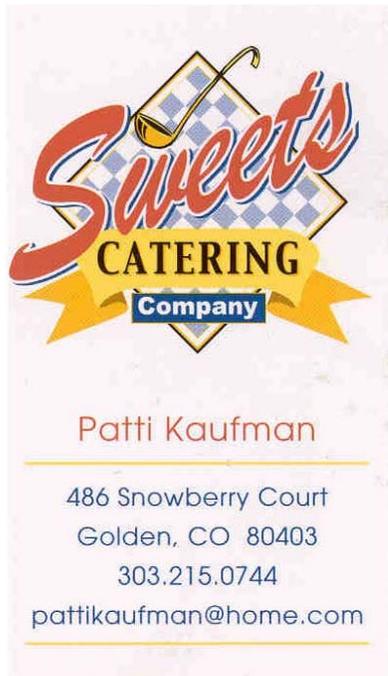
Aspiring Employees

Many resumes from students graduating in the very near future have been received. Employers, please contact Tim Petz chair@aegrms.org for information regarding potential employees for

summer part-time or full-time work. Students can drop off your information with Tim at the meetings or via e-mail.

Your Business Card Here

The section is looking for companies or individuals who would like to advertise their products or services in the section newsletter and on the website. This is anything from a business card (\$10/month), quarter page spread (\$20/month), to a half page exposition (\$40/month). If you are interested, contact Ed Friend webmaster@aegrms.org or Kristi McQuiddy newsletter@aegrms.org.



Section News

1. Jessica Humble is actively seeking speakers for the CSM Student Section. Please contact her at student-chair@aegrms.org if you are interested in sharing your knowledge and experience.
2. Please forward any newsworthy items to Kristi McQuiddy newsletter@aegrms.org by the 20th of the month.

Do you have E-mail?

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Addresses/updates may be sent to Scott Walker (secretary@aegrms.org)

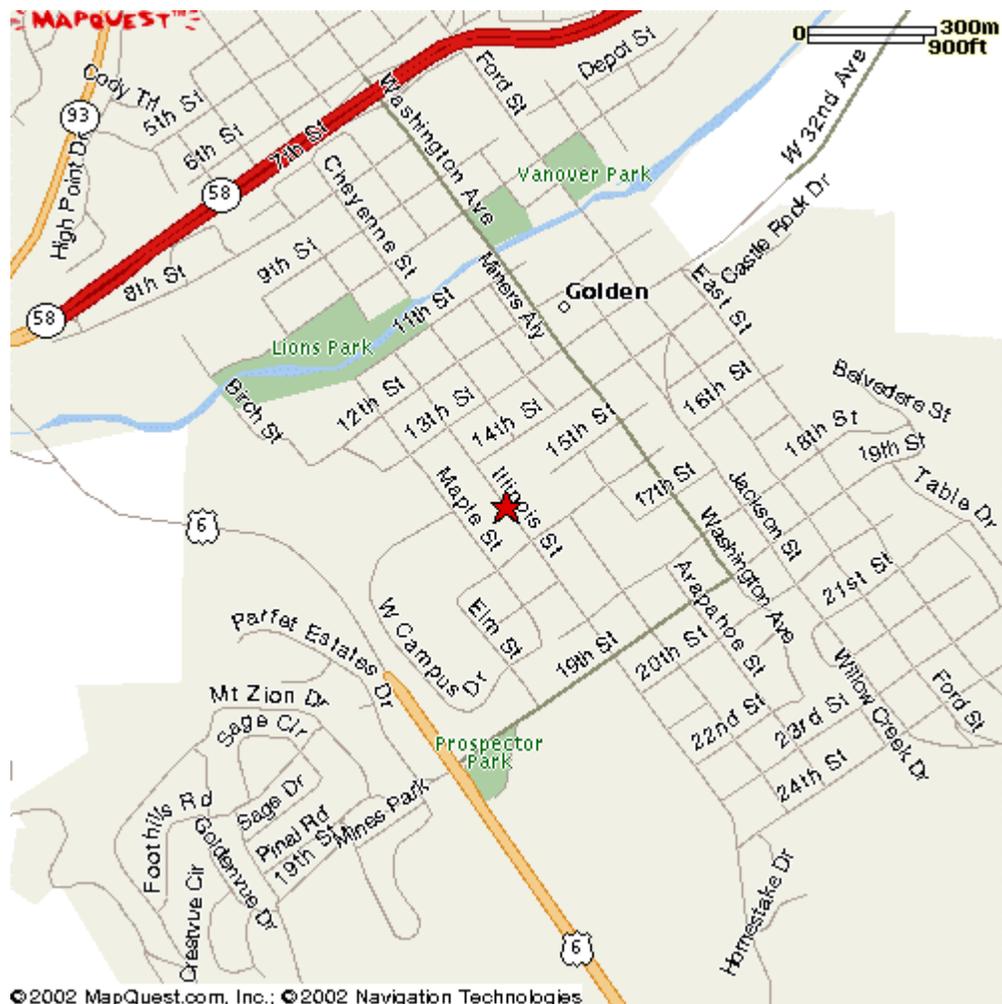
Section Chair's Corner

It was a St. Patrick's Day Fiesta. Sweets Catering provided the best corned beef, cabbage, and Sheppard's pie in the land. We all ate very well and had leftovers to take home! Our AEG President Myles Carter came in from his home town of Montreal to talk about 'Analysis and Remediation of Structures Affected by Heaving and Sulfatation caused by Pyrite Bearing Granular Fill'. He did a great job, and we all had plenty of questions for him afterward. Debra Tilford-Green was our distinguished guest for the evening. Thanks to both Myles and Debra for traveling to the Rocky Mountain Section of AEG.

VAIL 2003, it is going to be huge!

Your President

Tim Petz



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