

ASSOCIATION OF ENGINEERING GEOLOGISTS

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

THE ROCKY MOUNTAIN SECTION NEWSLETTER

www.aegrms.org

MEETING DATE

**THURSDAY
OCTOBER 3, 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
SEPTEMBER 27th**

Change in Meeting Date

The October meeting will be one week early this month on October 3, 2002. Please mark this on your calendar and RSVP by no later than Friday, September 27, 2002. There was a great turnout last meeting, but the caterers were running low on food. Please RSVP on time so we can provide them with an accurate head count and they can provide us with plenty of wonderful food.

The Tenuous Relationship between Groundwater and Wood Piles in Back Bay Boston

James R. Lambrechts, Member ASCE
Haley & Aldrich, Inc., Boston, MA

Why are the wood pile foundations of the last century rotting away today in some areas of Boston? It can be a very expensive home repair if you suddenly discover that your stately rowhouse has rotted wood piles, to the tune of a quarter million dollars or more. Why is this happening? Come and listen to a presentation on the geology, construction history, and remedial foundation repairs needed at many of the 125+ year old rowhouses in several of Boston's historic and expensive neighborhoods.

The stately brick rowhouses in Boston's Back Bay and surrounding areas were built in the late 1800's. The land filling of the mud flats that were literally the Back Bay area took 30 years, beginning about 1860. Because of the unique post-glacial geology, the wood piles only had to be about 30 feet long, being driven through the then-recent fill and organic deposit (formerly the mudflats of the tidal estuary), and reach bearing on the crust of the thick Boston blue clay or overlying sand (where present).

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So within a generation, the former tidal estuary was filled, in what was one of the worlds largest earth-moving projects, and became very desirable neighborhoods. Builders of the day knew that the wood piles had to be kept submerged below groundwater for their preservation, and wood pile cut-off levels were therefore set some depth below the prevailing groundwater level. In the same period, the city installed extensive sewer network, parts of which were replaced and expanded early in the 20th century. Given that the Back Bay area is essentially flat, and the filling was only to about seven feet above high tide, and most houses were built with half basements, it follows that the major intercepting sewers would have been installed below groundwater.

The construction of sewers with invert levels below groundwater level, and the need to keep wood piles submerged below groundwater for their long-term preservation, has in some areas been found to be conflicting realities, in which the wood piles invariably lose. The first notable example was in 1929, when an investigation of settlement at the Boston Public Library discovered rotted wood pile tops under about one-third of the building. The underpinning required is an arduous process of excavation by hand beneath the building to expose the rotted tops of wood piles, one by one. These are then cut off, and replaced with steel posts that are then encased in concrete. The repair technique has changed little in the past 70 years. In the 20th century, many more structures have been built below groundwater level, and some have impacts on groundwater levels.

These issues, current efforts to determine where the groundwater table is today, the geology of Boston and the aspects of the below ground constructions that have led to the current problems of lowered groundwater and rotting wood piles will be discussed in some detail.

Case Histories

This is a guest column we hope to continue with contributions from AEG members. Harry Siebert has again offered a column. We are looking for other professionals to share their insight and knowledge with their peers through this medium. If you have an article to contribute contact Kristi McQuiddy newsletter@aegrm.org.

Rock and the Drought

Harry L. Siebert

I am sure many members have been involved with engineering geology because it afforded field work. In the '50s a summer field camp was required for geology majors. Today I would state that field

observation is necessary. I have the opportunity to view rock cuts that are a problem, and fills over less competent rock. I think with 3 years of drought in the Four Corners it is obvious that problems of stability exist even without significant snow or rain. The action of wind, diurnal temperature variations of 50+ degrees, loss of moisture, etc are still active. If you have a rock cut or oversteepened cut on your way to the office or field observe it and stop to view the rate of change-be an observer.

My associate and I viewed the wind erosion of slopes along the road to the Eldora Ski Area. My wife raised the question relative to the long term erosion on the slope stability. It was a winter without much snow cover and the winnowing of fines was a problem. One recommendation was draping mesh over the slope to reduce the rate of erosion. If it was a steeper slope then lightweight geotextile fabric under chain link works well and is cost effective.

Block fall on slopes both natural and constructed are still active. In fact some county roads have failures that were stable in the past. The hot temperatures of the summer dried cohesive material that eroded causing a rockfall. This is not new and has occurred in Arizona and this state before. The character of the talus accumulation is an indicator of potential block fall conditions. The sandstone unit underlain by a black shale will not be stable over time. Units of the Mancos shale really can weather rapidly due to pyrite and gypsum dissolution.

Another mechanism can be sapping which Kirk Bryan, a ground water geologist in the southwest, later a Harvard faculty member, described. The process can cause significant blockfall conditions. The source of the subsurface water is usually intersecting joints and this water can also be chemically active.

A recent failure of a fill over 20 feet thick on a clay rich unit of the Mancos on Highway 160 has been active for over 12 months. The loss of roadway and shoulder required stabilizing the toe of the slope. I wonder where stability or relieving

berms have gone. This failure in dry desiccating conditions is unusual. The strength of a clayey shale when dry is very low and improves rapidly with water and re-molding. Failure of clays when dry or saturated is not a new concept.

In late July, a slide near Abiquiu, New Mexico, closed a state highway for a short time. The cut slope was unstable one week prior to the slide. A bridge engineer from New Mexico DOT stated it was due to a thunderstorm. The slope would have failed without the storm.

Coal Bed Methane (CBM) and underground coal mining have caused surface cracks to occur. Topsoil is sensitive to subsurface extraction of gas or solids due to a volumetric change. CBM may require the disposal of large quantities of water to capture the methane. Readjustments can be minor and with normal precipitation they are not visible, the cracks maybe considered "self healing". Tom Holzer could go on for days on this subject. In my opinion every CBM well should be monitored for surface elevation changes. One of these days someone is going to claim some surface water because the drainage has been altered.

I feel that in the preliminary design of projects involving rock and soil mechanics the change in strength and density due to natural conditions are considered as the numerical values are minor. If an average is adequate why not review minimum and maximum first and then determine the parameters.

CSM Student Auction

The Student Chapter of the Rocky Mountain Section of AEG will have a silent auction to raise money for student section activities during the November meeting (November 14, 2002).

Mmmm Beer

The beer names for the Vail 2003 meeting have been determined and the winners are . . .

1. Core Lager
2. Amber Magma
3. Rock Bock

Labels will be printed up and samples will be ready in the near future.



RMS 2002-2003 Speakers

October 3, 2002 - Jim Lambrechts, Haley and Aldrich, *Boston's Rotting Wood Piles*

November 14, 2002 - Tony Stirbys, *I-25 Corridor Project*

December 12, 2002 - TBD

January 9, 2003 - TBD

February 13, 2003 - Student Night, *Students from South Dakota School of Mines and Technology and Colorado School of Mines*

March 13, 2003 - TBD

April 10, 2003 - TBD

May 8, 2003 - TBD

Workshop on Collapsible Soil and Evaporite Karst Hazards

The CGS is hosting a one-day workshop on collapsible soils and evaporite karst hazards in the Lower Roaring Fork River corridor on Friday, October 18, 2002, at the Eagle County Community Center in El Jebel. Technical presentations are scheduled for the morning with an informal field trip after lunch. The registration fee is \$65 and includes topical papers on collapsible soils, sinkholes, and the Carbondale Collapse Center, in addition to coffee service, lunch, and soft drinks. The field trip fee is \$15. Registrants will also receive the new CGS publication, Map Series 34, *Collapsible Soils and Evaporite Karst Hazards Map of Roaring Fork River Corridor, Garfield, Eagle, and Pitkin Counties*. Visit the CGS webpage http://www.geosurvey.state.co.us/pubs/evaporite_conf/index.htm for additional workshop information, a list of speakers and their topics, and a registration form. For registration by phone, call Betty Fox at (303) 866-3330 or e-mail: betty.fox@state.co.us.

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.

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@aeqrms.org.

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.



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Words from the Chair

On behalf of the AEG Rocky Mountain Section Officers I would like to welcome everyone back for the 2002-2003. This season has and will be, an action packed adventure ride starting with the AEG Headquarters relocation to Denver and finishing with the 2003 AEG Annual Meeting in Vail. From time to time the Rocky Mountain Section may become more involved in general AEG activities because the new Denver headquarters is geographically appealing for routine Board meetings. If this is the case then I'm sure our members will rise to the occasion, if called upon.

My main focus for this season will be serving our members, however, our main focus as a Section will be hosting the September 15-21 Annual Meeting in Vail. I will be working with the Annual Meeting Committee Chairman Mike Hattel and providing support from our existing resources by passing along vital information and broadcasting requests for volunteers.

The first section meeting of the season is of course, the last meeting conducted by the outgoing Chairperson, none other than Tim "The Energizer Bunny" Petz. Those of you who have worked with Tim know what I mean. His boundless energy and dedication helped make the 2001 – 2002 AEG – RMS season a record breaker, not to mention, a hard act to follow. Thanks again Tim.

Jim Wright

Colorado Ground-Water Association to Host McEllhiney Distinguished Lecture

The Colorado Ground-Water Association will be hosting the National Ground Water Association 2002 McEllhiney Distinguished Lecture Series. John Schnieders of Water Systems Engineering, Inc. will lecture on **Chemical Rehabilitation of Wells**. This will be followed by a discussion session with opportunity to review local case histories with contractors and consultants. John Schnieders is a dynamic speaker with a vast wealth of knowledge about water wells and water well rehabilitation.

The lecture and workshop will take place in Room 108 at Berthoud Hall at the Colorado School of Mines campus in Golden between 9:00AM and 12:00 noon Saturday, October 12, 2002. Refreshments will be provided. CSM students are welcome.

The CGWA is grateful to Johnson Screens for helping make this event possible.

Vail 2003 Update

There will be a kickoff meeting during the GSA convention in Denver. The meeting will be either the evening of Monday or Tuesday October 28, or 29, 2002. More information to follow.

Aspiring Employees

Many resumes from students graduating in the very near future have been received. Employers, please contact Tim Petz pastchair@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.

Transportation-Related Geotechnical Issues to be Discussed During October 4, 2002 Conference in Denver

The Geotechnical Group of ASCE is planning a 1-day Conference to be held at the Marriot Hotel Southeast on October 4, 2002 entitled: **“More Than Just Lines on a Map: Geotechnical Engineering in Transportation.”** James R. Lambrechts of Haley and Aldrich will give the Keynote Address that summarizes geotechnical innovations developed during Boston’s “Big Dig.” From there, recent transportation-related geotechnical projects across the U.S. and in Colorado will be discussed. New geotechnical research results will also be presented that advance geotechnical design. The conference will be a single-track, one-day event on Friday. Typically, 150 professionals attend the biennial conference. AEG-RMS, CAGE and the CGS will join the geotechnical group in hosting the conference.

Five special sessions have been convened for the conference:

- Foundation Solutions in Transportation
- Slope Stabilization
- Tunnels
- Colorado Challenges
- Geological/Geotechnical Characterization

Projects discussed will include:

- T-REX
- Telluride Airport
- E-470
- Zion National Park highways
- Wolf Creek Pass
- I-70 Corridor
- DIA
- U.S. 285 Windy Point
- Woodrow Wilson Bridge
- Snowmass Canyon State Highway 82
- State Highway 119, Blackhawk

The following research results will be presented:

- Pile driving in the Denver Formation with correlations to unconfined compressive strength
- Drilled shaft load testing in the Denver Formation
- Drainage of landslides using horizontal wick drains
- Surficial stability of earth slopes
- Influence of rock mass parameters on TBM performance
- Use of project-specific database and GIS
- Resilient modulus from direct measurements
- Driving piles through geogrid
- 2D&3D Crosshole Sonic Logging Tomography (CSLT)
- Geosynthetics to reduce swelling
- Micropiles for excavation support
- Use of handheld computers to facilitate data collection

The conference will include poster sessions and exhibits by companies and organizations. The

luncheon presentation will be by Arturo Resi di Cervia from the Trevicos Corporation who will reflect on our geotechnical industry from a contractor's perspective. Bob Barrett, Dr. Jonathan Wu, and Al Ruckman will give a closing presentation on "Issues of Responsibility" following the technical sessions.

The conference program and registration form may be accessed on our website:
http://sections.asce.org/colorado/tec_grps/geotechnical/prelim.html

Parting Words

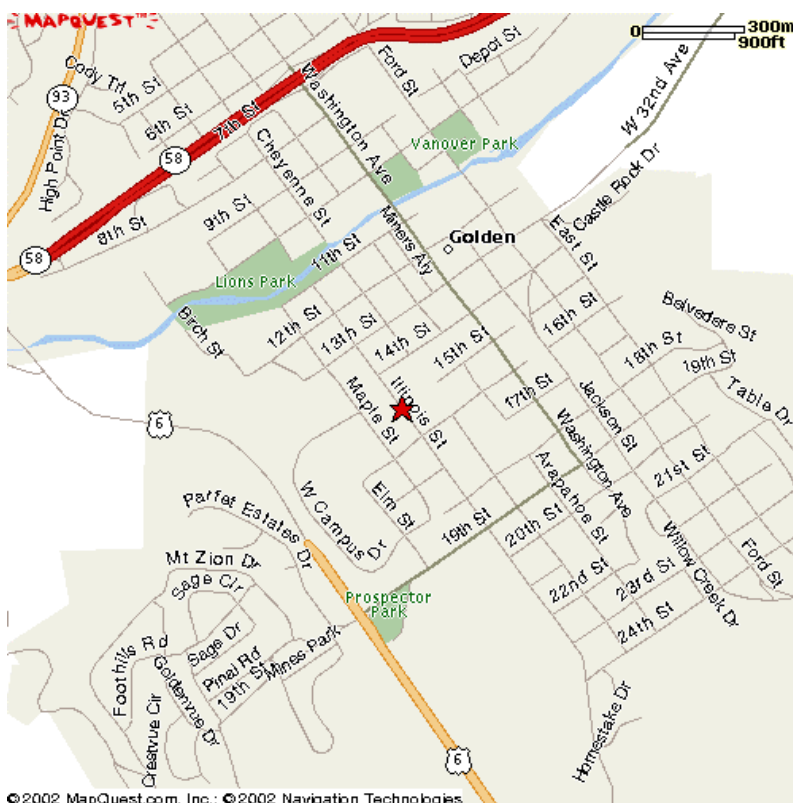
The turnout at the last meeting was great for our 2002-2003 kickoff. Many people fought through the driving rain to listen to Roy Spitzer give an interesting and informative presentation on the

outlet works portion of the Standley Lake Rehabilitation Project.

A big thanks to Harry Seibert for his continued contributions to the newsletter with his case histories. There is a vast resource of knowledge in this section, hopefully some more people will be willing share some of their knowledge and experience with the section through this forum. Please contact either one of us and we will be happy to assist you in any way we can.

The Editors

Ed Friend
Kristi McQuiddy



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