



The Official

# Newsletter

of the Oregon Section Association of Engineering Geologists

Serving Professionals in Engineering, Environmental, and Groundwater Geology

## OCTOBER 2004 SECTION MEETING

GUESTS: Bob Burk, URS, and Norm Norrish, Wyllie & Norrish

### PRESENTATION: Washington SR-20 Rock Avalanche – Characterization, Analysis, Monitoring and Mitigation

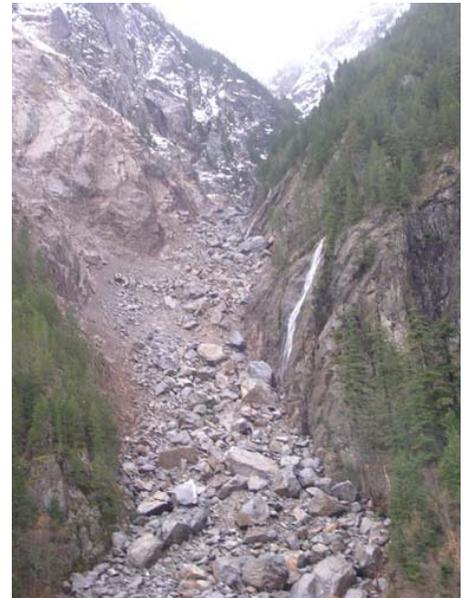
On November 9, 2003 a 1,000,000+ cubic yard rock avalanche traveled up to 2,000 feet downslope and closed State Route 20, the North Cascades Highway, near Newhalem, Washington. The primary failure occurred along an imbricate fault zone in Tertiary age Skagit Gneiss in Afternoon Creek drainage, with secondary material traversing down an avalanche chute in Falls Creek drainage to the road.

Immediate risk to the public included additional rockfall, rock avalanches and debris flows. The area of slope failure was highly dilated along pre-existing discontinuities and intact rock fractures. This area was considered susceptible to continued rockfall and additional major rock avalanches. Lack of water issuing from the rock avalanche debris in Afternoon Creek drainage after the slope failure led to concern about remobilization of the debris and blocking of the Skagit River, thereby endangering downstream

communities. Smaller amounts of debris entrained in Falls Creek was considered highly likely to mobilize onto the road because of the steep direct path to SR-20.

Monitoring included aerial reconnaissance, conventional survey prisms monitored with a total station instrument, and three electronic instrument packages installed by the USGS. Data were telemetered from geophones, tiltmeters, extensometers, a water-level pressure transducer and a tipping bucket rain gauge. A second rock avalanche on December 19, 2003 was successfully predicted using monitoring data.

Based on an assessment of risk, mitigation measures considered were removal of the hazard, slope



reinforcement, and protection of the highway. Removal of the hazard was rejected because of the diffi-

*(Continued on page 3)*



**This Month's Meeting is on Tuesday October 19**

**Luck Labrador Brew Pub  
915 SE Hawthorne Blvd  
Portland, Oregon**

6:00 pm Social  
7:00 pm Dinner  
8:00 pm Presentation

\$12.00 dinner (\$6.00 for students).  
Options: Chicken or Veggie Bento

Call or leave voice mail at  
503-639-3400 ext. 433 by 4 pm

Thurs. Oct. 14 with your  
reservation. There is a \$2.00  
surcharge for those who do not  
reserve by the deadline. Call now!

## MESSAGE FROM THE CHAIR

Congratulations to you all. At the AEG national meeting in Dearborn I had the pleasure of accepting, on behalf of the Oregon Section, the **2004 Outstanding Section** award. That was followed by Soren Clark accepting the **2004 Outstanding Student Chapter** award for the PSU Student section. Thank you to all of you who worked hard last year to make the Section a success. Special thanks to Warren Krager and the board for the leadership, Dave Scofield and those that worked with him for The Dalles Dam field trip, and the many of you who put last falls short course Slope Stability for

Transportation Systems together. I look forward to working with all of you in the coming year. Your entire board, and committed membership, can take credit for bringing this award to Oregon.

I would also like to recognize Dorian Kuper who is now Secretary of the national AEG organization, on a path to become president in four years. Ruth Wilmoth and Andrew Harvey are also serving on AEG committees implementing our new Strategic Plan. Scott Burns, although officially retired from the Executive Council, will never relinquish his enthusiastic presence

in the national organization.

I will be coming to the October meeting with an update on Association affairs, and on the implementation of the new Strategic Plan. I urge you all to go to the website, [www.aegweb.org](http://www.aegweb.org), review the Strategic Plan (in the members section) and bring ideas for your section to implement that plan.

I look forward to seeing you all on Tuesday, October 19 for our first meeting of the program year.

*Rowland French*  
*AEG Oregon Section Chair*

Oregon Section AEG was presented with AEG's 2004 Outstanding Section Award at the Annual Meeting in Dearborn Michigan. Rowland French, Chair of Oregon Section AEG, accepted the award from AEG President Dave Simon



Portland State University Chapter was presented with the AEG's 2004 Outstanding Student Chapter Award. Soren Clark, President of the Student Chapter accepted the award from AEG President Dave Simon

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scriptions are free.

News items are invited and should be sent to: Charlie Hammond, OR Section AEG Newsletter Editor, Cornforth Consultants, 10250 SW Greenburg Road, Portland, OR 97223, email: [or.aeg.news@cornforthconsultants.com](mailto:or.aeg.news@cornforthconsultants.com), phone (503) 452-1100. Electronic me-

dia is preferred. Deadline for submittal is Friday three weeks before each meeting.

Please notify Charlie if you have a change to your email or mailing address.

# OREGON SECTION OFFICERS & COMMITTEE CHAIRS



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culty of working high on the slope, some 2,000 feet above the highway, and the risk of creating progressive failure that would further destabilize the mountainside above the current failure area and lead to a more severe hazard. Reinforcement was rejected because of the block size, and construction access difficulties. Protection of the roadway was the preferred mitigation measure. Six options were defined. Based on cost, these options were narrowed to three primary options. Option 1 was excavation of an embayment that provided a catchment area for reasonably foreseeable rockfall events that would likely have a direct impact onto SR 20. Option 2 was a rock shed that would allow any rockfall, rock avalanche, snow avalanche, or debris flow events to pass over the road and into the Skagit River channel. Option 3 involved moving SR 20 onto an embankment built in the Skagit channel, thereby creating a basin to

contain any of the likely mass wasting events. Based on rockfall modeling, a geotechnical investigation and cost analysis, Option 1 was selected. Rockfall modeling presented challenges based on the 2,000 foot-long trajectory.

### Speaker Bios

Bob Burke, LEG., PhD, Quaternary Research Center, University of Washington, 1979; MS, Geology, University of Washington, 1971; BS, Geology, San Diego State University, 1969. Dr. Burk has 32 years of national and international experience in the practical application of engineering geology to both large and small-scale engineering projects.

Norn Norrish, PE, MASc

Rock Mechanics, University of British Columbia, 1974; B.A.Sc., Geological Engineering (Geotechnical Option), University of British Columbia, 1971; M.A.Sc.. Mr. Norrish has 32 years of experience in a wide variety of geotechnical studies for mining, transportation and civil construction. Particular specialties include rock slope design and stabilization, tunnel rehabilitation, rock mechanics and blasting.



## NEWS ITEMS

### AEG Oregon Section Website Seeks Sponsors:

The Board is pleased to announce the opportunity for corporate sponsorship of our Oregon Section website. Companies can have their name, logo,

and link to their website displayed on the Oregon Section website for a nominal fee of \$100 per year. Benefits of sponsorship include high visibility within the AEG community and support of the AEG section. Come

on!!!... Do it now!!!... Put the heat on the company bean-counters!!!... Email George Freitag (gfreitag@gri.com) if interested or for more information.

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## AEG OREGON CALENDAR

**Nov 30:** Jim O'Connor, USGS, Glacier changes at Three Sisters over a century

**Dec 21:** Christmas Holiday

**Jan 18:** TBA, Joint Meeting with

ASCE Geotech

**Feb 15:** Ryan Shelby, Geo-Tech Explorations, Drilling Methods

**Mar 22:** Matt Rea, US Army Corps, Willamette River Basin Management

**Apr 19:** Student Night at PSU

**May 17:** Jeff Keaton, subject TBA

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## THANKS FOR SUPPORTING OREGON AEG!

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