

## *CURRICULUM VITAE -DALE R. MARCUM*

Principal Geologic Engineer

### **Current Address**

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### **Registration**

Registered Professional Civil Engineer in California, No. 65837

### **Education**

M.S., Geotechnical Engineering: University of California, Berkeley, California, 1987  
B.A., Geology: Western State College, Gunnison, Colorado, 1983

### **Representative Experience**

Mr. Marcum has over 27 years of professional experience in the geotechnical consulting field, working on geologic and geotechnical engineering projects in both northern and southern California, Hawaii, Colorado and Utah.

Mr. Marcum has a background in both geology and geotechnical engineering and has combined these disciplines as a geologic engineer (Registered Professional Engineer) specializing in earth and rock slope stability issues. Mr. Marcum currently teaches the rock mechanics portion of an annual slope stability course presented by the University of Wisconsin. He has also presented technical lectures on a variety of subjects including instrumentation, landslides, engineering geology, rock toppling and rock fall case histories, and co-led geological engineering tours of the Bay Area with Dr. Richard Goodman for the 45<sup>th</sup> and 47<sup>th</sup> American Rock Mechanics Association Symposiums. He has worked on many large landslides, including the Love Creek Landslide in Santa Cruz, the Big Rock Mesa Landslide in Malibu, The Hulu-Woolsey and Ailuna-Leighton landslides on Oahu and the Ocean Trails landslide in Palos Verdes. Mr. Marcum has also performed geological engineering review services for a ski resort expansion in landslide terrain in Crested Butte, Colorado, and has provided rock slope stability mapping and peer review services for an interstate widening project in Utah. He also served on an appeal panel for Draper City Utah regarding development within landslide terrain in the Traverse Mountains. Mr. Marcum also served as an independent reviewer for the characterization and analysis of a potential rockslide at PG&E's Diablo Canyon Nuclear Power Plant. He is currently serving as a technical reviewer for an engineering geologic investigation and geotechnical analysis of the White Point Rockslide in Palos Verdes. To date, the work has included aerial photographic research, engineering geologic reconnaissance and mapping, downhole logging of large diameter borings, logging of small diameter core, review of laboratory data and engineering characterization of the earth units, and review and comment on finite element modeling results. Mr. Marcum has mapped and designed repairs for steep rock quarry slopes in San Francisco (recently completed the Telegraph Hill-Chestnut Street project) and steep rock slopes above hydro facilities in the Sierra.

Mr. Marcum has extensive experience performing geological engineering hazard assessments of rock and soil slope stability for hydro-electric water conveyance facilities in the central and northern Sierra Nevada.

## **DALE R. MARCUM (cont.)**

This work includes stability assessments of over 240 miles of canals and flumes, 19 penstocks, 5 siphons and the abutments of 8 dams. Mr. Marcum also evaluated the landslide and debris flow potential along an 8-mile long diversion pipeline in the Sierra Nevada, and assessed the stability of two water conveyance tunnels.

Many of Mr. Marcum's projects involved the design of remediation measures including shotcrete, low and high capacity rock bolts and deep rock anchors, cantilevered and tied-back concrete shear pins, grading repairs involving removal and replacement of the unstable material and/or the installation of earth buttresses, cantilevered retaining walls and lowering the ground water table using both vertical and horizontal drains.

As our Principal Geologic Engineer, Mr. Marcum is responsible for overall project supervision and coordination including mapping, exploration and site assessment, analysis of geologic and geotechnical data, geotechnical design, and preparation and presentation of technical reports. His areas of expertise include:

- Engineering geologic mapping, hazard mapping and risk assessment
- Subsurface investigation, small and large diameter drilling and coring
- Instrumentation design, installation and analysis for rock and soil sites
- Laboratory testing, program design and analysis
- Stability analyses, rock and soil slopes, two and three dimensional limit equilibrium
- Landslide and erosion mitigation design, retaining walls, tieback shear pins, rock anchors and bolts

### **Professional Affiliations**

American Society of Civil Engineers  
Seismological Society of America  
American Public Works Association

### **Professional Affiliations**

Senior Geological Engineer; Cotton, Shires and Associates, Inc., Los Gatos, CA; 1987 to present;  
Staff Technician; Earth Systems Consultants, Palo Alto CA, 1983 to 1986

### **Technical Talks and Course Instruction**

2016 Course Instructor: "Geological Aspects of Slope Stability", "Rock Slope Investigations" and "Rock Mechanics For Slopes" and "Rock Slope Remediation and Case Studies, Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Madison, Wisconsin.

2015 Course Instructor: "Rock Slope Investigations" and "Rock Slope Engineering and Case Studies", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Santa Clara, California.

2014 Course Instructor: "Geological Aspects of Slope Stability", "Rock Slope Investigations" and "Rock Slope Engineering and Case Studies", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Madison, Wisconsin.

**DALE R. MARCUM (cont.)**

2013 Course Instructor: "Field Investigations for Rock Slopes", "Rock Mechanics For Slopes" and "Rock Slope Remediation and Case Histories", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Santa Clara, California.

2012 Course Instructor: "Rock Mechanics For Slopes", "Field Investigations for Rock Slopes", and "Rock Slope Remediation and Case Histories", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Santa Clara, California.

2011 "Toppling Induced Cracking In the Lining of PG&E'S Belden Tunnel", Presented with Dr. Richard Goodman at the 45th American Rock Mechanics Association Symposium in San Francisco, California.

2011 "Rockslide Due to Secondary Rock Topple Mechanism, Northern Sierra Nevada, California", presented at the Thirteenth International Congress and Field Trip on Landslides, Kyoto, Japan.

2010 Course Instructor: "Introduction to Geological Engineering and Rock Slope Failures", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Santa Clara, California.

2009 "Sensor Rotation In Deep Inclometers", Guest speaker, along with John Lemke and Robert Chew, at the ASCE Geotechnical Group Workshop in June, Caltrans District 4 Headquarters, Oakland, California.

2009 "Slope Inclometers", Invited lecturer for the University of California at Berkeley's graduate course "Advanced GeoEngineering Testing and Design (CE 270L), Berkeley, California.

2009 "Introduction to Geological Engineering and Rock Slope Failures", Course instructor for the University of Wisconsin Slope Stability and Landslides Short Course, Cupertino, California.

2007 "General Geotechnical Hazards", Invited lecturer for an information and training session on geologic hazards for the Gunnison County Planning Commission and County Staff, Gunnison, Colorado.

2003 "An Introduction to Engineering Geology – Rockfalls and Landslides in the Bay Area and the Sierra", Guest Lecturer for Western State College of Colorado, Gunnison, Colorado.

2003 "Rock Toppling Mechanism Of Slope Failure From Instrument Analysis At The Caribou No. 2 Penstock, North Fork Feather River, Northeast California", Association of Engineering Geologists, Sacramento Section, North Valley Chapter, Redding, California.

2003 "Deep Slope Movement Interpreted From Instrumentation Analysis, Belden Siphon, North Fork River, Northeast California, California", Technical Seminar, Association of Engineering Geologists National Convention, Vail, Colorado, Coauthors Robert McManus, William Page and John Hollfelder of PG&E., Vail, Colorado.

2003 "Rockfall Hazard Evaluation at the Kern Tunnel Intake, Kern Penstock, Kern River, Southern Sierra Nevada, California", Technical Seminar, Association of Engineering Geologists National Convention, Vail, Colorado, Coauthors William Page, PG&E, and John Wallace and Joe Durdella, Cotton, Shires & Associates, Inc., Vail, Colorado.

2002 "Rock Toppling Mechanism Of Slope Failure From Instrument Analysis At The Caribou No. 2 Penstock, North Fork Feather River, Northeast California", Technical Seminar, Association of Engineering Geologists National Convention, Reno, Nevada, Coauthors Robert McManus, William Page and John Hollfelder of PG&E., Reno, Nevada

1995 "Investigation of Shallow Rock and Soil Failures, PG&E's Caribou Hydroelectric Facility, North Fork River, Plumas County, California", Technical Seminar, Association of Engineering Geologists

**DALE R. MARCUM** (cont.)

National Convention, Sacramento, California, Coauthors William Page, PG&E, John Wakabayashi, Sacramento, California.

**Selected Publications**

ENGINEERING GEOLOGIC HAZARD MAPPING OF WATER CONVEYANCE CANALS: DATA ACQUISITION TECHNIQUES AND TECHNOLOGY, 2016 in press (with J. Wallace, R. Reynolds, E. Steen and R. McManus), Applied Geology in California, Association of Engineering Geologists Special Publication

HISTORY AND MECHANISMS OF ROCK SLOPE INSTABILITY ALONG TELEGRAPH HILL, SAN FRANCISCO, CALIFORNIA, 2015-in press, (with WALLACE J.), Abstract submitted for the 49<sup>th</sup> U.S. Rock Mechanics/Geomechanics Symposium, San Francisco, California.

GEOLOGIC ENGINEERING TOUR OF SAN FRANCISCO AND THE SAN FRANCISCO PENINSULA, 2013, (with R. GOODMAN) American Rock Mechanics Association, 47<sup>th</sup> US Rock Mechanics/Geomechanics Symposium, Field Trip Leader and Field Trip Guide Book.

GEOLOGIC ENGINEERING TOUR OF SAN FRANCISCO AND THE SAN FRANCISCO PENINSULA, 2011, (with R. GOODMAN and J. Wallace) American Rock Mechanics Association, 45<sup>th</sup> US Rock Mechanics/Geomechanics Symposium, San Francisco, California , Field Trip Leader and Field Trip Guide Book.

TOPPLING INDUCED CRACKING IN THE LINING OF PG&E'S BELDEN TUNNEL, 2011, (with R. Goodman and R. McManus), Paper submitted for the American Rock Mechanics Association, 45<sup>th</sup> US Rock Mechanics/Geomechanics Symposium, San Francisco, California.

DEEP ROCK TOPPLING DISTRESS AT BELDEN TUNNEL AND SIPHON, SIERRA NEVADA, CALIFORNIA, 2011, (with J. Wallace), Abstract submitted for the 13<sup>th</sup> International Conference and Field Trips on Landslides, Kyoto, Japan.

WOODLEAF ROCKFALL, NORTHERN SIERRA NEVADA, CALIFORNIA: KEEPING THE POWERHOUSE OPERATING AFTER A NEAR MISS, 2011, (with J. Wallace), Abstract submitted for the 13<sup>th</sup> International Conference and Field Trips on Landslides, Kyoto, Japan.

THE NORTHRIDGE BLUFF LANDSLIDE: RAPID BLUFF RETREAT ASSOCIATED WITH A MAJOR COASTAL LANDSLIDE IN DALY CITY, CALIFORNIA, 2007, Johnson, P.L., and Marcum, D.R., , in Schaefer, V.R.; Schuster, R.L.; and Turner, A.K., eds., Conference Presentations, First North American Landslide Conference, Vail, Colo., 2007, Proceedings: Association of Environmental and Engineering Geologists (AEG), Special Publication No. 23, p. 1694-1706.

ROCKFALL HAZARD EVALUATION AT THE KERN INTAKE, KERN CANYON PENSTOCK, KERN RIVER, SOUTH-CENTRAL CALIFORNIA: 2003 (with William D. Page, J. Wallace and Joseph M Durdella ), in Program with Abstracts, Association of Engineering Geologists, 2003, Annual Meeting, Page 70.

INSTABILITY OF AN ABANDONED QUARRY SLOPE: LESSONS LEARNED FROM FRANCISCAN COMPLEX CHERT, SAN FRANCISCO, CALIFORNIA: 2002 (with J. Wallace, and William R. Cotton), in Program with Abstracts, Association of Engineering Geologists, 2002, Annual Meeting, Page 89.

**DALE R. MARCUM** (cont.)

ANALYSIS OF LANDSLIDES IN THE EPICENTRAL REGION REACTIVATED BY THE 1989 LOMA PRIETA EARTHQUAKE, CENTRAL SANTA CRUZ MOUNTAINS, CALIFORNIA: in review (with W. F. Cole, P. O. Shires and B. R. Clark), in *The Loma Prieta, California Earthquake of October 17, 1989*, U. S. Geological Survey Professional Paper.

ANALYSIS OF LOMA PRIETA EARTHQUAKE-TRIGGERED LANDSLIDES, CENTRAL SANTA CRUZ MOUNTAINS, CALIFORNIA: 1991, (with W. F. Cole, P. O. Shires, B. R. Clark, and R. P. Lozinsky), Geological Society of America, Cordilleran Section 87th Annual Meeting, March 25-27, 1991, San Francisco, California, Abstracts with Programs, p.63.

INVESTIGATION OF LANDSLIDES TRIGGERED BY THE 1989 LOMA PRIETA EARTHQUAKE AND EVALUATION OF ANALYSIS METHODS: 1991 (with W. F. Cole, P. O. Shires, and B. R. Clark), Final Technical Report to U. S. Geological Survey, National Earthquakes Hazards Reduction Program, Grant Award No. 14-08-0001-G1860.