

CURRICULUM VITAE - PATRICK O. SHIRES

President
Senior Principal Civil and Geotechnical Engineer and Geophysicist

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Registration

Registered Geotechnical Engineer in California, Registered Geophysicist in California
Registered Professional Civil Engineer in California, Colorado, Hawaii, Idaho, and Washington

Education

M.S., Civil Engineering (Geotechnical) with Graduate Courses in Geophysics: Stanford University, Stanford, California, 1975; B.S., Stanford University, Stanford, California, 1972.

Representative Experience

As Senior Principal in Charge of CSA civil and geotechnical engineering projects, Mr. Shires' responsibilities range from investigation, analysis and product review to final design participation and project management for large projects. Mr. Shires remains actively involved in the engineering investigation, design, construction, and review for technical investigations. In addition, he is qualified as an expert witness in Civil/Geotechnical Engineering and has testified at over 90 trials and binding arbitrations as an expert witness, including trials resulting in landmark legal decisions involving earth movement, construction dispute and watercourse (hydrology) issues. Mr. Shires has over 46 years of professional experience in the fields of civil and geotechnical engineering and geophysics throughout the United States and abroad. In the early part of his career, he supervised the technical investigation and engineering and geophysical analyses for many landslides, water and wastewater treatment and distribution facilities, pipelines, dams, nuclear and fossil fuel power plant and high-rise building sites throughout the western United States. He investigated over 50 dam sites and was the chief design engineer for a 160-foot high rockfill dam in Arizona.

At his present position, Mr. Shires has specialized in slope stability investigations on over 750 landslide projects, over 120 of which have been in southern, 60 in central, and over 500 in northern California, and 12 in Hawaii as well as landslides in Idaho, Utah and Colorado. He has supervised many major landslide investigation projects, including the Big Rock Mesa (Malibu), Rambla Pacifico (Malibu), Anaheim Hills and Sycamore Ranchito (Santa Barbara) landslides and the La Conchita (claiming 10 lives) and Camarillo Springs (fire burn area) debris flows in southern California; the Love Creek Debris Flow (claiming 10 lives), Hillside Avenue Debris Flow (claiming one life), Eliot Quarry, Telegraph Hill and hundreds of other landslides in northern California; and the Manoa, Ailuna-Leighton and other landslides in Hawaii, as well as flooding and debris flow issues associated with major storm events on three islands of Hawaii. He has investigated large landslides in Utah and Idaho, including the Green Hollow Landslide in Cedar City, North Salt Lake City Landslide in Utah and the North Alto Via Landslide in Boise.

Mr. Shires has also specialized in the investigation of failures associated with coastal processes and river and creek flooding, including dam and levee failure and design issues. He has served as the chief design engineer on major landslide repairs and coastal protection projects. Mr. Shires regularly participates in International Field Workshops on Landslides, and has attended field workshops in Japan (twice), Australia, New Zealand, Switzerland (twice), Austria, Italy, Czech Republic, Slovak Republic, Spain, England and Norway.

Mr. Shires has considerable experience as an expert witness for various geotechnical-related issues, including slope stability (landslides), expansive earth materials (soil and bedrock), high-rise building issues (shoring and settlement), rupturing of oil pipelines, tunneling and construction-related defects/accidents. Mr. Shires has conducted forensic investigations of issues associated with several high-rise buildings in San Francisco, San Jose and San Diego.

Mr. Shires has also specialized in the civil design of remedial measures for dealing with drainage and slope stability problems, including the design of grading plans, retaining wall structures, shear pins, tiebacks and extensive drainage works. He has worked on numerous dam projects, including design, remediation, monitoring and interaction with various governing agencies. He has been the chief design engineer on over 200 landslide repair projects, including designing a \$50,000,000 landslide repair in Santa Barbara County, coastal seawalls to protect coastal bluffs in Pacifica and Pismo Beach and extensive slope repairs to protect homes below the Knockash Hill rockslides in San Francisco. He was retained by the Chinese government to work on the Yangtze Water Resource Commission's Three Gorges Dam project in China and was the MTA tunneling geotechnical engineering expert for over \$10 billion in claims in Los Angeles. He is currently retained by the Millennium Tower Association and unit owners to provide forensic services for settlement and tilting of the Millennium Tower in San Francisco and the U.S. Department of Justice on behalf of the U.S. Army Corps of Engineers for Hurricane Harvey in Houston. His areas of expertise include:

- Landslides, debris flows, flooding & levees stability
- Dams, waterway and coastal engineering and design
- Geotechnical design for water and wastewater facilities
- Grading (filling & excavation) design and practice
- Roadway, parking, pavement and drainage design
- Investigation of slope stability and shoring issues
- Earth movement expert
- Foundation and wall design
- Expansive soil and bedrock expert
- Seismic analysis and design
- Construction defects/accidents
- Issues with high-rise buildings

As Principal Geophysicist, Mr. Shires has conducted numerous geophysical investigations throughout the western United States, from small-scale studies of rippability for grading to providing Quality Assurance for investigations at P.G.&E.'s nuclear power plants in California to investigations of numerous dam sites. Over the past 46 years, he has conducted and managed a wide variety of geophysical studies, and has provided expert witness geophysical services, including:

- Seismic and radio-detection surveys for pipelines
- Surface surveys for regional seismic analyses
- Reflection surveys for fault investigations
- Seismic surveys for landslides & rippability
- Downhole, crosshole and/or surface seismic surveys for over 35 dams
- Gravity and seismic surveys for tunnels
- Magnetic and earth resistivity surveys for environmental hazards exploration
- Seismic studies of landfills & tailings dumps

Professional History

President, Senior Principal Civil and Geotechnical Engineer and Geophysicist, 1983 - Present;
Cotton, Shires and Associates, Inc., Los Gatos, California
Staff through Supervising Civil and Geotechnical Engineer and Geophysicist, 1972-1983;
Earth Sciences Associates, Inc., Palo Alto, California

Professional Affiliations

American Society of Civil Engineers
American Underground Association
Society of Exploration Geophysicists

American Society for Testing and Materials
Earthquake Engineering Research Institute
Consulting Engineers Association of California

Appointments

Industrial Research Associate: United States Geological Survey, Menlo Park, California
Past Member / Chairman: Architectural Site Control Commission, Portola Valley, California
Expert Consultants Panel Member: City of Rancho Palos Verdes, California; Millennium Tower
Arbitrator: California Ridge Development, San Jose, California

Independent Geotechnical Expert for Mediators: Rancho Solano Development, Fairfield, California; Knockash Hill Rockslides, San Francisco, California; Buck Center/Partridge Knolls Landslide, Novato, California; Jackson Meadows Subdivision Slope Stability, Morgan Hill, California; and Calabasas Slope Movement, Calabasas, California

Selected Publications

DESIGN AND CONSTRUCTION OF THE SUMMIT SENIOR CARE FACILITY INTO THE SIDE OF AN UNSTABLE CALIFORNIA HILLSIDE (with H.W. Schnabel): *Deep Foundations Institute 43rd Annual Conference in Anaheim, October 2018.*

GEOLOGIC AND GEOTECHNICAL FACTORS CONTROLLING INCIPIENT SLOPE INSTABILITY AT A GRAVEL QUARRY, LIVERMORE BASIN, CALIFORNIA (with P.L. Johnson and T.P. Sneddon): *Environmental & Engineering Geoscience, Vol. XXII, No. 2, May 2016, pp. 141-155.*

THE SUBSURFACE COMPLEXITY OF ALLUVIUM-BUTTRESSED LANDSLIDES AT KNIGHTS VALLEY, CALIFORNIA 2013 (with P.L. Johnson): *Geological Society of America, Abstracts with Programs, v. 45, no.7, p. 150.*

THE SYCAMORE RANCHITO LANDSLIDE, SANTA BARBARA, CALIFORNIA: in *Proceedings of the 2012 XIII International Conference and Field Trip on Landslides (ICFL), Kyoto, Japan.*

THE VAL POLA LANDSLIDE OF 1987, VALTELINA, ITALY: in *Proceedings of the 2000 Annual Meeting of the Association of Engineering Geologists, San Jose, California.*

EVALUATION OF BUILDING DISTRESS CLAIMS DUE TO TWIN SUBWAY TUNNELING IN HOLLYWOOD, CALIFORNIA, 2000 (with W.F. Cole and E.A. Hay): in *Proceedings of the 2000 Annual Meeting of the Association of Engineering Geologists, San Jose, California.*

ADDED WEIGHT INCREASE VIA RAINFALL: A LIKELY FAILURE MECHANISM FOR COLLUVIAL LANDSLIDES ON OAHU, HAWAII: 1997 (with W. F. Cole), in *Proceedings of 1997 Annual Meeting of Association of Engineering Geologists, Portland Oregon.*

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

CHARACTERIZATION OF LANDSLIDES FOR EVALUATION OF EARTHQUAKE-TRIGGERED LANDSLIDES IN CALIFORNIA: 1994 (with W.F. Cole, J.M. Wallace and D.R. Marcum), in *Proceedings of 37th Annual Meeting of Association of Engineering Geologists, Williamsburg, Virginia.*

STANDARD-OF-CARE FOR EXPANSIVE SOIL DESIGN: 1992, (with H. Mack), *Proceedings of the 7th International Conference on Expansive Soils, August 3-5, 1992, Dallas, Texas, sponsored by the American Society of Civil Engineers, International Society of Soil Mechanics and Foundation Engineering, National Science Foundation and Texas Tech University, Volume 1, pp. 387-391.*

ANALYSIS OF LOMA PRIETA EARTHQUAKE-TRIGGERED LANDSLIDES, CENTRAL SANTA CRUZ MOUNTAINS, CALIFORNIA: 1991, (with W. F. Cole, D. R. Marcum, 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, D. R. Marcum and B. R. Clark), *Final Technical Report to U. S. Geological Survey, National Earthquakes Hazards Reduction Program, Grant Award No. 14-08-0001-G1860.*

PRELIMINARY SUBSURFACE CHARACTERIZATION OF EARTHQUAKE-TRIGGERED LANDSLIDES IN THE CENTRAL SANTA CRUZ MOUNTAINS, CALIFORNIA: 1990, (with W. F. Cole, R. P. Lozinsky, and B. R. Clark), Geological Society of America Annual Meeting, October 28-November 1, 1990, Dallas, Texas, Abstracts with Program, Volume 22, Number 7, p.58.

INVESTIGATION OF 31 LANDSLIDES AFFECTING THE CITY OF SANTA CRUZ WATER SUPPLY DISTRIBUTION SYSTEM: August, 1982, (with L. Alvarez and R. H. Wright), Conference on Landsliding Resulting from the January 1982 San Francisco Bay Area Storm, Stanford University.

A CASE HISTORY OF EXPANSIVE CLAYSTONE DAMAGE: September, 1975, (with R. L. Meehan and M. T. Dukes), Paper 11590, *in Journal of the Geotechnical Engineering Division, Proceedings of the American Society of Civil Engineers*, Volume 101, No. GT9, pp. 933-948.