Romualdi, Davidson & Associates
Consulting Engineers

Hugh L. Davidson

P.E., Ph.D., Civil Engineering, Principal
Email: hugh@rdaweb.com

Areas of Specialization

Failure analysis, forensic engineering, product design, soil mechanics, foundation engineering, structural engineering, soil-structure interaction phenomena, transmission structure foundations, foundation testing, traffic accident reconstruction and highway design, and finite element analysis.

Professional Registration

Professional Engineer, Pennsylvania, West Virginia

Educational Background

B.S. - Civil Engineering 1963, University of Maryland

M.S. - Civil Engineering 1965, Lehigh University

Ph.D. - Civil Engineering 1974, Lehigh University

Additional Graduate studies at the University of Connecticut and the University of California at Berkeley.

Employment History

Romualdi, Davidson, and Associates, Inc., 1983 - Present

Currently President responsible for forensic engineering studies.GAI Consultants, Inc., 1980-1988

GAI Consultants, Inc., 1974-1982

Advanced from Staff Engineer, to Assistant Project Engineer, to Engineering Manager responsible for managing projects in geotechnical and structural engineering.

General Dynamics/Electric Boat, 1965-1967

Design of various structural components of nuclear submarines including the main sea water piping and associated centrifugal pumps. Contract analysis of plate and shell structures.

David Taylor Model Basin, 1963

Design of nuclear submarine hulls.

Professional Experience

Forensic Engineering:

Design review, failure analysis and repair design of reinforced concrete pipe culverts under highway embankments.

Product design studies involving industrial machines, scaffolds and consumer products.

Reconstruction of over 250 traffic accidents.

Highway design reviews to determine causality in traffic accidents.

Building distress associated with earth movement.

Landslide studies.

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Director of a research project for the Electric Power Research Institute (EPRI) to develop an improved design methodology for laterally loaded drilled piers. The project involved 14 prototype tests throughout the U.S., and extensive analytical studies including three-dimensional finite element analysis.

Presented nationwide seminars to utility engineers on Laterally Loaded Drilled Pier Design.

Development of a state-of-the-art loading agenda for transmission structures for Pennsylvania Power & Light Company.

Director of a study to develop soil and rock design parameters, using pressure meter testing, for foundation design of a 500 kV transmission line in eastern Pennsylvania for Pennsylvania Power & Light Company. The project included development of a design methodology for laterally loaded drilled piers.

Director of a subsurface investigation and design of an under-drain system, a sedimentation pond, and cut and fill slopes for Electric Power Research Institute's Coal Cleaning Test Facility near Homer City, Pennsylvania.

Additional geotechnical engineering experience includes development of a design guide for foundations of electrical transmission poles; stability analyses of fill embankments and natural slopes for the design of fly ash disposal areas and for remedial dam construction; and numerous bearing capacity and settlement studies.

Additional structural engineering experience includes experimental investigation of the buckling strength of spherical shells; static stress analysis of complex plate and shell structures; development of analytical methods for predicting the behavior of steam turbine components; thermal and structural analysis of a deteriorated concrete dome owned by Fox Chapel Authority; and development of finite element computer codes for static stress analysis of linear and nonlinear solids.

Lectured in engineering graphics, fluid mechanics, and soil mechanics at Lehigh University. Taught a five-week graduate course in deep foundations at Carnegie Mellon University.

Professional Affiliation

American Concrete Institute

American Society of Civil Engineers

- President, Pittsburgh Section, 1991-1992
- Previous Chairman of the Pittsburgh Section Geotechnical Group
- Chairman of Board of Trustees, Student Award Foundation 2004-2007

American Society of Highway Engineers

American Society of Mechanical Engineers

National Society of Professional Engineers

SAE International

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Honors

Pittsburgh Engineer of the Year Award presented by the Pittsburgh Section of ASCE, 1997.

Michael A. Gross Meritorious Service to the Pittsburgh Section of ASCE, 2006.

Tau Beta Pi

Chi Epsilon

Publications

DiGioia, A.M., Jr., Davidson, H.L., and Donovan, T.D., "Design of Laterally Loaded Drilled Piers," presented at the IEEE PES 1982 Winter Meeting, New York, January 31 - February 5, 1982.

DiGioia, A.M., Jr., Davidson, H.L., and Donovan, T.D., "Laterally Loaded Drilled Piers, a Design Model,' proceedings of a session sponsored by the Geotechnical Engineering Division of the ASCE National Convention, St. Louis, Missouri, October 28, 1981

Davidson, H.L., and Chen, W.F., "Nonlinear Response of Drained Clay to Footings," Computers and Structures, Vol. 8, No. 2, 1978.

Davidson, H.L., and Chen, W.F., "Nonlinear Response to Undrained Clay to Footings," Computers and Structures, Vol. 7, No. 4, 1977.

Davidson, H.L., DiGioia, A.M., Jr., Donovan, T.D., "Drilled Piers and Direct Embedment Foundations for Transmission Structures Subjected to Overturning Forces," IEEE PES Winter Meeting, New York, January 1977.

Davidson, H.L., DiGioia, A.M., Jr., Donovan, T.D., "Site Investigation and Selection of Geotechnical Design Parameter for Transmission Structure Foundation Design," IEEE PES Winter Meeting, New York, January 1977.

Davidson, H.L., and Chen, W.F., "Nonlinear Analysis in Soil and Solid Mechanics," Proceedings of the Second International Conference on Numerous Methods in Geomechanics, Blacksburg, Virginia, June 20 - 25, 1976.

Davidson, H.L., and Chen, W.F., "Two Elastic=Plastic Soil Models for Numerical Analysis," Soils and Foundations, Vol. 16, No. 2, June 1976.

Davidson, H.L., "Elastic-Plastic Large Deformation Response of Clay to Footing Loads," Ph.D. Dissertation, Lehigh University, 1974.

Davidson, H.L., and Chen, W.F., "Bearing Capacity Determination by Limit Analysis," Journal of the ASCE Soil Mechanics and Foundation Division, Vol. 99, No. SM6, June 1973.

Davidson, H.L., and Godino, V., "Discrete Element Shell Analysis of Piping Elbows," presented at the ASCE Engineering Mechanics Specialty Conference, Washington, D.C., October 1966.