



Curriculum Vitae of
HOWARD A. PERKO, Ph.D., P.E.

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(Revised April 20, 2006)

EDUCATION

Ph.D. Civil Engineering, May 2002, Colorado State University, Fort Collins, CO
(Area of Study: Inter-particle Mechanics/Geotechnical Engineering)

M.S. Civil Engineering, May 1996, Colorado State University, Fort Collins, CO
(Area of Study: Soil Shear Strength/Geotechnical Engineering)

B.S. Civil Engineering, May 1993, Michigan Technological University, Houghton, MI
(Concentration: Mining/Geotechnical Engineering)

PROFESSIONAL ENGINEERING REGISTRATION

Colorado	License No. 33340
Florida	License No. 61051
Georgia	License No. 029399
Indiana	License No. 10505050
Kentucky	License No. 22128
Minnesota	License No. 43042
New York	License No. 081365
Ohio	License No. 66008
Virginia	License No. 040697
West Virginia	License No. 15378
Wisconsin	License No. 35955-006
Wyoming	License No. 15378

PROFESSIONAL ENGINEERING EXPERIENCE

March 2005 Division Manager, CTL/Thompson, Inc., Fort Collins, CO
to Present

Oversee northern Colorado branch operations. Establish engineering and administrative policy, vision statements, budgets, and procedures. Supervise department managers for geotechnical engineering, structural engineering, environmental engineering, and construction observation/materials testing. Manage complex geo-structures projects. Communicate with headquarters staff.

- June 1999 to Present Chief Engineer, Magnum Piering, Inc., Cincinnati, OH
 Manage the nationwide technical support center for Magnum Piering, Inc. Oversee new product development activities and plan product test programs. Develop new product ideas for manufactured foundations and earth anchoring. Frequently conduct seminars throughout the United States on the technology of hydraulically driven steel pier underpinning systems and helical anchors. Authored company technical literature. Regularly attend seminars and trade shows on behalf of manufacturer. Currently working on Acceptance Criteria for helical pier foundations on behalf of the Ad Hoc Committee of Helical Foundation Manufacturers for the International Code Council Evaluation Service.
- January 1999 to 2005 President, Secure Engineering Companies, Denver, CO and Fort Collins, CO
 Founder and manager of two consulting engineering firms that were acquired by CTL/Thompson, Inc. Prior to the acquisition, the firm completed over 1,000 projects and was ranked the 6th fastest growing business in Northern Colorado with over 120% growth in 2004. Specialized in foundation and structural engineering for residential and commercial construction. Project experience included a 56,000 sf health club, two 7-story apartment buildings, a 25,000 sf masonry building, a 30,000 sf steel frame building, repairs to Windsor High School, renovation of Victory Chapel, numerous single family residences, and a variety of different shoring and earth retention projects.
- May 1994 to Aug 1998 Project Engineer, CTL/Thompson, Denver, Ft. Collins, & Glenwood Springs, CO
 Planned and supervised geotechnical field investigations and materials testing programs and wrote soil and foundation reports. Also, directed exploratory drilling, collected samples, and logged soil borings, tested soil samples in laboratory, and conducted construction inspections and soil compaction testing. Project experience includes small to large zoned earth dams, ski areas, bridges, underground garages and tanks, pavements, utilities, and foundations for commercial, industrial, and residential structures. Assisted with the establishment of a branch office in Fort Collins, Colorado.
- Feb 1992 to May 1993 (part-time) Computer Laboratory Consultant, Michigan Tech, Houghton, MI.
 Assisted students in the use of engineering software including various CADD packages, structural analysis programs, spreadsheets, and data bases. Skilled Unix, Microsoft, and Macintosh operating systems and several programming languages.
- May 1992 to Aug 1992 Engineering Intern, Barr Engineering Company, Minneapolis, MN.
 Worked as a water resources engineer in training. Wrote contract and specification documents for a pipeline. Maintained a water quality data base for

the Minneapolis chain of lakes. Performed hydrologic studies, open channel flow analysis, water quality studies, and fluid flow calculations for design of municipal storm water collection systems, creek restorations, water wells, and pipelines.

May to Aug 91, 90, & 89 Engineering Technician, Inman, Foltz and Associates, Minocqua, WI.

Performed boundary, topographic, and construction surveying. Drafted figures and worksheets. Wrote property descriptions. Did routine engineering and surveying calculations. Crew chief responsible for providing horizontal and vertical control for over 300 exploratory borings for Noranda Mining, Corp. Achieved 6th order closure accuracy despite adverse terrain.

RESEARCH EXPERIENCE

Aug 2001 to Aug 2003 Research Scientist, Colorado State University, Fort Collins, CO

Science Investigator (Co-PI) on a soil mechanics investigation funded by the NASA Mars Data Analysis Program. Conducted studies of Mars 2003 Mission priority landing sites including computer modeling of landslides from MGS images and MOLA topographic information, measurement of crater geometries in MOC images, laboratory testing of Mars soil simulants, and review of thermal emission spectrometer data. Found a strong correlation between thermal inertia and soil shear strength. Compiled a final report that was provided to Rover Engineers to aid them in navigating the Martian surface during exploration as well as in selecting appropriate simulants for future use in rover testing and development.

Aug 1999 to May 2002 Graduate Research Fellow, NASA Jet Propulsion Laboratory, Pasadena, CA

Studied the effects of vacuum and cryogenic temperatures on the adhesive properties of comet mantle dust simulants. Constructed a theoretical model that describes the thermodynamics of a meniscus of adsorbed water between a dust particle and a surface and its effect on adhesion. Performed laboratory experiments consisting of vibration induced dust removal in simulated space environments. Measured dust electrostatic charge using hand-built electrometers.

Aug 1998 to Aug 1999 Graduate Research Assistant, Colorado NASA Space Grant

During this incubator period, planned research investigations and wrote research proposals on a variety of topics including Comet dust, Mars soil and dust, reduced gravity effects on soil behavior, photovoltaic effects in lunar soils, and vacuum welding of ceramics. Also, worked on education and public outreach activities.

Jan 1998 to Aug 1998 Research Project Manager, CSU & CTL/Thompson, Inc., Denver, CO.

Administrated a joint private and university research program into the volume

change characteristics of expansive soils. Developed an improved empirical relationship between soil suction:water content ratio and the suction compression index. Simplified procedures and decreased time required for laboratory testing.

August 1994 to Feb 1995 Graduate Research Assistant, CSU & CTL/Thompson, Inc., Denver, CO.

Participant in a joint private and university research project involving a 300 home subdivision that has undergone over three (3) feet of heave in some areas. Compiled a data base and analyzed laboratory and field heave data. Developed a method to estimate maximum remaining heave and time rate of heave.

Aug 1993 to Mar 1995 Graduate Research Assistant, Colorado NASA Space Grant

Studied the effects of low vacuum and diurnal temperature extremes on the interparticle forces, tribologic properties and surface physics of lunar soils. Composed M.S. thesis on the effects of adsorbed gas on lunar soil shear strength.

TEACHING EXPERIENCE

Aug 2002 to Aug 2004 Academic Faculty, Colorado State University, Fort Collins, CO

Taught Statics and Solid Mechanics courses during Fall semester 2002 and a Solid Mechanics course during Fall semester 2003. Course enrollment varied between 90 and 155 students per class. Experimented with and incorporated various teaching methods including power point presentations, class demonstrations, experiential learning activities, and semester projects.

August 1993 to May 1994 Graduate Teaching Assistant, Colorado State University, Fort Collins, CO.

Taught a properties of materials course centered around the mechanical testing of metals, wood, plastic, asphalt concrete, and cement concrete. As the assistant laboratory manager, had responsibilities that included inventory, equipment set-up, maintenance, scheduling, and organization. Supervised an undergraduate student hourly employee.

Feb 1993 to May 1993 Undergraduate Teaching Assistant, Michigan Tech. Univ., Houghton, MI.

Taught a soil mechanics laboratory course. Performed Atterberg limits, sieve analysis, consolidation, proctor, direct shear, permeability, hydrometer, unconfined compression, and other soil tests.

PUBLICATIONS

Dissertation & Thesis

1. Perko, H.A. (2002) *Theoretical and Experimental Investigations in Planetary Dust Adhesion*, Ph.D. Dissertation, Civil Engineering Department, Colorado State University, Fort Collins, CO
2. Perko, H. A. (1996). *Surface Cleanliness Effect on Lunar Soil Shear Strength*, Master of Science Thesis, Colorado State University, Fort Collins, CO

Journal Papers

3. Perko, H.A. (2006) “Underpinning and Shoring for Underground MRI Research Facility at Ohio State University”, Forthcoming 2006, Journal of Professionalism, ASCE Press, Reston, VA
4. Perko, H.A., Nelson, J.D., and Green, J.R. (2005) “Mars Soil Mechanics Investigation” Journal of Aerospace Engineering, ASCE Press, Reston, VA
5. Perko, H.A., Nelson, J.D., and Sadeh, W.Z. (2001) “Surface Cleanliness Effect on Lunar Soil Shear Strength” April 2001, Journal of Geotechnical and Geoenvironmental Engineering, ASCE Press, Reston, VA

Refereed Conference Papers

6. Thompson, R.W., Rethamel, W., and Perko, H.A. (2006) “Comparison of Constant Volume and Oedometer Swell Pressures”, Proceedings of Unsat 2006, American Society of Civil Engineers, Phoenix, AZ
7. Perko, H.A. (2005) “Underpinning and Shoring for Underground MRI Research Facility at Ohio State University” Proceedings of Underground Construction in Urban Environments, ASCE Geo-Institute, New York City
8. Perko, H.A. and Nelson, J.D. (2002) “Mars Global Surveyor Soil Mechanics Data Analysis” Proceedings of the 7th International Conference on Construction, Operations, and Sciences in Space, Albuquerque, NM, ASCE Press, Reston, VA
9. Perko, H.A., Nelson, J.D., and Green, J.R. (2002) “A Review of Planetary Dust Transport, Deposition, Adhesion, and Removal” Proceedings of the 7th International Conference on Construction, Operations, and Sciences in Space, Albuquerque, NM, ASCE Press, Reston, VA

10. Perko, H.A., Thompson, R.W., and Nelson, J.D. (2000). "Suction Compression Index Based on Results from CLOD Tests", *Advances in Unsaturated Geotechnics*, C.D. Shackelford, S.L. Houston, and N.Y. Chang, Eds., ASCE Press, Reston, VA, pp. 393-408.
11. Perko, H.A. (2000). "Energy Method for Predicting the Installation Torque of Helical Foundations and Anchors", *New Technologies and Design Developments in Deep Foundations*, N.D. Dennis, Jr., R. Casteli, and M.W. O'Neill, Eds., ASCE Press, Reston, VA, pp. 342-352.
12. Perko, H.A. and Nelson, J.D. (2000) "Effects of Vacuum and Reduced Gravity on Bearing Capacity", *Proceedings of the 6th International Conference on Construction, Operations, and Sciences in Space*, Albuquerque, NM, ASCE Press, Reston, VA, pp. 842-850.
13. Perko, H.A. (1998). "Surface Cleanliness Based Dust Adhesion Model", *Proceedings of the 5th International Conference on Construction, Operations, and Sciences in Space*, Albuquerque, NM, ASCE Press, Reston, VA, pp. 495-505.
14. Perko, H.A., Nelson, J.D., and Sadeh, W.Z. (1996). "Surface Cleanliness Effect on Lunar Soil Mechanics", *Proceedings of the 4th International Conference on Construction, Operations and Sciences in Space*, Albuquerque, NM, ASCE Press, Reston, VA, pp. 689-698.
15. Perko, H. A. (1996). "Effects of Surface Cleanliness on Lunar Soil Shear Strength", *Proceedings of the Annual Meeting of the American Institute of Astronautics and Aeronautics*, Reno, NV, AIAA 96-0015.

Refereed Conference Abstracts

16. Perko, H.A., Green, J.R., and Nelson, J.D. (2001) "Investigations into Planetary Dust Adhesion" *Proceedings of the Annual Meeting of the Division of Planetary Scientists*, American Astronomical Society, New Orleans, LA
17. Perko, H.A., Green, J.R., and Nelson, J.D. (2000) "Preliminary Results from Ultrahigh Vacuum and Cryogenic Dust Adhesion Experiments" *Proceedings of the Annual Meeting of the Division of Planetary Scientists*, American Astronomical Society, Pasadena, CA
18. Perko, H.A. (1999). "Solar Energy Conversion Using In Situ Lunar Regolith", *Proceedings of the Roundtable Discussion on Space Resources Utilization*, Golden, CO.

Invited Papers

19. Perko, H.A. (2006) "Geotechnical Techniques used in Planetary Exploration", *Proceedings of Geo-volution*, ASCE and AGU Joint Conference, Denver, CO.

20. Perko, H.A. (2006) "Installation Torque as a Predictor of Helical Pier Axial Capacity" Technical Article, HelicalPierWorld.com.

Other Papers

20. Perko, H.A. (2005) *HeliPost Engineering Handbook*, Secure Piers, LLC, Fort Collins, CO
21. Perko, H.A. (2004) "Introduction to Corrosion and Galvanizing of Helix Foundations" Helical Foundations and Tiebacks Technology Seminar, Deep Foundation Institute, Tampa, FL.
22. Perko, H.A. (2004) "Mars Soil Mechanics Investigation" Final Technical Report, NASA OSS Proposal No. NRA-00-01-MDAP-059, NASA Contract NAG5-11280 Supp 1.
23. Perko, H.A. (2003) "Lateral Capacity and Buckling Resistance of Helix Pier Foundations" Helical Foundations and Tiebacks Technology Seminar, Deep Foundation Institute, Cincinnati, OH.
24. Perko, H.A. and Rupiper, S.J. (2000) *Basic Helix Foundation Engineering*, Ingal-Precision Foundations, Inc., Larkspur, CO
25. Perko, H.A. (1999) "Summary of Earth Retaining Methods Utilizing Helical Anchors", *Magnum Helix Foundation Tech. Ref. Manual*, Magnum Piering, Inc., Cincinnati, OH
26. Perko, H. A. (1996). "Predicting Remaining Heave and the Time Rate of Heave by the Hyperbolic Method", Colorado State University Technical Report, Fort Collins, CO.
27. Perko, H. A. (2006) "Acceptance Criteria for Helical Foundation Systems and Devices" ICC Evaluation Services, Inc., International Code Council

PATENTS

Earth Anchors and Methods for their Use, U.S. Patent No. 6,058,662.
Helice Pier Post for Support of Sound Barriers, U.S. Patent No. 6,722,821
(Other Patents Pending)

AWARDS

NASA Graduate Student Research Fellowship, Jet Propulsion Laboratory, 1999-2002
First Place Technical Paper, Graduate Division, AIAA Regional Conf., Albuquerque, NM, 1996
Resident Scholar Appointment, Colorado Gamma Chapter, Sigma Phi Epsilon, 1993-1994
Honorable Mention for Outstanding Teaching, Michigan Technological University, 1993
Outstanding Leadership Award, Michigan Technological University, 1993
Initiation into Chi Epsilon National Civil Engineering Honor Fraternity, 1992

Inductee, Order of the Engineer, 1992

Exceptional Student Scholarship, Michigan Technological University, Houghton, MI, 1989-1993

CURRENT MEMBERSHIPS

Editorial Advisory Board, HelicalPierWorld.com

Secretary, Helical Foundations and Tiebacks Committee, Deep Foundation Institute

Member, Soil Nail Committee, Deep Foundations Institute

Member, Colorado Association of Geotechnical Engineers

Member, American Council of Consulting Engineers

Member, American Society of Foundation Engineers

Professional Member, American Galvanizers Association

Member, Northern Colorado Home Builders Association

Associate Member, Remodelers Council

Associate Member, Association of Building Contractors

Associate Member, American Society of Civil Engineers

WORKSHOP PARTICIPATION

DFI Soil Nail Earth Retention Workshop, Denver, CO 2006

DFI Helical Foundations and Tiebacks Workshop, Los Angeles, CA 2005

DFI Helical Foundations and Tiebacks Workshop, Tampa, FL 2004

DFI Helical Foundations and Tiebacks Workshop, Cincinnati, OH 2003

DFI Auger Cast Pile Workshop, New York, NY 2004

Strategic Planning, Valuation and Ownership Seminar, Denver, CO 2003

Planetary Science Summer School, Pasadena, California, 1999 & 2001

NASA Planetary Protection Workshop, Pingree Park, CO, 2001

JPL/CSWG Comet Nucleus Sample Return Workshop, Pasadena, CA, 2000

Ball Aerospace Deep Impact Cratering Workshop, Boulder, CO, 2000

Helix Pier Short Course, GeoDenver Conference, ASCE, Denver, CO, 2000

Expansive Soils Short Course, CSU, Fort Collins, CO, 2000

PAST ACTIVITIES

Chairman, DFI Annual Conference, Colorado Springs, CO, 2007

Guest Speaker, Geo-volution, ASCE & AGU, Denver, CO, 2006

Co-Chairman, Soil Nail Earth Retention Workshop, DFI, 2006

Member, St. Joseph's Catholic Church Real Estate and Facilities Planning Committee, 2005

Member, American Institute of Aeronautics and Astronautics, 1994-2005

Fitness Instructor, The Fort Collins Club, 1998-2005

Junior Member, American Astronomical Society, 2001-2003

Session Chairman, Lunar and Martian Construction and Exploration, ASCE Space Conf., 2002

Judge, ASCE Undergraduate Robotics Competition, Albuquerque, New Mexico, 2000 & 2002

Guest Faculty, Space Science and Engineering K-12 Teacher Workshop, Fort Collins, CO, 2001

Science Consultant, Mars Dust Mitigation Technology Development, Mars 2007 Mission, 2001

Chapter Counselor, Colorado Gamma Chapter, Sigma Phi Epsilon Fraternity, 1996-2000
Member, ASCE Subcommittee on Lunar and Martian Soil Simulants, 1994-1999
Alumni Board Member, Colorado Gamma Chapter, Sigma Phi Epsilon Fraternity, 1993-1998
Session Co-chairman, Development for Lunar and Mars Basing, ASCE Space Conference, 1998
Fitness Instructor, The Point Athletic Club, 1996-1998
Balanced Man Project Steward, Sigma Phi Epsilon National Fraternity, 1993-1997
Man Power Web Volunteer, Sigma Phi Epsilon Alumni Relations, Western Region, 1993-1995
Graduate Student Advisor, Colorado State Chapter, AIAA, 1994
Activity Director, MTU Student Chapter of ASCE, 1993
Member Development Chairman, Michigan Eta Chapter of Sigma Phi Epsilon, 1993
President, MTU Student Chapter of the American Society of Civil Engineers, 1992
Student-Faculty Interaction Committee, Michigan Technological University, 1992
Advertising Chairman, Michigan Tech Student Chapter of Chi Epsilon, 1992
ASCE Liaison, Michigan Tech Student Chapter of Chi Epsilon, 1992
Minaquabat Water Ski Team, Minocqua, WI, 1991
Resume Handbook Editor, MTU Student Chapter, ASCE, 1991
President, Michigan Eta Chapter, Sigma Phi Epsilon, 1991
Activity Director, Michigan Tech Ski Club, 1991
Representative, Interfraternity Council, 1991
Scholarship Chairman, Michigan Eta Chapter, Sigma Phi Epsilon, 1990
MTU Alpine Ski Team, Houghton, MI, 1990
President, Michigan Tech Alpine & Nordic Ski Club, 1990
President, Student Council, Lakeland Union High, 1989

CERTIFICATIONS

ACI Certified Concrete Technician
NICET Certified Nuclear Gage Operator
PADI Certified Advanced Open Water Diver
AFAA Certified Fitness Instructor
AFAA Certified Step Reebok Instructor