

**DR. CATHERINE T. AIMONE-MARTIN**  
Professor of Mineral Engineering  
Department of Mineral Engineering  
New Mexico Institute of Mining & Technology  
Socorro, New Mexico 87801

**EMPLOYMENT HISTORY**

1985 -present    New Mexico Institute of Mining and Technology  
                    Department of Mineral Engineering, Socorro, New Mexico

                    2000            Sabbatical leave working at Sandia National Labs, Carlsbad, NM, WIPP site  
                                    Involved in DRZ (damaged rock zone) studies within the nuclear repository  
                                    Performance Assessment program at the Waste Isolation Pilot Project (analysis of rock creep  
                                    and fracture, time-dependent microstructure behavior and brine flow).  
                                    Organized the 2<sup>nd</sup> Annual Workshop on Geomechanics of Nuclear Waste Repositories:  
  Role of Rock Mechanics and Mining Engineering in Reducing Uncertainties  
  (at the 4<sup>th</sup> North American Rock Mechanics Symposium – Seattle 2000)

                    1990-1995        Director, State Mining and Mineral Resource Research Institute, New Mexico Tech  
                    1996                Westinghouse WED/ DOE appointment at WIPP  
                                    Analysis of rock mechanics instrumentation, fracture patterns, creep behavior of rock salt

                    1989-1997        Department Chair, Department of Mineral and Environmental Engineering

                    1983-1985        Joint Appointment - Researcher, Center for Explosives Technology

  

1977-1978        STS Consultants, LTD., Northbrook, Illinois    Geotechnical Engineer  
1976-1978        Golder Associates, Inc., Seattle, Washington    Geological Engineer  
1974-1975        Anaconda Britannia Mines, LTD., Britannia Beach, B.C., Canada, Geological Engineer  
1971-1972        Steep Rock Iron Mines, LTD., Atikokan, Ontario, Canada Geological Technician

**EDUCATION**

PhD    Northwestern University, Evanston, Illinois, Ph.D., 1981,  
          Mineral Resources Engineering and Management and Civil (Geotechnical) Engineering  
          Dissertation: Rock blasting and fragmentation modeling

B. Sc.    Michigan Technological University, Houghton, Michigan B.S., 1971  
          Geological Engineering and Mining Engineering

**AFFILIATIONS**

Society of Mining Engineering of the American Institute of Mining, Metallurgical and Petroleum Engineers  
Society of Explosives Engineers - Board of Directors 1983 -1993  
International Society for Rock Mechanics  
American Rock Mechanics Association  
American Society of Civil Engineers - Geo-Institute Rock Mechanics Committee  
International Association of Bomb Technicians and Investigators

**APPOINTMENTS**

Los Alamos National Laboratory  
                    1987-1995        Research Appointment with EES-3 Division    Q clearance obtained  
                    1988-1995        Laboratory Affiliate

National Academy of Sciences, National Research Council  
                    1995-present        U.S. National Committee for Rock Mechanics

Editorial Board, *Rock Mechanics* Journal, MIT, 1998 - present

New Mexico Mining Association  
                    1998 - present        Board of Directors, Member

**AWARDS**

1996    Distinguished Alumni of Geological Engineering, Michigan Technological University

**SERVICES**

Reviewer, *Rock Mechanics*, MIT

Reviewer, *Fragblast*, ISRM

Reviewer, U.S. Department of Commerce, National Institute of Standards and Technology, Energy-related inventions

National Academy of Sciences - Review Panels on Comprehensive Test Ban Treaty issues for D.O.E.

National Science Foundation - On going proposal reviews

Department of Energy - Review Panels for WIPP

## PRESENTATIONS AND PUBLICATIONS

1. Co-Author, "Social, Economic, and Legal Consequences of Blasting in Strip Mines and Quarries", Contract No. J0285036, prepared for the U.S. Bureau of Mines, Northwestern University, May 1981.
2. Aimone, C.T., "DRBLST - A Computer Cost Model for Surface Coal Mine Fragmentation". Proceedings, 17th International Symposium on Computer Applications in the Mineral Industry, Golden, Colorado, April 1982.
3. Aimone, C.T., "Fragmentation Measurement Results for Fourteen Full-Scale Production Blasts: A Comparison with Three Dimensional Wave Code", Proceedings, 9th Conference on Explosives and Blasting Techniques, Dallas, 1983.
4. Meyers, M.A. and Aimone, C.T., "Dynamic Fracture by Spalling in Metals", Annual meeting of T.M.S. of A.I.M.E., Atlanta, 1983.
5. Meyers, M.A. and Aimone, C.T., "Dynamic Fracture (Spalling) of Metals", Progress in Materials Science (monograph), Vol. 28, Pergamon Press, Ltd., 1983.
6. Aimone, C.T., Meyers, M.A., and Mojtabei, N., "Shock Wave Induced Fragmentation of Copper Porphyries", Proceedings, 25th U. S. National Symposium on Rock Mechanics, Northwestern University, 1984.
7. Aimone, C.T., "Near Borehole Fracture and Fragmentation Studies in Copper Porphyries", Proceedings, 11th Conference on Explosives and Blasting Techniques, San Diego, 1985.
8. Dowding, C.H. and Aimone, C.T., "Wave Propagation Model for Rock Fragmentation", Rock Mechanics and Rock Engineering, Vol. 18, No. 1, 1985.
9. Aimone, C.T., "Blast Design for Particle Sizing and Costs From Crater Tests in the Santa Rosa Tar Sands", presented at the Fall Meeting of S.M.E., Albuquerque, 1985.
10. Dahlstrand, T.K., Buccille, W.A. and Aimone, C.T., "Blasting and Vibration Study of the O & G Industries, Inc., Quarry Operations, Woodbury, Connecticut. STS D'Appolonia Ltd., 1985
11. Edwards, C.L., Dick, D.D., Weaver, T.A., and Aimone, C.T., "Small-Scale Cratering Experiments". Report LA-UR 86-1280, Los Alamos National Laboratory, 1986.
12. Aimone, C.T., et. al., "Small-Scale Crater Tests in Weak Concrete and Sand", Proceedings, 12th Conference on Explosives and Blasting Techniques, Atlanta, 1986.
13. Aimone, C., Yoshita, M., Tirumurti, C., Program MIXTURE - a One-Dimensional Hydrodynamic Code for Porous Rock", Report, Center for Explosives Technology Research, NMIMT, 1986.
14. Aimone, C.T. and Dahlstrand, T.K., "A Study of Blasting Vibrations and Structural Response to Surrounding Dwellings at Traprock Quarry". Proceedings, 2nd International Symposium on Rock Fragmentation by Blasting, Keystone, 1987.
15. Brown, J.A., Blacic, J. D., Aimone, C. T., Fugelson, L. E., Dick, D.D., and Kranz, R. L., "Stress Wave Propagation and Attenuation in Berea Sandstone at High Strain Levels", Los Alamos National Labs, for Ballistic Missile Office, January 1988.
16. Money, W., Aimone, C., Benze, J., and Touryan, K., "Focused Shock Drilling Exploratory Research Program", Final Report, Department of Energy, DOE/ER/13330-2, August 1988.
17. Money, W., Benze, J., and Aimone, C., "Electrohydraulic Rock Fracturing by Pulsed Power Generated Focused Shocks", 7th IEEE Pulsed Power Conference, Palo Alto, June 1989.
18. Aimone, C.T., The Use of Explosives in Safe Blasting Practices: Transportation, Storage and Handling", Short Course for the New Mexico Rural Electric Cooperative Association, New Mexico Tech, July 1989.
19. Touryan, K., Touryan, L., Benze, J., and Aimone, C., "An Innovative Use of Pulsed Power Technology for Liberating Minerals From Ores", Phase I Final Report for NSF, Tetra Corp., Albuquerque, 1990.
20. Brown, J.A., Blacic, J.D., Aimone, C.T., and Dick, R.D., "Stress Wave Propagation and Attenuation in Sandstone at High Strain Levels", Geophysical Monograph 56, American Geophysical Union, 1990, pp. 149 - 171.
21. Aimone, C. and Rhodes, V., "Preparing for Blast Damage Cases When Foundation Soils are a Factor", Proceedings, 17th Conference on Explosives and Blasting Techniques, Society of Explosives Engineers, Las Vegas, 1991.

22. Aimone, C.T. and Mojtabai, N., "Electronic Detonators", IEEE Potentials, April 1991.
23. Ross, G. and Aimone, C.T., "Solid Waste Collection and Disposal Study for Lincoln County, Phase I: Economic Assessment of Alternatives", Project Report, 1991.
24. Ross, G. and Aimone, C.T., "Solid Waste Collection and Disposal Study for Lincoln County, Phase II: Evaluation of Potential Landfill Sites", Final Project Report, 1991.
25. Aimone, C. T.. "Overview of Blast Damage Litigation", Application and Use of Explosives in the Mineral Industry", Short Course, 97th Annual Convention, Northwest Mining Association, December, 1991.
26. C. Aimone-Martin, K. Oravec, E. Dussell, "Summary Report on TDR Calibration for In-situ Rock Mass Deformation Measurements at the WIPP Site", Technical Report to WERC.
27. K.M. Chua, C. Aimone-Martin, and N. Mojtabai, "Performance of Rock Reinforcement Systems at Elevated Temperatures", Technical Report to WERC, for publication consideration, 1992.
28. K.M. Chua, C. Aimone-Martin, N. Mojtabai, "A Numerical Study of the Effectiveness of Mechanical Rock Bolts in an Underground Opening Excavated by Blasting", 33rd U.S. Symposium on Rock Mechanics, Santa Fe, June 1992.
29. Edwards, C.L., Aimone, C.T., Pearson, C. and Baker, D.F., "Effects of Structural Setting and Rock Properties on Amplitudes of Surface Motions in the Vicinity of Small Explosive Tests", Proceedings, 10th Symposium on Explosives and Blasting Research, Society of Explosives Engineers, Austin, February 1994.
30. Aimone, C.T., Oravec, K.I., "Time Domain Reflectometry Calibration for the Waste Isolation Pilot Project", presented at the Society of Mining Engineers, Annual meeting, Albuquerque, February 1994.
31. Aimone, C.T., Oravec, K.I. and Nytra, T., "TDR Calibration for Quantifying Rock Mass Deformation at the WIPP Site, Carlsbad, NM", Technical Completion Report, Project No. WERC-01-23171, August 1994.
32. Chua, K.M., Xu, L, Aimone, Cathy, and Ghwier, M., "Strength and Fracture Toughness of the Yucca Mountain Tuff at Elevated Temperatures", Technical Completion Report, WERC, September 1994.
33. Aimone, C.T., Oravec, K.I., "TDR Calibration for Quantifying Rock Mass Deformations at the Waste Isolation Pilot Project (WIPP) Site, Carlsbad, New Mexico", Symposium and Workshop on Time Domain Reflectometry in Environmental, Infrastructure, and Mining Applications, U.S. Bureau of Mines Special Publication SP 19-94, Evanston, IL, September 1994, pp 507-517.
34. Bhada, R.K., Aimone-Martin, C.T., Duran, A, Kuhns, D.J., Lewis, C.R., Navratil, J.D., Rostami, J., Smith, D.M., and Wah, K.K., Independent Peer Review of the U.S. Department of Energy Waste Isolation Pilot Plant Engineered Alternatives Cost/Benefits Study Final Report, for the Nuclear Regulatory Commission and DOE Carlsbad Office, 1996.
35. Aimone-Martin, C.T. and S. Beattie, "Effect of Structural Setting on Blast-Induced Velocities and Amplitude of Ground Motions in Perlite", *Proceedings*, 12th Symposium on Explosives and Blasting Research, Society of Explosives Engineers, Orlando, February 1996.
36. Aimone-Martin, C.T., Oravec, K. I., Nytra, T.K., "A Mechanical Device for the Measurement of Combined Shear and Tension in Rocks", *International Journal of Rock Mechanics and Mining Sciences*, Vol. 34, No. 1, 1997, pp. 147-151.
37. Aimone-Martin, C. T., and Francke, J. L., 1997, "Time Domain Reflectometry (TDR): A Comparison of Field Data to Laboratory Shear Tests", 36th U.S. Rock Mechanics Symposium, Columbia University, New York, June; printed in the *International Journal of Rock Mechanics and Mining Sciences*, Vol. 34, Nos. 3/4.
38. Aimone-Martin, C. T., "Construction Vibration Standards for the City of Albuquerque", final report, submitted to the Environmental Health Department, Consumer Protection Division, City of Albuquerque, 1997.
39. Aimone-Martin, C.T., Oravec, K.I., and Bowser, J., "Results of Point Load Tests to Determine the Effects of Clay and Other Insolubles on Point Load Strength", report to Westinghouse WID, Carlsbad, NM, 1997.
40. Aimone-Martin, C. T., Dick, R. D., Weaver, T. A., Edwards, C. L., "Small-Scale Cratering Experiments I: Concrete" *FRAGBLAST, International Journal for Blasting and Fragmentation*, Vol. 2., 1998, pp. 143-180.
41. Dick, R. D., Aimone-Martin, C. T., Weaver, T. A., Edwards, C. L., "Small-Scale Cratering Experiments II: Sand" *FRAGBLAST, International Journal for Blasting and Fragmentation*, Vol.2., 1998, pp. 269-294.
42. O'Neil, T.J., Ahrens, T.J., Aimone-Martin, C.T., Blandford, R.R., Gardner, B.M., Karmis, M.E., Leith, W.S., Rendu, M-J., Wiegand, J., and Zavodni, Z.M., "Seismic Signals from Mining Operations and the Comprehensive Test Band Treaty", prepared by the Committee on Seismic Signals from Mining Activities, National Academy of Science, National Research Council for the Department of Energy, 1998.
43. Aimone-Martin, C.T. and Oravec, K.I., "Deformation and Fracture Characteristics in Rock Salt

- From Diametral Compression Tests”, report to Westinghouse WID, Carlsbad, NM, 1999.
44. Aimone-Martin, C. T., Chua, K. M., and Ghwier, M., “Strength of Yucca Mountain Tuff at Elevated Temperatures”, *Rock Mechanics and Rock Engineering*; final preparation.
  45. Aimone-Martin, C.T., and Ness, N., “The Influence of Structural Geology on Blast Vibration Ground Motions Characteristics of Amplitude and Frequency”, *International Journal of Rock Mechanics and Mining Sciences*, in preparation.
  46. Aimone-Martin, C.T., and Martin, R.S., “Effects of Temperature and Humidity on Airblast Sound Pressure Levels”, *Journal of Explosives Engineering*, April-May, 2000
  47. Aimone-Martin, C. T., Pease, B. L., and Wheat, M., “Vibration Control And Seismic Analysis of The Kneeling Nun Rock Pinnacle Adjacent to The Santa Rita Pit, New Mexico”, 26<sup>th</sup> Symposium on Explosives and Blasting Techniques, Anaheim, February 2000, pp. 13-22; *keynote talk*
  48. Aimone-Martin, C. T., Faroni, K., and Gelormino, T., “Fifteen Years of Blast Vibration Control and Improved Public Relations for Two Traprock Quarries”, 26<sup>th</sup> Symposium on Explosives and Blasting Techniques, Anaheim, February 2000, pp. 187-196.
  49. Aimone-Martin, C.T. and Martell, M.A., 2000, “Salinity Gradient Solar Pond Technology Applied to Potash Solution Mining”, in *Environmental Improvements in Mineral Processing and Extractive Metallurgy*, M. A. Sánchez, F. Vergara and S. H. Castro, Eds., University of Concepción; presented at V International Conference On Clean Technologies For The Mining Industry, May 9-13, 2000, Santiago, Chile.

## BOOKS

1. SME Mining Engineering Handbook, 1992, 2nd Edition, Chapter 9.2.1 Blast Design, pp. 722-746.

## CONFERENCES, SHORT COURSES, SEMINARS

1. Aimone, C.T. and Oriard, L.L., "Rock Blasting Techniques and Practices", Short Course presented November 1984, New Mexico Tech, Socorro, NM.
2. Aimone, C.T., "Blasting Techniques and Practices Applied to Highway Construction and Maintenance", Seminar for the New Mexico State Highway Department, May 1987.
3. Aimone, C.T., “The Use of Explosives in Safe Blasting Practices: Transportation, Storage and Handling”, Short Course for the New Mexico Rural Electric Cooperative Association, New Mexico Tech, July 1989.
4. Sponsor/Organizer, "Mining Issues Forum", Santa Fe County, Santa Fe, November 17, 1990.
5. Co-sponsor/organizer, "Mine Reclamation in the West", sponsored with N.M. Energy, Minerals and Natural Resources Department, November 14-15, 1991, Albuquerque, N.M.
6. Aimone, C. T. "Overview of Blast Damage Litigation", Application and Use of Explosives in the Mineral Industry, Short Course (presenter and co-director of course), 97th Annual Convention, Northwest Mining Association, December, 1991.
7. Aimone-Martin, C. T., “Mining Law and Technology Conference”, Socorro, New Mexico, September 4-6, 1997, sponsored with the N.M. State Bar Association and the N.M. Energy, Minerals and Natural Resources Department.
8. Co-organizer and invited speaker, 1998, New Directions for U.S. Rock Mechanics, organized session on “Catastrophic Rock Failure”, a forum sponsored by the American Rock Mechanics Association and funded by NSF, Asilomar, CA; report finding published in the *International Journal of Rock Mechanics and Mining Sciences & Geomechanics Abstracts* (in preparation).
9. Aimone-Martin, C. T., “The Effects of Poor Soil Conditions on Structures”, invited speaker, 2<sup>nd</sup> Annual Blasting Vibration Technology Conference, sponsored by Vibra-Tech and Geosonics, Key West, FL, February 1998.
10. Aimone-Martin, C. T., “Rock Blasting”, invited short course lecturer, presented at the North American Rock Mechanics Symposium, Cancun, Mexico, June 1998
11. Aimone-Martin, C.T., “Vibrating Your Rocks”, invited speaker at Best in the West Drilling and Blasting Conference, Sheridan, WY, sponsored by the Great Plains Chapter of ISEE, April 2000.
12. Aimone-Martin, C.T., “Evaluating Blast Damage Cases When Soil Conditions are a Factor”, Invited Seminar for the Bluegrass Chapter of ISEE, Louisville, KY, June 23, 2000.
13. Aimone-Martin, C.T., et al., “Rock Blasting and Vibration Control”, 2-day short course at the Crazy Horse Monument, Rapid City, SD, September 22-23, 2000.

## RESEARCH CONTRACTS

1. Mineral Institute, Department of Interior, 1982	\$ 3,877
Open Cast Blast Designs Blast Casting Project at the Utah International Navajo Mine.	
2. New Mexico Energy Research and Development Institute and Solv-Ex Corporation, Albuquerque, 1982	7,000
Crater Tests in the Santa Rosa Tar Sands Sandstone	
3. Mineral Institute, Department of Interior and Phelps Dodge Corporation, 1982	9,654
Rock Fragmentation Design and Cost Model for the Morenci Mine, Phelps Dodge Corp.	
4. Ensign Bickford Foundation Grant, 1983, 1984	4,000
5. Utah Mineral Technology Center in Comminution Phase I, 1983.	50,000
Explosively-Induced Shock Waves in Ore Minerals: Fracture and Attenuation	
6. Utah Comminution Center Phase II, 1983	45,000
Explosively-Induced Fracturing in Ore Minerals: Roles of Dynamic Stress Waves and Gas Pressurization	
7. Utah Comminution Center Phase III, 1984	36,250
Crater Tests Using Spherical and Cylindrical Explosive Geometries	
8. Los Alamos National Laboratory, 1985	35,000
The Measurement of Observable Parameters in Small-Scale Crater Tests	
9. Tetra Corporation, Albuquerque, 1986	24,042
Focused Shock Drilling	
10. New Mexico State Highway Department, 1988	8,000
Slope Stability Monitoring Using TDR	
11. Carson National Forest, USDA, 1989	17,987
Horizontal Water Well Drilling Project	
12. TETRA Corporation, Albuquerque, 1990	11,814
Pulse Power Technology for Separating Minerals from Ores	
13. Socorro County, 1990	8,149
Veguita Landfill Engineering Survey and Design	
14. U.S. Geologic Survey, 1990-1993	158,682
Multi-Dimensional Pumping Well Tracer Tests	
15. Lincoln County, 1990 - 1991	6,196
Solid Waste Collection and Disposal Study for Lincoln County, NM	
16. Environmental Improvement Division and City of Socorro, 1990	7,430
Groundwater Monitoring Wells at Eagle Picher Superfund Site, NM	
17. Grefco Inc., 1990	13,280
Drilling and Blasting project for No Agua Mine, Grefco, New Mexico	
18. Mineral Institute Research Program, U. S. Bureau of Mines, 1990 – 1995	750,000
Director of Mineral Institute: Minerals-related research projects	
20. Waste Management Education and Research Consortium, 1991 – 1992	50,000
Performance of Rock Reinforcement Systems at Elevated Temperatures	
21. Waste Management Education and Research Consortium, 1991 - 1992	53,884
Calibration of Near-Field Stability Instrumentation at the Waste Isolation Pilot Project	
22. Los Alamos National Labs, 1991-92	27,548
High Resolution Seismic Development Program	
23. AMAX Coal Co., 1992	8,000
Pipeline Vibration Study	
24. Waste Management Education and Research Consortium, 1992-93	48,000
Calibration of Near-Field Stability Instrumentation at the Waste Isolation Pilot Project	
25. Waste Management Education and Research Consortium, 1992-93	55,000
Performance of Rock Reinforcement Systems at Elevated Temperatures	
26. Los Alamos National Labs, 1992-93	25,000
Environmental Restoration Program High Resolution Seismology to Evaluate Buried Wastes, Phase II	
27. TETRA Corp., 1992-94	35,014
An Innovative Use of Pulsed Power Technology for Separating Minerals From Ores	
28. Waste Management Education and Research Consortium, 1993-94	58,788
Calibration of Near-Field Stability Instrumentation at the Waste Isolation Pilot Project	

29. Waste Management Education and Research Consortium, 1992-93	60,000
Performance of Rock Reinforcement Systems at Elevated Temperatures	
30. Amax Coal Company, 1992-93	5,000
Criteria for Blasting in the Vicinity of Pipelines	
31. Los Alamos National Lab, 1993-94	86,000
Intermediate Scale Explosive Source Experiments	
32. City of Socorro	13,846
Landfill Closure for the City of Socorro	
33. Los Alamos National Lab, 1995-1997	97,995
Large Scale Explosive Source Experiments	
34. Department of Energy, 1996	
Peer Review of the Engineering Alternatives Cost/Benefit Study	12,443
35. University of New Mexico, Subcontract, 1996	40,000
Creep Tests of WIPP Rock Salt	
36. Department of Energy, Western Associated Universities, 1996	10,000
Geotechnical Assessment of Rock Mass Behavior at WIPP	
37. City of Albuquerque, 1996-97	29,000
Development of Construction Vibration Standards	
39. Westinghouse, WID 1997-99	50,000
Rock Salt Brazilian Fracture Tests for the Waste Isolation Pilot Plant	
40. Sandia National Laboratories/Carlsbad Office, 2000	49,000
For research and development work in applied rock mechanics at the Waste Isolation Pilot Plant (WIPP) and economics development in salinity gradient solar pond technology	
41. Department of Interior, Office of Surface Mining and Reclamation, 2000-2001	108,000
Comparative Study of Structure Response to Coal Mine Blasting Non-Traditional Residential Structures	
42. Department of Interior, Office of Surface Mining and Reclamation, 2000-2001	50,000
Comparative Study of Domestic Well Integrity to Coal Mine Blasting	