

Publication List

M. E. Barkey

Books and Monographs

Crystal Elasticity: Fundamental Anisotropy of Materials, By Richard C. Bradt and M. E. Barkey. Elsevier Science, under contract, manuscript delivery date, May 2006.

Fatigue Testing, Analysis, and Design: Theory and Applications, By Y. Lee, R. Hathaway, J. Pan, and M. E. Barkey. Elsevier Science, 2004.

Book Chapters

Spot Weld Fatigue by M. E. Barkey and S. Zhang, a chapter in Fatigue Testing, Analysis, and Design: Theory and Applications, 2004.

Development of Accelerated Life Test Criteria by Y. Lee and M. E. Barkey, a chapter in Fatigue Testing, Analysis, and Design: Theory and Applications, 2004.

Refereed Journal Articles

25. G. Wang and M. E. Barkey “Investigation of Spot Weld Fatigue Crack Growth Process Using X-ray Imaging,” submitted to the *AWS Welding Journal Research Supplement*, April 2005.
24. E. Amrock, M. E. Barkey, and M. C. Turgeon “Pressure Testing of Recyclable Transmission Lines for a Fusion Reactor,” accepted to *Experimental Techniques*, March 2005.
23. D. Shang and M. E. Barkey “Analysis of Fatigue Crack Behavior Based on Dynamic Response Simulations and Experiments for Spot-Welded Joints,” submitted to *Fatigue and Fracture of Engineering Materials & Structures*, December 2004.
22. C. Olson, G. Rochau, S. Slutz, C. Morrow, R. Olson, M. Cuneo, D. Hanson, G. Bennett, T. Sanford, J. Bailey, W. Stygar, R. Vesey, T. Mehlhorn, K. Struve, M. Mazarakis, M. Savage, T. Pointon, M. Kiefer, S. Rosenthal, K. Cochrane, L. Schneider, S. Glover, K. Reed, D. Schroen, C. Farnum, M. Modesto, D. Oscar, L. Chhabildas, J. Boyes, V. Vigil, R. Keith, M. Turgeon, B. Cipiti, E. Lindgren, V. Dandini, H. Tran, D. Smith, D. McDaniel, J. Quintenz, M. K. Matzen, J. P. VanDevender, W. Gauster, L. Shephard, M. Walck, T. Renk, T. Tanaka, M. Ulrickson, W. Meier, J. Latkowski, R. Moir, R. Schmitt, S. Reyes, R. Abbott, R. Peterson, G. Pollock, P. Ottinger, J. Schumer, P. Peterson, D. Kammer, G. Kulcinski, L. El-Guebaly, G. Moses, I. Sviatoslavsky, M. Sawan, M. Anderson, R. Bonazza, J. Oakley, P. Meekunasombat, J. De Groot, N. Jensen, M. Abdou, A. Ying, P. Calderoni, N. Morley, S. Abdel-Khalik, C. Dillon, C. Lascar, D. Sadowski, R. Curry, K. McDonald, M. Barkey, W. Szaroletta, R. Gallix, N. Alexander, W. Rickman, C. Charman, H. Shatoff, D. Welch, D. Rose, P. Panchuk, D. Louie, S. Dean, A. Kim, S.

Nedoseev, E. Grabovsky, A. Kingsep, V. Smirnov, "Development Path for Z-Pinch IFE" *Fusion Science and Technology* 47 (3), April 2005, pp. 633-640.

21. G. Wang and M. E. Barkey "Fatigue Crack Identification in Tensile-Shear Spot Welded Structure by Dynamic Response Characteristics," accepted to the *ASME Journal of Engineering Materials and Technology*, January 2005.
20. D. Shang, M. E. Barkey, Y. Wang, and T. C. Lim, "Fatigue Damage and Dynamic Natural Frequency Changes of Spot Welded Joints," SAE Technical Paper 2003-01-0695, selected for publication in 2003 SAE Transactions: *Journal of Materials & Manufacturing*, September 2004, and selected for the 2003 SAE Arch T. Colwell Merit Award.
19. G. Wang and M. E. Barkey "Experimental Investigation of Fatigue Cracking and Its Influence on Dynamic Response Characteristics of Spot Welded Specimens," *Experimental Mechanics*, Volume 44/3 pp. 512-521, 2004.
18. Y. Guo, M. E. Barkey and D. Yen, "FE-Simulation of the Effects of Machining-Induced Residual Stress Profile on Rolling Contact of Hard Machined Components," *International Journal of Mechanical Sciences*, Volume 46/3 pp. 371-388, 2004.
17. Y. Guo, M. E. Barkey and D. Yen, "Modelling of Rolling Contact Fatigue for Hard Machined Components with Process-Induced Residual Stress," *International Journal of Fatigue*, Volume 26, pp. 605-613, 2004.
16. R. C. Bradt, M. E. Barkey, S. E. Jones and M. E. Stevenson, "Projectile Impact Fracture of Flat Glass," *Journal of Practical Failure Analysis*, Volume 3(1), pp. 5-10, 2003.
15. D. Shang, M. E. Barkey, Y. Wang, and T. C. Lim, "Effect of Fatigue Damage on the Dynamic Response Frequency of Spot Welded Joints," *International Journal of Fatigue*, Volume 25/4, pp. 311-316, 2003.
14. M. E. Barkey and J. Han, "Fatigue Analysis of Spot Welds Subjected to a Variable Amplitude Loading History," *2001 SAE Transactions Journal*, published September 2002.
13. M. E. Stevenson, M. E. Barkey, and R. C. Bradt, "Fatigue Failures of Austenitic Stainless Steel Orthopedic Fixation Devices," *Journal of Practical Failure Analysis*, Volume 2(3), pp. 57-64, 2002.
12. R. C. Bradt, M. E. Barkey, S. E. Jones and M. E. Stevenson, "Projectile Impact Fracture of Flat Glass," *Glass Researcher: Bulletin of Glass Science and Engineering*, Vol. 11, No. 2, pp. 20-23, 2002.
11. M. E. Barkey, H. Kang, and Y. Lee, "Failure Modes of Single Resistance Spot Welded Joints Subjected to Combined Fatigue Loading," *International Journal of Materials and Product Technology*, Vol. 16, Nos. 6/7, pp. 510-526, 2001.
10. T. Zeiler and M. E. Barkey, "Design Sensitivities of Fatigue Performance and Structural Dynamic Response in an Automotive Application," *International Journal of Structural and Multidisciplinary Optimization*, Vol. 21, pp. 309-315, 2001.
9. M. E. Barkey and J. Han, "Fatigue Analysis of Spot Welds Subjected to a Variable Amplitude Loading History," *SAE Special Publication SP-1621 "Fatigue and Failure of Spot Welds and Welded Joints,"* November 2000.

8. H. Kang, M. E. Barkey, and Y. Lee, "Evaluation of Multiaxial Spot Weld Fatigue Parameters for Proportional Loading," *International Journal of Fatigue*, Vol. 22, pp. 691-702, 2000.
7. T. Zeiler and M. E. Barkey, "Analytical Design Sensitivity Derivatives of Time and Frequency Responses as an Aid to the Design Process," *International Journal of Vehicle Design*, Vol. 23, Nos. 1/2, pp. 176-190, 2000.
6. M. E. Barkey and H. Kang, "Testing of Spot Welded Coupons in Combined Tension and Shear," *Experimental Techniques*, Vol. 23, No. 5, pp. 20-22, 1999.
5. H. Kang and M. E. Barkey, "Fatigue Life Estimation of Spot-Welded Joints Using an Interpolation/Extrapolation Technique," *International Journal of Fatigue*, Vol. 21, pp. 769-777, 1999.
4. H. Y. Wang and M. E. Barkey, "A Strain Space Nonlinear Kinematic Hardening/Softening Plasticity Model," *International Journal of Plasticity*, Vol. 15, pp. 755-777, 1999.
3. H. Y. Wang and M. E. Barkey, "Strain Space Formulation of Armstrong-Frederick Family of Plasticity Models," *ASME Journal of Engineering Materials and Technology*, 120:230-235, 1998.
2. V. B. Kottgen, M. E. Barkey, and D. F. Socie, "Pseudo Stress and Strain Based Approaches to Multiaxial Notch Analysis," *International Journal of Fatigue and Fracture of Engineering Materials and Structures*, Volume 18, Number 9, pp. 981-1006, 1995.
1. M. E. Barkey, D. F. Socie, and K. J. Hsia, "A Yield Surface Approach to the Estimation of Notch Strains for Proportional and Nonproportional Cyclic Loading," *ASME Journal of Engineering Materials and Technology*, 116:173-180, 1994.

Refereed Conference Papers

13. Y. Guo, M. B. Prime and M. E. Barkey, "A Finite Element Analysis Based Compliance Method Coupled with Wet Etching to Determine Residual Stress in High Speed Milling Aluminum Alloys," *2005 ASME International Congress and Exposition*, Paper Number: IMECE2005-80102, abstract accepted April 2005.
12. R. C. Bradt, S. E. Jones, M. E. Barkey, and M. E. Stevenson, "Failure of Projectile Impact Resistant Glass Panels," *The 105th American Ceramics Society Annual Meeting*, Nashville Tennessee, June 2003.
11. Y. Guo, M. E. Barkey and D. Yen, "The Effects of Process-Induced Residual Stress Patterns on Rolling Contact Stress of Hard Machined Components," *2003 International Mechanical Engineering Congress and Exposition (IMECE): Advances in Machining of Hard Materials*, Washington D.C., November 2003.
10. H. Wang and M. E. Barkey, "A Multiaxial Ratcheting Model for Notched Structures," accepted to *Fracture Mechanics 2003: Symposium of Structural Integrity & Material Aging, Shanghai*, August 2003 (not presented).
9. D. Shang, M. E. Barkey, Y. Wang, and T. C. Lim, "Fatigue Damage and Dynamic Natural Frequency Changes of Spot Welded Joints," *SAE Technical Paper 2003-01-0695* presented at the SAE World Congress, March 2003.
8. M. E. Barkey and J. Han, "Fatigue Analysis of Spot Welds Subjected to a Variable Amplitude Loading History," *SAE Technical Paper 2001-01-0435* presented at the SAE World Congress, March 2001.
7. M. E. Barkey and H. Wang, "A Strain Space Nonlinear Kinematic Hardening and Softening Plasticity Model". Presented at Plasticity '99 in Cancun, Mexico, January 1999. Published in conference proceedings "Constitutive and Damage Modeling of Inelastic Deformation and Phase Transformation," edited by Akhtar S. Khan (pp.7-10).
6. C. Midkiff, B. Todd, J. Parker, M. Barkey, and J. Gershenson, "Delivery of a Complete Undergraduate Engineering Degree by Distance Learning Using a Mobile Laboratory". ASEE section conference, 1997 published in refereed conference proceedings.
5. S. E. Jones, M. E. Barkey, W. K. Rule, and E. R. Huber, "Mechanical Characterization of Hardened Astralloy-V (R) Using the Taylor Impact Test". AIAA Space Programs and Technologies Conference and Exhibit, Huntsville, Alabama, September 1996. Published as preprint number AIAA-96-4294, 8 pages, also published in conference proceedings.
4. W. K. Rule, M. E. Barkey, and S. E. Jones, "Numerical and Analytical Modeling of Hypervelocity Impacts on a Whipple Bumper System". AIAA Space Programs and Technologies Conference and Exhibit, Huntsville, Alabama, September 1996. Published as preprint number AIAA-96-4364, 7 pages, also published in conference proceedings.
3. M. E. Barkey, V. B. Köttgen, and M. Hack. "Pseudo-Stress Space Plasticity and Detection of Near-Proportional Loading." Accepted for presentation at Engineering Against Fatigue conference, Sheffield, March 1996 (not presented).
2. V. B. Köttgen, M. E. Barkey, and D. F. Socie, "Structural Stress-Strain Analysis of Nonproportional Loading Suitable for FEM Postprocessing", presented at Fatigue Design 1995 in Helsinki, Finland.

1. M. E. Barkey and D. F. Socie, "Calculation of Notch Strains for Nonproportional Cyclic Loading Using a Structural Yield Surface", Published in refereed conference proceedings entitled Multiaxial Fatigue and Design by the European Structural Integrity Society (ESIS-21), edited by A. Pineau, G. Cailleaud, and T.C. Lindley, 1996.

Other Technical Publications

Research Report "Z-Pinch Power Plant Recyclable Transmission Line (RTL) Structural Analysis & Experiments," by Matt Turgeon (SNL), and Mark E. Barkey (The University of Alabama) 22 December 2004.

5. Matt Turgeon and M. E. Barkey Research Report "Z-Pinch Power Plant Recyclable Transmission Line (RTL) Structural Analysis & Experiments," Sandia National Laboratories Research Report, December, 2004.
4. Surya P. Chodimella, M. E. Barkey, and S. E. Jones, "Impact Failure Modeling of a Spot Welded Joint," *presented at the 2003 SAE World Congress*, March 2003.
3. P. K. Chodimella, M. E. Barkey, and S. E. Jones. "High Velocity Impact Simulation of Spot Welded Joints." Abstract and Animated Computer Simulation accepted to SC2001 (Supercomputer Conference), November 10-16, Denver, Colorado, 2001. Demonstration made by the Alabama Supercomputer Center.
2. M. E. Barkey and M. Hack. "FALANCS Fatigue Analysis and Computation Theory Manual." For LMS Durability Technologies. (Theory Manual for fatigue analysis software.) 1999.
1. M. E. Barkey and M. Hack. "FALANCS Fatigue Analysis and Computation System Manual." For LMS Durability Technologies. (User's Manual for fatigue analysis software.) 1998.

The University of Alabama Structural Durability and Fatigue Performance

The Structural Durability and Fatigue Performance Group was established by Dr. M. E. Barkey and associated students at the University of Alabama in 1996. The group focus is on all aspects of structural durability and material fatigue, and places particular emphasis on ground vehicle applications.

The purposes of the group reports are to disseminate information in a timely manner for current areas of research and to archive pertinent information regarding the fatigue and material testing facilities and procedures at the University of Alabama.

The group reports were suspended in 2002 as publication lead times of journals decreased due to electronic article submission and review. Copies of journal articles in submission may be directly requested from M. E. Barkey.

Report Number

- 141** *Effect of Fatigue Damage on the Dynamic Response Frequency of Spot-Welded Joints*, D. Shang, M. E. Barkey, Y. Wang, and T. C. Lim, May 2002.
- 140** *A Numerical Study of Ratcheting at a Notch Under Combined Bending and Torsion*, N. Madapadi, October 2001.
- 139** *Procedure and Analysis Techniques for High Velocity Impact Simulation of Spot Welded Joints*, P. K. Chodimella, M. E. Barkey, October 2001.
- 138** *High Velocity Impact Simulation of Spot Welded Joints*, P. K. Chodimella, M. E. Barkey, and S. E. Jones, September 2001.
- 137** *Fatigue Analysis of Spot Welds Subjected to Variable Amplitude Combined Loading*, J. Han, August 2001.
- 136** *Fatigue Analysis of Spot Welds Subjected to a Variable Amplitude Loading History*, M. E. Barkey and J. Han, September 2000.
- 135** *Failure Modes of Single Resistance Spot Welded Joints Subjected to Combined Fatigue Loading*, M. E. Barkey, H. Kang, and Y. Lee, November 1999.
- 134** *Fatigue Analysis of Spot Welds Subjected to Combined Tension and Shear Loading*, H. Kang, October 1999.
- 133** *Evaluation of Multiaxial Spot Weld Fatigue Parameters for Proportional Loading*, H. Kang, M. E. Barkey, and Y. Lee, August 1999.
- 132** *Implementation of Hooke's Law as an ABAQUS User Subroutine*, B. Stuart, August 1999.
- 131** *Fatigue Life Calculations of Resistance Spot Welds Using Rupp's Method Applied to Multiaxial Test Data*, H. Kang and M. E. Barkey, July 1999.

- 130 *Fatigue Life Calculations of Resistance Spot Welds Using Sheppard's Method Applied to Multiaxial Test Data*, H. Kang and M. E. Barkey, July 1999.
- 129 *Fatigue Life Calculations of Resistance Spot Welds Using Lawrence and Swellam's Method Applied to Multiaxial Test Data*, H. Kang and M. E. Barkey, July 1999.
- 128 *Stiffness Changes in Spot Welded Joints Due to Fatigue Damage Development*, S. Hill, H. Kang, and M. E. Barkey, June 1999.
- 127 *Fatigue Life Estimation of Resistance Spot Welds Using Sheppard's Structural Stress Method*, H. Kang and M. E. Barkey, March 1999.
- 126 *Fatigue Life Estimation of Resistance Spot Welds Using Lawrence and Co-Workers' Method*, H. Kang and M. E. Barkey, March 1999.
- 125 *Nonlinear Kinematic Hardening and Softening: Seminar Materials*, M. E. Barkey and H. Wang, March 1999.
- 124 *Testing of Spot Welded Coupons in Combined Tension and Shear*, M. E. Barkey and H. Kang, January 1999.
- 123 *Analytical Design Sensitivity Derivatives of Time Frequency Responses as an Aid to the Design Process*, T. A. Zeiler and M. E. Barkey, November 1998.
- 122 *Determination of Strain Life Fatigue Constants for MS6000-44VA-050 Galvanized Sheet Steel*, H. Kang and M. E. Barkey, October 1998.
- 121 *A Strain Space Nonlinear Kinematic Hardening/Softening Plasticity Model*, H. Wang and M. E. Barkey, September 1998.
- 120 *Multiaxial Nonlinear Kinematic Hardening and Softening in Strain Space*, H. Wang, September 1998.
- 119 *A Clamping Study for the Chrysler Multiaxial Spot-Weld Fixture*, H. Kang and M. E. Barkey, August 1998.
- 118 *A Multiaxial Ratchetting Model for Notched Structures*, H. Wang and M. E. Barkey, July 1998.
- 117 *Fatigue Life Estimation of Spot-Welded Joints Using An Interpolation/Extrapolation Technique*, H. Kang and M. E. Barkey, June 1998.
- 116 *A Thesis Proposal--Fatigue Analysis of Spot Welds Under Combined Tension and Shear*, H. T. Kang, February 1998.
- 115 *Load Space and its Application to Finite Element Post-processing for Fatigue Analysis*, M. E. Barkey, M. Hack, and V. B. Köttgen, January 1998.
- 114 *A Review of Recent Literature on the Fatigue Life of Spot Welds*, H. Kang and M. E. Barkey, December 1997.
- 113 *Strain Space Formulation of the Armstrong-Frederick Family of Plasticity Models*, H. Wang and M. E. Barkey, October 1997.
- 112 *A Collet-less Bending and Torsion Test Frame*, M. Razavi and A. Thomas, September 1997.
- 111 *Static Bending Test Procedure to Determine Rectangular Rosette Misalignment*, M. Razavi and M. E. Barkey, September 1997.
- 110 *A Thesis Proposal--Multiaxial Cyclic Plasticity: A Strain Space Formulation*, H. Wang, September 1997.

- 109 *Load Controlled Fatigue Tests of 6061-T6 Aluminum*, M. E. Barkey, August 1997.
- 108 *Multiaxial Notch Analysis: Seminar Materials*, M. E. Barkey, June 1997.
- 107 *Multiaxial Test Frame Software Development*, N. E. Brown, May 1997.
- 106 *Testing Procedure for SATEC Uniaxial Testing Machines*, M. E. Barkey, February 1997.
- 105 *Monotonic Uniaxial Tension Tests of 5456-O Aluminum*, M. E. Barkey, February 1997.
- 104 *Pseudo-Stress Space Plasticity and Detection of Near Proportional Loading*, M. E. Barkey, V. B. Köttgen, and M. Hack, December 1996.
- 103 *An Implementation of a Continuous Yield Surface Plasticity Model for Plane Stress*, M. E. Barkey, November 1996.
- 102 *A Simple Kinematic Analysis of Oblique Hypervelocity Impact*, M. E. Barkey, August 1996.
- 101 *Monotonic Uniaxial Tension Tests of Some Metallic Materials*, M. E. Barkey, August 1996.
- 100 *Calculation of Notch Strain Under Multiaxial Nominal Loading*, M. E. Barkey, Ph.D. Thesis, Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, 1993.