



**MICHAEL E. STEVENSON, Ph.D., P.E.**  
**PRESIDENT, PRINCIPAL**

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Dr. Stevenson is President and Principal of Engineering Systems Inc. (ESI). Dr. Stevenson specializes in the performance and analysis of engineering materials and systems in a variety of applications and complex failure investigations. He has conducted complex, multidisciplinary failure investigations pertaining to buried infrastructure systems, structural failures, vehicles, and industrial & consumer products. He is experienced with failure analysis of marine, automotive, all-terrain vehicle, aerospace, biomedical, crane, rail, structural, power generation and utility infrastructure systems & components. His technical interests include dynamic mechanical properties of materials, indentation hardness testing, fatigue and fracture mechanics, applied techniques for failure analysis, high strain rate material mechanics, and the performance of copper and copper alloys in extreme mechanical/chemical environments. Dr. Stevenson has provided testimony in matters pending before both state and federal courts.

**Areas of Specialization**

- Engineering Failure Analysis
- Ballistic Testing of Materials
- Contact and Impact Mechanics
- Corrosion Engineering
- Fatigue and Fracture Mechanics
- Mechanical Testing
- Mechanical and Physical Metallurgy
- Mechanics of Materials
- Non-Destructive Testing & Inspection
- Welding Metallurgy
- Non-Metallic Materials
- Mechanical & Materials Design

**Education**

- Ph.D., Metallurgical Engineering, University of Alabama, 2001
- B.S. and M.S., Metallurgical and Materials Engineering, University of Alabama, 1998 and 1999

*June 2017*

## **Licensed Professional Engineer (P.E.)**

Alabama (26082)  
Colorado (PE-44776)  
Georgia (29920)  
Illinois (062-063115)  
Louisiana (PE.0036034)  
Michigan (6201057901)  
Missouri (2011002292)  
Mississippi (19976)  
Nebraska (E-13834)  
North Carolina (037549)  
South Carolina (28551)  
NCEES (28144)

## **Professional Affiliations/Honors**

### **ASM International**

Member  
Editor-in-Chief, *Journal of Failure Analysis and Prevention* (2011 – Present)  
Associate Editor, *Journal of Failure Analysis and Prevention* (2007-2011)  
Editorial Review Board, *Journal of Materials Engineering and Performance* (2005-2007)  
Failure Analysis Committee  
    Chairman 2009-2010  
    Vice Chairman 2008-2009  
    Secretary 2007-2008

### **The International Metallographic Society (IMS)**

Member  
Editorial Advisory Board, *Materials Characterization* (2006-2008)

### **The Minerals, Materials and Metals Society (TMS)**

Member  
Structural Materials Committee (2001-2005)

### **American Welding Society (AWS)**

Member

### **National Association of Corrosion Engineers (NACE)**

Member

### **American Society for Testing and Materials (ASTM)**

Member  
Corrosion of Metals (G01)  
Fatigue and Fracture Committee (E08)  
Mechanical Testing Committee (E28)  
Forensic Engineering Committee (E58)  
Forensic Engineering Subcommittee (E30.05)  
    Vice-Chairman, 2005  
    Secretary, 2002 – 2005

### **American Society of Mechanical Engineers (ASME)**

Member

## **American Society for Non-Destructive Testing (ASNT)**

Member

## **Society of Automotive Engineers (SAE)**

Member

## **Professional Affiliations**

Industrial Advisory Board, U. of Alabama Department of Aerospace Engineering and Mechanics

ASM-I Liaison/Vice-Chairman – Panel SD7 – Marine Forensics, Society of Naval Architects and Marine Engineers, **SNAME**, 2002-2008

Symposium Co-Chair (With R.J. Shipley), Failure Analysis and Non-Destructive Testing, ASM Annual Meeting, 2003

Symposium Co-Chair (With M.L. Weaver), Failure of Structural Materials, TMS Annual Meeting, Charlotte, NC, February 2004

Symposium Chair, Metallurgical Failure Analysis: Present and Future, IMS Annual Meeting, Savannah, GA, August 2004

Symposium Co-Chair (With J.L. Raphael), Computational Modeling and Failure Analysis, ASM Annual Meeting, 2004

Symposium Co-Chair (With R.J. Parrington), Failure Analysis of Non-Metallic Materials, ASM Annual Meeting, 2005

Symposium Co-Chair (With D.A. Turnquist), Failure Analysis: Fatigue & Fracture, ASM Annual Meeting, 2007, 2008, 2009

Program Co-Chair (With D.C. McGarry and T.N. Ackerson) Charles R. Morin Memorial Failure Analysis Symposium, ASM Annual Meeting, 2009

## **Classroom Teaching Experience**

### Engineering Materials I: Structure and Properties of Materials

Served as graduate teaching assistant and lecturer for topics of: basic structure property relationships in engineering materials; mechanical, magnetic, chemical, optical and electronic properties of materials; corrosion of materials; polymers and composites; metals and their alloys; ceramics and glasses.

### Mechanical Behavior of Materials

Served as lecturer for topics of: plasticity; fracture mechanics; metal fatigue; failure analysis; fractography; non-destructive testing.

## **Positions Held**

### **Engineering Systems Inc., Norcross, Georgia**

President and CEO, 2010 to Present

President, Principal, 2009 to Present

Principal, Director of Georgia Operations, 2009

Vice President, Director of Georgia Operations, 2007 – 2009

### **Metals and Materials Engineers, Suwanee, Georgia**

Vice-President & Principal Engineer, 2004 – 2007

Principal Metallurgist and Director, Metallurgical Services, 2001 – 2003

### **QORE Property Sciences, Suwanee, Georgia**

Materials Engineer, 2001

### **University of Alabama, Tuscaloosa, Alabama**

Graduate Researcher, 1998-2001

Mechanical Metallurgy Laboratory, Department of Metallurgical Engineering

Terminal Ballistics Laboratory, Department of Aerospace Engineering & Mechanics

### **Ultrasonics & Magnetics Corporation, New Orleans, Louisiana**

NDT Consultant/Metallurgist, 1996-2000

## **Technical Reports**

*Dr. Stevenson has authored over 300 technical reports addressing various topics, including:*

Component Failures Relating to Fires and Explosions

Corrosion Failure Analysis and Life Prediction

Dynamic Behavior of Materials

Environmentally Assisted Cracking of Materials

Fatigue and Fracture Mechanics

Failure Analysis of Rail Systems and Components

Failure of Aircraft, Automotive, and Crane Systems and Components

Marine Structural Evaluation

Metallurgical Failure Analysis

Mechanical Integrity of Tubular Components

Performance of Bolts and Bolted Connections

Failure Analysis of Water/Wastewater Systems

## **Archival Publications**

"Case Study: Analysis of Corrosion Patterns to Evaluate the Preaccident Configuration of an ATV Tie Rod End Connection," S. Uchneat, **M. Stevenson**, J. McDougall, *ASM Journal of Failure Analysis and Prevention*, Vol. 16, Issue 4, August 2016

"Post-Fire Structural Integrity Evaluation of an Aircraft Utilizing ASTM E 1004-02," J.L. McDougall, D.G. Klepacki, **M.E. Stevenson**, M.T. Kenner, *ASM Journal of Failure Analysis and Prevention*, Vol. 15, Issue 1, February 2015

"Overload Fracture of Cast Aluminum Wheel," E.R. Weishaupt, **M.E. Stevenson**, J.K. Sprague, *ASM Journal of Failure Analysis and Prevention*, Vol. 14, Issue 6, December 2014

"Failure Analysis of a Glass Filled Phenolic Resin Power Steering Pump Pulley," **M.E. Stevenson**, M.D. Hayes, D.A. Turnquist, Submitted to *ASM Journal of Failure Analysis and Prevention*, October, 2014. Presented at SPE's ANTEC 2015, Orlando FL, March 25, 2015. Recipient of the Dr. Myer Ezrin Best Paper Award at ANTEC 2015.

- "Failure Analysis of a Corroded Threaded Fitting in an Ammonia Refrigeration System," **M.E. Stevenson**, S.A. Sanders, G.J. Novak, R. Pape, *ASM Journal of Failure Analysis and Prevention*, Vol. 14, Issue 3, June 2014
- "Failure Investigation of an Aircraft Crankshaft Gear Connection," **M.E. Stevenson**, D.G. Klepacki, J.L. McDougall, D.E. Alexander, *ASM Journal of Failure Analysis and Prevention*, Vol. 12, Issue 6, December 2012
- "Case Study: Corrosion Failure of Yellow Brass Tubing in Radiator Application," E.R. Weishaupt, **M.E. Stevenson**, J.L. McDougall and D.A. Turnquist, *ASM Journal of Failure Analysis and Prevention*, Vol. 12, Issue 3, June 2012
- "Failure Analysis of Hydraulic Fitting Brazed Connections," **M.E. Stevenson**, M.D. Hayes, J.L. McDougall, S.A. Sanders, *ASM Journal of Failure Analysis and Prevention*, Vol. 12, Issue 2, April 2012
- "Step Ladder Failure Analysis, a Comparison of Analytical Methods," M.T. Kenner, **M.E. Stevenson**, E.H. Knox, M.P. Van Bree, J.A. Wilkinson, Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition, Denver, CO. November 11-17, 2011
- "Failure Analysis of a Commercial Brush Chipper Hood," D.M. Norfleet, **M.E. Stevenson**, J.A. Wilkinson, M.T. Kenner, D.B. Brickman, *ASM Journal of Failure Analysis and Prevention*, Vol. 11, Issue 6, December 2011
- "Continued Corrosion After Removal of Corrosive Drywall," G.B. Freeman, R. DeMott, T. Gauthier, J.L. Hubbard and **M.E. Stevenson**, *ASM Journal of Failure Analysis and Prevention*, Vol. 11, Issue 3, June 2011
- "Interpreting the Evidence: Elemental Analysis in the SEM," R.J. Shipley, **M.E. Stevenson**, *ASM Journal of Failure Analysis and Prevention*, Vol. 11, Issue 3, June 2011
- "Analysis of a Spiral/Spliced Pipe Weld Hydrostatic Test Rupture," J.L. McDougall, F.E. Schmidt and **M.E. Stevenson** *Proceedings of Microscopy and Microanalysis*, 15 (Suppl 2) (2010)
- "Uses of Abaqus/Standard in Failure Analysis," M.T. Kenner, J.A. Wilkinson, **M.E. Stevenson**, and M.D. Hayes, Simulia Customer Conference (2009)
- "Metallurgical and Metallographic Aspects of Engineering Failure Analysis," **M.E. Stevenson**, J.L. McDougall, and M.D. Hayes, *Proceedings of Microscopy and Microanalysis*, 14 (Suppl 2) (2008)
- "Failure Analysis of a Tree Pruner Saw Blade Anchor Screw," **M.E. Stevenson**, M.D. Hayes, J.L. McDougall, E.R. Weishaupt, and D.A. Turnquist, *Proceedings of Microscopy and Microanalysis* 14 (Suppl 2) (2008)
- "Failure Analysis of a Temporary Power Line Anchor," **M.E. Stevenson**, M.E. Barkey, J.L. McDougall, and E.R. Weishaupt, *Journal of Failure Analysis & Prevention*, 8(3) (2008)
- "Stresses in Bent Copper Tubing: Application to Fatigue and Stress-Corrosion Cracking Failure Mechanisms," **M.E. Stevenson**, M.E. Barkey, and J.L. McDougall, *Journal of Failure Analysis & Prevention*, 5(6), pp. 25-29 (2005)
- "Failure Analysis of Steel Bearing Plates," E.E. Vernon, **M.E. Stevenson**, and E.R. Weishaupt, *Journal of Failure Analysis & Prevention*, 5(6), pp. 18-24 (2005)

- "Engineering Failure Analysis," **M.E. Stevenson**, Guest Editorial, *Journal of Failure Analysis & Prevention*, 5(6), pp. 5-6, pp. 20-25 (2005)
- "Analysis of Sheet Steel Fracture During Deep Drawing," J.L. McDougall, **M.E. Stevenson** and K. McKeever, *Journal of Failure Analysis & Prevention*, 5(5) (2005)
- "Applied Fracture Mechanics in Metallurgical Failure Investigations," **M.E. Stevenson** and J.L. McDougall, *Proceedings of Microscopy and Microanalysis* (2005)
- "Failure Analysis of a High-Speed Pinion Shaft," **M.E. Stevenson**, J.L. McDougall, R.D. Bowman, and R.L. Herman, *Journal of Failure Analysis and Prevention*, 5(2), pp. 48-54 (2005)
- "Stress-Corrosion Cracking in Copper Refrigerant Tubing," J.L. McDougall and **M.E. Stevenson**, *Journal of Failure Analysis and Prevention*, 5(1), pp. 13-16 (2005)
- "Failure Analysis of Gray Iron Pump Housings," E.E. Vernon, **M.E. Stevenson**, J.L. McDougall, and L. McCall, *Journal of Failure Analysis and Prevention*, 4(6), pp. 15-18 (2004)
- "Premature Failure of Steel Gantry Crane Wheels," E.E. Vernon, **M.E. Stevenson**, and J.L. McDougall, *Journal of Failure Analysis and Prevention*, 4(5), pp. 16-18 (2004)
- "Failure of a Vehicle Braking System Air Reservoir," J.L. McDougall and **M.E. Stevenson**, *Proceedings of Microscopy and Microanalysis* 10 (Suppl 2), (2004)
- "Metallurgical Failure Analysis: Present and Future," M.E. Stevenson, *Proceedings of Microscopy and Microanalysis* 10 (Suppl 2), (2004)
- "Effects of Improper Heat Treatment on Steel Crane Wheels," E.E. Vernon, **M.E. Stevenson**, and J.L. McDougall, *Proceedings of Microscopy and Microanalysis*, 10 (Suppl 2), (2004)
- "Failure Analysis in a Vehicle Accident Reconstruction," **M.E. Stevenson**, J.L. McDougall, E.E. Vernon, L. McCall, and R.D. Bowman, *Journal of Failure Analysis and Prevention*, 4(2), pp. 49-55 (2004)
- "Failure of Projectile Impact Resistant Glass Panels," R.C. Bradt, S.E. Jones, M.E. Barkey, and **M.E. Stevenson**, *Ceramic Armor and Armor Systems*, E. Medvedovskii, Ed., Ceramic Transactions, Vol. 151, pp. 131-144 (2003)
- "Water Chemistry And Processing Effects On the Corrosion Degradation of Copper Tubing In Cooling Water Systems," J.L. McDougall, L. McCall, and **M.E. Stevenson**, *Practical Failure Analysis*, 3(5), pp. 81-88 (2003)
- "The High Strain Rate Dynamic Stress-Strain Curve for OFHC Copper," **M.E. Stevenson**, S.E. Jones, and R.C. Bradt, *Materials Science Research International*, 9(3), pp. 187-195 (2003)
- "Metallurgical Failure Analysis of Titanium Wing Attachment Bolts," **M.E. Stevenson**, J.L. McDougall, and K.G. Cline, *Practical Failure Analysis*, 3(4), pp. 75-80 (2003)
- "Nondestructive Testing and Failure Analysis," **M.E. Stevenson**, Guest Editorial, *Practical Failure Analysis*, 3(3), pp.5-6 (2003)
- "Radiographic Inspection in Failure Investigation," R.D. Bowman, B.A. Bennett, and **M.E. Stevenson**, *Practical Failure Analysis*, 3(3), pp. 73-77 (2003)
- "Apparent Indentation Size Effect in a CVD Aluminide Coated Ni-Base Superalloy," B. Ning, **M.E. Stevenson**, M.L. Weaver, and R.C. Bradt, *Surface and Coatings Technology*, Vol. 163-164, pp.112-117 (2003)



"Metallurgical Failure Analysis of Cold Cracking in A Structural Steel Weldment: Revisiting a Classic Failure Mechanism," **M.E. Stevenson**, S.L. Lowrie, R.D. Bowman, and B.A. Bennett, *Practical Failure Analysis*, 2(4), pp. 55-60 (2002)

"Fatigue Failure of Austenitic Stainless Steel Orthopedic Fixation Devices," **M.E. Stevenson**, M.E. Barkey and R.C. Bradt, *Practical Failure Analysis*, 2(3), pp. 57-64 (2002)

"Knoop Microhardness Anisotropy and the Indentation Size Effect on the Basal Plane of Single-Crystal Alumina (Sapphire)," M. Kaji, **M.E. Stevenson**, and R.C. Bradt, *Journal of the American Ceramic Society*, 85(2), pp. 415-422 (2002)

"Knoop Microhardness Anisotropy and the Indentation Size Effect on the (100) of Single Crystal NiAl," M.L. Weaver, **M.E. Stevenson**, and R. C. Bradt, *Materials Science and Engineering A345*, pp. 113-117 (2002)

"Failure Analysis Lessons Learned From September 11," **M.E. Stevenson** and D.S. Mackenzie, Guest Editorial, *Practical Failure Analysis*, 2(1), pp. 6-8 (2002)

"Microhardness Anisotropy and the Indentation Size Effect on the Basal Plane of Single Crystal Hematite," **M.E. Stevenson**, M. Kaji, and R.C. Bradt. *Journal of the European Ceramic Society*, Vol. 22, pp. 1137-1148 (2002)

"Projectile Impact – A Major Cause of Fracture for Flat Glass," R.C. Bradt, M.E. Barkey, S.E. Jones, and **M.E. Stevenson**, *The Glass Researcher*, 11(2), pp. 20-23 (2002)

"Micron and Sub-Micron Level Hardness Testing for Failure Analysis," **M.E. Stevenson** and R.C. Bradt, *Practical Failure Analysis*, 1(5), pp. 37-42 (2001)

"Effects of Precipitation Hardening 2024 Aluminum on its High Strain-Rate Deformation," **M.E. Stevenson**, W.K. Rule, S.E. Jones, and R.C. Bradt, *Thermal Hydraulics, Liquid Sloshing, Extreme Loads, and Structural Response, 2001, ASME 2001*, Vol. 421, pp. 25-29 (2001)

"Microhardness Anisotropy and the Indentation Size Effect (ISE) on the (100) of Single Crystal NiAl," **M.E. Stevenson**, M.L. Weaver, and R.C. Bradt, *High Temperature Ordered Intermetallic Alloys IX*, MRS Proceedings, Vol. 646, N6.4.1-N6.4.6 (2001)

"Analysis of Microhardness Measurements," **M.E. Stevenson** and R.C. Bradt, *Advanced Materials and Processes*, August 2000, H41-42 (2000)

"Fracture Patterns of a Composite Safety Glass Panel During High Velocity Projectile Impacts," **M.E. Stevenson**, S.E. Jones, and R.C. Bradt, *Fractography of Glasses and Ceramics IV*, Vol. 122, pp. 473-488 (2000)

"Introduction to the Mechanical Behavior of Nonmetallic Materials," M.L. Weaver, **M.E. Stevenson**, *ASM Handbook, Vol. 8: Mechanical Testing and Evaluation*, pp. 13-25 (2000)

"Elastic and Plastic Properties of Gamma + Laves Phase In-Situ Composite Alloys Using Nanoindentation Techniques," M.L. Weaver, **M.E. Stevenson**, M. Shamsuzzoha, R.D. Ott, and M.P. Brady, *High Temperature Ordered Intermetallic Alloys VIII*, Materials Research Society Symposium Proceedings, Vol. 552, KK2.6.1-KK2.6.6 (1999)

## Presentations, Seminars, and Invited Lectures

"Applications of Failure Analysis Techniques in ATV Accident Investigation," Materials Science & Technology Conference & Exhibition (MS&T 2015), Columbus, OH, October 5, 2015 **(Invited)**

"Addressing the Uncalibrated Observator: Applying Engineering and Scientific Technology to Fire and Explosion Investigations," DRI Fire Science and Litigation Seminar, Scottsdale, AZ, November 6, 2014 **(Invited)**

"How and Why Things Fail – Forensic Engineers & Information Specialists," Special Libraries Association Conference, Chicago, IL, July 17, 2012 **(Invited)**

"Tools and Techniques for Analyzing Structural Damage in Ladders," ASM International Annual Meeting, Houston, TX, October 2010 **(Invited)**

"Investigation of Bottle Related Incidents," ASM International Annual Meeting, Pittsburgh, PA, October 2009 **(Invited)**

"Why Experts Disagree," (With D.C. McGarry) ASM International Annual Meeting, Pittsburgh, October 2008 **(Invited)**

"Failure Analysis of an Outlet Shutoff Valve and Subsequent Hazardous Materials Release," ASM International Annual Meeting, Detroit, September 2007 **(Invited)**

"Engineering Failure Analysis in Cause & Origin Investigations," Cozen O'Connor Southeast Subrogation Seminar, May 2007 **(Invited)**

"Metallurgical and Materials Failure Analysis for Recreational Products," DRI Products Liability Seminar, New Orleans, LA, February 2007 **(Invited)**

"Applied Mechanics in Metallurgical Failure Investigation," ASM International Birmingham Chapter, Birmingham, AL, February 2006 **(Invited)**

"Failure Analysis of Brazed Plate Heat Exchangers in Lithium Chloride Service," ASM International Annual Meeting, Columbus, OH, September 2005 **(Invited)**

"Applied Fracture Mechanics in Metallurgical Failure Investigations," 38<sup>th</sup> Annual Meeting of the International Metallographic Society, Honolulu, HI, August 2005 **(Invited)**

"Failure Analysis in Vehicle Accident Reconstruction," ASM International Fall Meeting, Columbus, OH, October 2004

"Metallurgical Failure Analysis: Present and Future," 37<sup>th</sup> Annual Meeting of the International Metallographic Society, Savannah, GA, August 2004 **(Invited)**

"The Future of Modeling and Simulation in Failure Analysis," NNSA Future Technologies Conference, Washington, DC, May 2004 **(Invited)**

"Advanced Engineering Failure Analysis," ASM International Atlanta Chapter, Atlanta, GA, January 2004 **(Invited)**

"Defect and Damage Assessment Using Ground Penetrating RADAR," ASM International Materials Solutions Conference, Pittsburgh, PA, October 2003

"Radiographic Inspection in Failure Investigations," ASM International Materials Solutions Conference, Pittsburgh, PA, October 2003

"Engineering Forensics and Failure Analysis," ASM International Birmingham Chapter, Birmingham, AL, October 2002 **(Invited)**

"Macro Scale Imaging For Failure Analysis," ASM International Annual Meeting, Columbus, OH, October 2002



- "Forensic Materials Engineering," Georgia Bar Association, Continuing Legal Education Seminar, December 2001 **(Invited)**
- "Effects of Heat Treating 2024 Aluminum on the High Strain-Rate Deformation in the Taylor Impact Test," ASME PVP Conference, June 2001
- "Size Effects in the Hardness of Titanium Interlayers Roll-Bonded With Aluminum," TMS Annual Meeting, February 2001
- "Ballistic Impact Testing and High Strain Rate Material Mechanics," IBM Storage Systems, San Jose, CA, October 2000 **(Invited)**
- "Frictional Effects on the Indentation Size Effect in Single Crystal NiAl," Materials Research Society Fall Meeting, November 2000
- "Evolving Fracture Patterns of A Composite Safety Glass Panel During High Velocity Impacts," Fractography of Glasses And Ceramics IV, Alfred University, Alfred, NY, June 2000
- "Fracture Resistance of Brittle Materials," Mechanical Metallurgy Seminar, University of Alabama, Tuscaloosa, AL, March 2000
- "Fracture Mechanics and Non-Destructive Testing," Training Seminar, USM Corp., New Orleans, LA, December 1999
- "Microhardness Anisotropy and the Indentation Size Effect on the Basal and Prism Planes of Single Crystal Hematite," American Ceramic Society Annual Meeting, April 1999
- "Metallurgical Failure Analysis," University of Alabama Metallurgical Engineering Seminar Series, Tuscaloosa, AL, October 1997
- "Corrosion Failure Analysis Trends in Oil Country Tubular Goods," NACE, Birmingham Section, Birmingham, AL, June 1997 **(Invited)**