

# **Safety Engineering & Forensic Analysis, Inc.**

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## **Stephen M. Arndt, B.S.A.E.**

Curriculum Vitae

### **ENGINEERING CONSULTANT IN MOTOR VEHICLE AND AIRCRAFT SAFETY:**

1. Vehicle crashworthiness – determine the ability of a vehicle and its subsystems to provide a safe and survivable environment for its occupants in the event of a survivable crash.
2. Fuel system design – evaluate the crash resistance of existing fuel system designs and analyze areas for improvement that will enhance the likelihood of fuel containment in the event of a survivable crash.
3. Accident investigation and reconstruction – investigate vehicles and crash scenes, reconstruct vehicle speed and impact conditions, and determine environmental effects, injury-producing mechanisms, and accident severity. Evaluation of restraint use and effectiveness. Analysis of vehicle dynamics, handling, stability, and control.

### **SUMMARY OF PUBLICATIONS:**

Published extensively on aviation and automotive crash safety. Research topics include advanced crash resistant fuel tank design, development of the survivable crash envelope for fixed wing and rotor wing U.S. Navy aircraft, the flammability of automotive fluids under real world conditions, structural crashworthiness of energy absorbing thermoplastic subfloor structures, restraint system design and effectiveness, aviation and automotive accident reconstruction, and vehicle dynamics - stability, and control.

## **EDUCATION:**

### **1984 - University of Arizona - Bachelor of Science, Aerospace Engineering.**

Course curriculum included aircraft and space system design, vehicle dynamics, aerodynamics, flight performance, and structural analysis. A senior project was required which produced the design of a single engine fixed wing aircraft from the evaluation of multiple initial concepts through the structural, aerodynamic, and performance analysis of a single optimized design.

### **1980's - Arizona State University - Graduate Studies in Mechanical Engineering**

## **AFFILIATIONS:**

Aircraft Owners and Pilots Association (AOPA)  
American Helicopter Society, International (AHS)  
The American Society of Mechanical Engineers (ASME)  
Association for the Advancement of Automotive Medicine (AAAM)  
National Association of Professional Accident Reconstruction Specialists, Inc. (NAPARS)  
Society of Automotive Engineers (SAE)

## **ORGANIZATIONAL PARTICIPATION**

Association for the Advancement of Automotive Medicine (AAAM), Scientific Program Committee from 2006-2011.

Society of Automotive Engineers (SAE), Safety Technology Session Organizer for the 1999 SAE International Congress and Exposition.

## **CONTINUING EDUCATION AND SYMPOSIA:**

1985            “Fiber Composites” short course, Continuing Education Institute.

1988            “The Analysis and Design of Structural Composites”, Simula Inc.

1985-1991     Joint Technical Coordination Group on Aircraft Survivability (JTTCG/AS) annual meetings.

1985-1991     Attended numerous combat vehicle survivability conferences sponsored by the Tank Automotive Command (TACOM).

1985-1992     Attended numerous seminars and symposia sponsored by the Society for the Advancement of Materials and Process Engineering (SAMPE).

1991            Private Pilot Certificate, Airplane Single Engine Land.

- 1992            Engineering Dynamics Simulation Model of Automobile Collisions (EDSMAC) Training, Engineering Dynamics Corporation.
- 1992            Crash Survival Investigation School - Basic, The International Center for Safety Education, a Division of Robertson Research Group, Inc.
- 1993            “Product Liability and the Engineer” short course, Society of Automotive Engineers (SAE).
- 1994            Three-day High Performance Driving Course, Bob Bondurant’s School of High Performance Driving.
- 1995            ATB/DYNAMAN Course, General Engineering and Systems Analysis Company, Inc. (GESAC).
- 1995            “Sensor Design for Automobile Airbag Systems” short course, Society of Automotive Engineers (SAE).
- 1995            “Automobile Vehicle Dynamics” short course, Society of Automotive Engineers (SAE).
- 1995            “Biomechanics of Impact Trauma,” short course, Association for the Advancement of Automotive Medicine (AAAM).
- 1997            “Airbag Design & Performance TOPTEC” workshop, Society of Automotive Engineers (SAE).
- 1997            “Sport Utility/Light Truck Vehicle Safety TOPTEC” workshop, Society of Automotive Engineers (SAE).
- 1999            “Brakes – Design & Safety” seminar, Society of Automotive Engineers (SAE).
- 2000            “Advanced Air Bag Technology in Frontal and Side Impacts” seminar, Association for the Advancement of Automotive Medicine (AAAM).
- 2009            Built a Glasair Sportsman single engine fixed wing experimental airplane.
- Ongoing        Frequent attendant to the Society of Automotive Engineering (SAE) International Congress and Exhibition.
- Ongoing        Frequent attendant to the Association for the Advancement of Automotive Medicine (AAAM) annual conference.

## **EXPERIENCE:**

**March 1978 to September 1979** Shop and Lab Technician  
Rainco (Sailplane Company), Tempe, AZ

Job duties included the construction of sailplane trailers, the fabrication of VHF transceiver antennas, and the calibration and testing of aircraft instruments such as altimeters, barographs, and airspeed indicators.

**September 1979 to June 1984** Shop Technician  
Arndt & Associates, Ltd., Tempe, AZ

Job duties included fabricating automobile component test apparatus, courtroom displays, and full-scale vehicle mockups. Provided support in the conduct of testing, vehicle inspections, and the analysis of test data.

**July 1984 to April 1992** Engineer, Supervisor of Product Development  
Simula Inc., Tempe/Phoenix, AZ

Simula, Inc. is a world leader in the development and production of aviation crash safety products and technology, supplying crashworthy crew seats for many of the U.S. military's helicopters. Simula was the organization selected to provide the last two revisions of the U.S. Army's Aircraft Crash Survival Design Guide, a five volume set, considered the seminal document to follow when designing for aircraft crash safety, published in June of 1980 and December of 1989. Simula, Inc. was chosen by the FAA as the organization to conduct a research program to investigate crash resistant design technologies applicable to U.S. civil rotorcraft that resulted in the publication of Rotorcraft Crashworthy Airframe and Fuel System Technology Development Program published October 1994. Mr. Arndt was actively working at Simula, Inc. in the Research and Development department on many of the crash safety technologies discussed in both of these military and civilian aviation crash safety reference documents.

The focus was on improving aviation crash safety and aircrew protection. Managed/conducted R&D programs that related to existing Simula products (crashworthy crew seats and lightweight ceramic/composite armor) as well as prospective new products and technologies. These programs included:

- Two programs for the U.S. Army Aviation Applied Technology Directorate (AATD) to develop energy-absorbing subfloor structures for helicopters using thermoplastic matrix composites. The purpose of this research was to investigate the performance of thermoplastic composites for potential use in energy absorbing subfloor structures. Thermoplastic composites are generally tougher than thermosets and had the potential

for a manufacturing cost advantage too. This program demonstrated that thermoplastic composites can meet or exceed the structural and energy absorbing performance demonstrated by conventional thermoset composites. This was done by conducting static and dynamic subscale and component level tests to evaluate the energy-absorbing performance of different materials, configurations, and manufacturing processes. A cost analysis was performed on the best thermoplastic material system and a baseline thermoset system. The results showed the cost advantage of thermoplastic composites when a sufficient quantity of parts are made.

- A program for the U.S. Air Force Armstrong Aerospace Medical Research Laboratory to develop limb segments (skeleton and flesh) for the Advanced Dynamic Anthropomorphic Manikin (ADAM) using composite materials to improve the limb segment inertial properties and enhance the kinematic response during ejection seat testing. The poor bio-fidelity of the test manikins available at the time limited their ability in predicting accurate human response when testing ejection seats. This was because most of the mass of the existing dummy design was in the skeleton which was typically made of steel. To maintain the proper overall mass, the skeleton was covered with lightweight flesh/skin. Human bone is much lighter than the dummies steel skeletal segments and human flesh/skin is much heavier than the dummies. The weight distribution of human segments (arms and legs) is very different than that of the test manikins of the time. This program utilized lightweight, high strength composite materials for the skeletal components and a heavier covering that was close to the density of human flesh to produce a much more accurate mass distribution for the test manikin segments.
- Two programs for the U.S. Army AATD to develop an Advanced Armored Crashworthy Crewseat for helicopters. Weight is always at a premium in aircraft. The emphasis of these programs was to reduce the weight of a typical armored crashworthy crew seat by 15 percent over state-of-the-art technology of the time through the use of advanced materials and design. Advanced materials and processing were utilized in a new design approach to demonstrate that the weight goals could be achieved. The concept was verified through full scale testing of a prototype advanced armored crashworthy crewseat. The technologies developed during this program were incorporated into Simula's design and development of the crew seats for the U.S. military V-22 Osprey tiltrotor aircraft.
- A program for the U.S. Army AATD to develop an advanced self-sealing, crash-resistant fuel tank material that meets the requirements of MIL-T-27422 at a weight savings of 20 percent over state-of-the-art designs of the time. Typical crash resistant fuel tank bladders of the time incorporated layers of ballistic nylon fabric as the reinforcement that provided the tank impact penetration and tear resistance. This program borrowed from the evolution of ballistic armor materials development. There had been a number of woven products that became available since crash resistant fuel tanks first were developed, including Kevlar and Spectra. These fibers are superior to ballistic nylon in their ability to defeat high velocity projectiles. They are both lighter weight and tougher than ballistic nylon. For that reason, they were

included in the research program to develop a lighter weight crash resistant fuel tank. The program demonstrated that this approach could produce the desired weight reduction for use in future designs but at a higher cost.

- A program for the U.S. Naval Air Development Center (NADC) to characterize the crash environment for both fixed wing and rotary wing naval aircraft. This was done by reconstructing 184 helicopter and 71 fixed wing mishaps to determine orientation and velocity of the principal impact. In addition, occupant injuries and the hazards which contributed to the injuries were examined for each mishap. Accident reconstruction was used to define the impact parameters for survivable accidents. A hazard analysis was conducted to correlate the major and fatal injuries to the injury-causing hazards mechanisms. This data provides the Navy with the basis for improving the crashworthiness of the existing aircraft fleet through retrofit programs and of future aircraft through setting crashworthy design specifications.
- Internal research and development programs relating to advanced composite materials. Programs included the use of advanced ceramics and composites to develop lighter weight armor for use in aircrew protection, the application of armor technology in the development of lighter weight turbine blade/disc containment rings, and the application of materials technology into other vehicle platforms (non-aircraft).

**May 1992 to December 1997** Consulting Engineer  
Arndt & Associates, Ltd., Tempe, AZ

Worked as an expert consultant and expert witness in the areas of automotive and aviation crash safety. This included conducting accident investigations of vehicles and crash scenes and completing detailed accident reconstructions. Assessed the crash safety design features of case specific vehicles and analyzed their effectiveness. Areas of applied crash safety technology expertise included fuel systems, restraint systems, and vehicle handling - stability and control. Conducted research and published peer reviewed technical papers in these areas of expertise. Areas of research included evaluating occupant restraint effectiveness in rollovers, the conditions under which seat belt buckles will experience an inertial release, the ignition properties of motor vehicle fluids in a real world environment, loading effects on vehicle handling, the rollover propensity of the Ford Bronco II, and the stability and control of the Ford Bronco II when it experienced different types of rear tire failures including tread separations, tire de-beads, and gradual air pressure loss.

**January 1998 to Present** Owner/President  
Safety Engineering & Forensic Analysis, Inc.  
Chandler/Phoenix, AZ

Continues as an expert consultant and expert witness in the areas of automotive and aviation crash safety as described above for Arndt & Associates, Ltd. Conducted numerous full scale vehicle handling tests to evaluate stability and control issues. Research areas include evaluating the handling characteristics of vehicles when they experience tire failures with

an emphasis on tire tread separations. Other areas of vehicle dynamics research include the effect of suspension design, tire size and type, Electronic Stability Control (ESC) effectiveness, rollover propensity, and rollover accident reconstruction. Participated in full scale testing of numerous vehicles, including various size SUV's, trucks, vans, minivans, and sedans. Research has led to the publication of numerous peer reviewed technical papers and invitations to lecturer on many of these research topics.

## **PUBLICATIONS:**

Coltman, Joseph W., Arndt, Stephen M., and Domzalski, Leon, "Evaluation of the Crash Environment and Injury-Causing Hazards in U.S. Navy Helicopters." Paper presented at the 23<sup>rd</sup> Annual SAFE Symposium, Las Vegas, Nevada, December 2-4, 1985.\*

Coltman, Joseph W., Domzalski, Leon, and Arndt, Stephen M., "Evaluation of the Crash Environment for U.S. Navy Helicopters...The Hazards and Navy Response." Paper presented at the 1986 American Helicopter Society National Specialist's Meeting on Crashworthy Design of Rotorcraft, Atlanta, Georgia, April 7-9, 1986.\*

Arndt, Stephen M., et al., Weight Reduction for an Advanced Crashworthy Crewseat. Final Report, TR-86424, Simula Inc., Phoenix, Arizona; U.S. Army Aviation and Technology Activity (AVSCOM), Fort Eustis, Virginia, August 5, 1986.\*

Arndt, Stephen M., et al., Lightweight Aircrew Armor Design Program Final Report, TR-86412, Simula Inc., Phoenix, Arizona; Aviation Applied Technology Directorate (AATD), U.S. Army Research and Technology Laboratories (AVSCOM), Fort Eustis, Virginia, August 18, 1986.\*

Arndt, Stephen M., Armor Performance and Threat Analysis for Support of E-Systems Programs, TR-86436, Simula Inc., Phoenix, Arizona; E-Systems, Greenville, Texas, December 15, 1986.

Arndt, Stephen M., et al., Evaluation of Elastomeric Matrix Materials for Use in Aircraft Primary Structures, TR-87437, Simula Inc., Phoenix, Arizona; Aviation Applied Technology Directorate, U.S. Army Aviation Research and Technology Activity, Fort Eustis, Virginia, July 1987.\*

Arndt, Stephen M., et al., "Evaluation of Toughened Matrix Materials for Use in Primary Aircraft Structures." Paper presented at the 19<sup>th</sup> SAMPE International Technical Conference, Crystal City, Virginia, October 15, 1987.\*

Arndt, Stephen M., et al., C-17 Crew Armor Material Trade-Off Study, TI-88529, Simula Inc., Phoenix, Arizona; Douglas Aircraft Company, Long Beach, California, October 24, 1988.\*

Coltman, Joseph W. and Arndt, Stephen M., The Naval Aircraft Crash Environment: Aircrew Survivability and Aircraft Structural Response, Simula Inc., Phoenix, Arizona, TR-88490; Naval Air Development Center, Warminster, Pennsylvania, September 9, 1988.\*

Arndt, Stephen M., Summary of Armor Data Used to Evaluate Armor Systems for Application in the Containment of Turbine Fan Blades, TI-89422, Simula Inc., Phoenix, Arizona; Advanced Structures Technology, Inc., Phoenix, Arizona, April 7, 1989.

Arndt, Stephen M. and Coltman, Joseph W., Investigation of Fiber-Reinforced Thermoplastic Materials for Use in Energy-Absorbing Subfloor Structures, TR-89440, Simula Inc., Phoenix, Arizona; Aviation Applied Technology Directorate, U.S. Army Aviation Research and Technology Activity, Fort Eustis, Virginia, June 16, 1989.\*

Arndt, Stephen M., et al., The Effects of Resin Content on Kevlar Armor Systems, Simula Inc., Phoenix, Arizona, July 5, 1990.\*

Arndt, Stephen M. and Coltman, Joseph W., “Design Trade-offs for Ceramic/Composite Armor Materials.” Paper presented at the 22<sup>nd</sup> International SAMPE Technical Conference, Boston, Massachusetts, November 7, 1990.\*

Van Ingen-Dunn, Caroline and Arndt, Stephen M., Development of Composite Manikin Segments to Improve Kinematic Response, Interim Report, TI-90461, Simula, Inc. Phoenix, Arizona, Armstrong Aerospace Medical Research Laboratory, Human Systems Division, Wright-Patterson AFB, Ohio, November 20, 1990.\*

Arndt, Stephen M., “Evaluation of Thermoplastic Matrix Composites for Use in Energy-Absorbing Helicopter Subfloors.” Published in the proceedings of the 47<sup>th</sup> Annual American Helicopter Society Forum and Technology Display, Phoenix, Arizona, May 6-8, 1991.

Van Ingen-Dunn, Caroline and Arndt, Stephen M., Development of Composite Manikin Segments to Improve Kinematic Response, Final Report, TR-91091, Simula Inc., Phoenix, Arizona; Armstrong Laboratory (ASSC), Biodynamics and Biocommunications Division, Wright-Patterson AFB, Ohio, November 26, 1991.\*

Arndt, Stephen M., et al., Lightweight, Crash-Resistant, Self-Sealing Fuel Tank Material, TR-91102, Simula Inc., Phoenix, Arizona; Aviation Applied Technology Directorate, U.S. Army Aviation Systems Command, Fort Eustis, Virginia, December 19, 1991.\*

Arndt, Stephen M., et al., Crash Impact Characteristics and Cost Analysis of Thermoplastic Subfloor Structure, Final Report, TR-92038, Simula Inc., Phoenix, Arizona; Aviation Applied Technology Directorate, U.S. Army Aviation Systems Command, Fort Eustis, Virginia, July 31, 1992.\*

Arndt, Stephen M., Mowry Gregory A., and Arndt, Mark W., “Characterization of Automotive Seat Belt Buckle Inertial Release,” Published in the Proceedings of the 37<sup>th</sup> Conference of the Association for the Advancement of Automotive Medicine, San Antonio, Texas, November 4-6, 1993.\*

Dickerson, Charles P., Arndt, Stephen M., Mowry, Gregory A., and Arndt, Mark W., “Effects of Outrigger Design on Vehicle Dynamics,” Published in The Engineering Society for Advancing



Mobility Land Sea Air and Space International. SAE Paper No. 940226. Presented at the Society of Automotive Engineers, Inc., Detroit, Michigan, February 28-March 3, 1994.\*

Arndt, Mark W., Dickerson, Charles P., Mowry, Gregory A., Arndt, Stephen M., and Shapiro, Steven, "Motor Vehicle Mass Property Envelopes," Published in The Engineering Society for Advancing Mobility Land Sea Air and Space International. SAE Paper No. 951065. February 27-March 2, 1995.\*

Dickerson, Charles P., Arndt, Mark W., Arndt, Stephen M., and Mowry, Gregory A., "Evaluation of Vehicle Velocity Predictions Using the Critical Speed Formula," Published in The Engineering Society for Advancing Mobility Land Sea Air and Space International. SAE Paper No. 950137. Presented at the Society of Automotive Engineers, Inc., Detroit, Michigan, February 27-March 2, 1995.\*

Shapiro, Steven C., Dickerson, Charles P., Arndt, Stephen M., Arndt, Mark W., and Mowry, Gregory A., "Error Analysis of Center-of-Gravity Measurement Techniques," Published in The Engineering Society for Advancing Mobility Land Sea Air and Space International. SAE Paper No. 950027. Presented at the Society of Automotive Engineers, Inc., Detroit, Michigan, February 27-March 2, 1995.\*

Arndt, Mark W., Dickerson, Charles P., Mowry, Gregory A., and Arndt, Stephen M., "Evaluation of Experimental Restraints in Rollover Conditions." SAE Paper No. 952712. Presented at the 39<sup>th</sup> Stapp Car Crash Conference, San Diego, California, November 8-10, 1995.\*

Arndt, Mark W., Dickerson, Charles P., and Arndt, Stephen M., "Effects of Passenger and Cargo Loading on a Motor Vehicle's Mass Properties." 39<sup>th</sup> Annual Proceedings, Association for the Advancement of Automotive Medicine, Chicago, Illinois, October 16-18, 1995.\*

Arndt, Mark W., Dickerson, Charles, Arndt, Stephen M., Mowry, Gregory A., and Shapiro, Steven C., "Effects of Passenger and Cargo Loading on a Motor Vehicle's Mass Properties." Published in The Engineering Society for Advancing Mobility Land Sea Air and Space International. SAE Paper No. 952676. Presented at the Society of Automotive Engineers, Inc., Winston-Salem, North Carolina, November 13-15, 1995.\*

Arndt, Stephen M., Stevens, Donald C., and Arndt, Mark W., "The Motor Vehicle in the Post-Crash Environment, An Understanding of Ignition Properties of Spilled Fuels." Presented at the 1999 SAE International Congress and Exposition, Detroit, Michigan, March 1-4, 1999.\*

Dickerson Charles P., Arndt, Mark W., and Arndt, Stephen M., "Vehicle Handling with Tire Tread Separation," SAE Paper 1999-01-0450. Presented at the 1999 SAE International Congress and Exposition, Detroit, Michigan, March 1-4, 1999.\*

Arndt, Mark W., Dickerson, Charles P., and St Arndt, Stephen M., "Influence of Passenger and Cargo Load on the At Limit Handling of a Mini Van." Presented at the 1999 SAE International Congress and Exposition, Detroit, Michigan, March 1-4, 1999.\*

Arndt, Stephen M., and Arndt, Mark W., “The Influence of a Rear Tire Tread Separation on a Vehicle’s Stability and Control.” Published in the Proceedings of the 17<sup>th</sup> International Technical Conference on the Enhanced Safety of Vehicles, Amsterdam, The Netherlands, June 4-7, 2001.\*

Arndt, Stephen M., Arndt, Mark W., and Metz, L. Daniel, “The Importance of Dynamic Testing in Determining the Yaw Stability of Vehicles.” Published and presented at the 18<sup>th</sup> International Technical Conference on the Enhanced Safety of Vehicles (ESV), Nagoya, Japan, May 19-22, 2003.\*

Arndt, Mark W, Rosenfield, Michael J., Arndt, Stephen M., and Stevens, Donald C., “Force Response during Tire Tread Detachment Event.” SAE Paper No. 2004-01-1075. Presented at the 2004 SAE International Congress and Exposition, Detroit, Michigan, March 8-11, 2004.\*

Arndt, Mark W., Rosenfield, Michael J., and Arndt, Stephen M., “Measurement of Changes to Vehicle Handling Due to Tread-Separation-Induced Axle Tramp.” SAE Paper No. 2006-01-1680. Presented at the 2006 SAE International Congress and Exposition, Detroit, Michigan, April 4-7, 2006.\*

Arndt, Mark W. and Arndt, Stephen M., “Tests Documenting Vehicle Handling with a Temporary-Use Rear Tire and a Run-Flat Rear Tire.” SAE Paper No. 2006-01-0905. Presented at the 2006 SAE International Congress and Exposition, Detroit, Michigan, April 4-7, 2006.\*

Arndt Mark W., Rosenfield, Michael J., Arndt, Stephen M., and Stevens, Donald C., “Analysis of Causes of an Unintended Rollover During a Tread Separation Event Test,” Presented at the ICRASH Conference, Athens, Greece, July 4-6, 2006.\*

Arndt, Mark W., Rosenfield, Michael J., Stevens, Donald C., and Arndt, Stephen M., “Test Results: Ford PCM Downloads Compared to Instrumented Vehicle Response in High Slip Angle Turning and other Dynamic Maneuvers.” SAE Paper No. 2009-01-0882. Presented at the SAE 2009 World Congress, April 20-23, 2009.\*

Arndt, Stephen M., Arndt, Mark W., and Rosenfield, Michael J., “Effectiveness of Electronic Stability Control on Maintaining Yaw Stability When an SUV has a Rear Tire Tread Separation.” SAE Paper No. 2009-01-0436. Presented at the SAE 2009 World Congress, April 20-23, 2009.\*

Arndt, Mark W., Rosenfield, Michael J., and Arndt, Stephen M., “How Tires Changes a SUV’s Performance in Fishhook and Sine-with-Dwell Testing.” Published at the 21<sup>st</sup> International Technical Conference on the Enhanced Safety of Vehicles (ESV), Stuttgart, Germany, June 15-18, 2009.\*

Stevens, Donald C., Arndt, Stephen M., Wayne, Leda, Arndt, Mark W., Anderson, Robert, Manning, Joseph, and Anderson, Russell, “Rollover Crash Test Results: Steer-Induced Rollovers.” SAE Technical Paper 2011-01-1114. Presented at the SAE 2011 World Congress, April 12-14, 2011.\*

Arndt, Mark W., Arndt, Stephen M., and Stevens, Donald C., “Drag Factors from Rollover Crash Testing for Crash Reconstructions,” IMECE2011-65537. Presented at the ASME 2011 International Mechanical Engineering Congress & Exposition, Denver, Colorado, November 11-17, 2011.\*

Arndt, Mark W., Stevens, Donald C., and Arndt, Stephen M., “Comparison of Linear Variable Deceleration Rate Rollover Reconstruction to Steer-Induced Rollover Tests.” SAE Technical Paper 2012-01-0469. Presented at the SAE 2012 World Congress, April 24-26, 2012.\*

Arndt, Stephen M., Tire Defect Litigation, Chapter 13, “Vehicle Dynamics and Testing in Tread Separation Cases,” Lawyers & Judges Publishing Company, Inc., 2016.

Arndt, Mark W. and Arndt, Stephen M., “Test Results: Vehicle Responses to Simulated Drag Caused by Front Tire Tread Detachment – The Effect of Scrub Radius and Speed,” IMECE2018-87609. Presented at the ASME 2018 International Mechanical Engineering Congress & Exposition, Pittsburgh, PA, November 9-15, 2018.\*

\*Co-Author

## **PRESENTATIONS:**

Featured speaker at the Society for the Advancement of Material and Process Engineering (SAMPE) Arizona chapter on the topic of Career Development, January 1990. Received 1990 Chapter Program Award for best presentation of the year.

“The Design, Operation, Maintenance, and Crash Investigation of Energy Absorbing Crashworthy Seats for Helicopters,” featured speaker at the NAVAIR/NADEP Naval Aviation Safety Engineering Course, Pensacola, Florida, July 1990.

“The Naval Aircraft Crash Environment: Aircrew Survivability and Aircraft Structural Response,” featured speaker at the NAVAIR/NADEP Naval Aviation Safety Engineering Course, Pensacola, Florida, July 1990.

“Design Trade-Offs for Ceramic/Composite Armor Materials,” paper presented at the 22<sup>nd</sup> International Society for the Advancement of Material and Process Engineering (SAMPE) Technical Conference, Boston, Massachusetts, November 7, 1990.

“Evaluation of Thermoplastic Matrix Composites for Use in Energy-Absorbing Helicopter Subfloor Structures,” presented at the Ninth Thermoplastic Matrix Composites Review, La Jolla, California, February 11-13, 1992.

Hands-on Accident Reconstruction Demonstration. Arizona Trial Lawyers Association, Tempe, AZ, April 17, 1993.

Hands-on Accident Reconstruction Demonstration. Attorneys Information Exchange Group, Tempe, AZ, October 30, 1993.

“Tire Effects on Limit Performance and Rollover,” presented at SAE Passenger Car Rollover TOPTEC: Cause and Prevention, San Diego, California, January 22, 1999.

“The Motor Vehicle in the Post-Crash Environment, An Understanding of Ignition Properties of Spilled Fuels,” presented at SAE International Congress and Exposition, Detroit, Michigan, March 1-4, 1999.

“AIEG Rollover Symposium,” invited speaker at the Attorneys Information Exchange Group meeting, Denver, CO, March 18, 2000.

“Effects of Tire Disablement on Vehicle Handling,” invited speaker at the Attorneys Information Exchange Group (AIEG) meeting, Orlando, FL, August 7, 2003.

“CAR CRASHES AND OCCUPANT INJURIES: A Team Approach to Crash Investigation,” Course instructor on rollovers. Association for the Advancement of Automotive Medicine and the University of Miami School of Medicine, Tempe, Arizona, April 19-20, 2004.

“Tests Documenting Vehicle Handling with a Temporary-Use Rear Tire and a Run-Flat Rear Tire.” Presented at the 2006 SAE International Congress and Exposition, Detroit, Michigan, April 4-7, 2006

Presentation to the Midwest Association of Technical Accident Investigators (MATAI), Council Bluffs, Iowa, May 5-7, 2008.

“Effectiveness of Electronic Stability Control on Maintaining Yaw Stability When an SUV has a Rear Tire Tread Separation.” Presented at the SAE 2009 World Congress, April 20-23, 2009

Presentation to Arizona Law Enforcement Agencies on Tire Effects on Vehicle Handling, Tucson, AZ, August 21, 2013.

“Test Results: Vehicle Responses to Simulated Drag Caused by Front Tire Tread Detachment – The Effect of Scrub Radius and Speed,” Presented at the ASME 2018 International Mechanical Engineering Congress & Exposition, Pittsburgh, PA, November 9-15, 2018