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## Curriculum Vitae

**STEVEN E. MEYER, P.E.**

Senior Engineer / Principal



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SUMMARY:

Background encompasses over 18 years of experience as a mechanical and design engineer. Specialized experience in the fields of Vehicular Accident Reconstruction, Restraint Systems, Failure Analysis, and Crashworthiness Analysis.

Key areas of expertise:

- Vehicular Accident Reconstruction
- Restraint Systems Analysis
- Vehicle Crashworthiness Analysis
- Mechanical/Structural Failure Analysis
- Advanced Computer Modeling
- Test Engineering
- Product Liability Investigations
- Vehicle & Scene Investigations
- Technical Exhibits

ACADEMIC TRAINING:

Bachelor of Science Degree, Mechanical Engineering, 1986  
CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

Juris Doctor Degree, 1991  
SAN JOAQUIN COLLEGE OF LAW, FRESNO

Specialized Training & Certifications:

Engineering Dynamics Corporation (EDC) - Accident Reconstruction  
Engineering Dynamics Corp. – Accident Reconstructions Simulations  
PC CRASH – Accident Reconstruction Training  
SAE – Injuries Anatomy Biomechanics & Federal Regulations  
SAE – Head and Neck Injury Symposium  
SAE – Accident Reconstruction: State-of-the-Art (TOPTEC)  
SAE – Airbag Design and Performance (TOPTEC)  
SAE – Passenger Car Rollover (TOPTEC) 1999  
SAE – Vehicle Safety Restraints Systems (TOPTEC)  
SAE – Passenger Vehicle Rollover (TOPTEC) 2002  
Certified CADAM Operator, (4000+ hrs) Lockheed Aircraft

PROFESSIONAL LICENSES:

California Registered Professional Engineer, Mechanical  
Member of State Bar of California

EXPERIENCE:

SENIOR ENGINEER/PRINCIPAL  
SAFETY ANALYSIS & FORENSIC ENGINEERING (SAFE), (1997 - Present)  
(Formerly LIABILITY RESEARCH GROUP 1992-1997)

Direct engineering and research activities including: In-depth investigation and reconstruction of 500+ real world accidents; Special focus on reconstruction and investigation of rollover collisions, including crashworthiness and restraint system analysis; Direct vehicle component test programs and full scale vehicle crash testing; Prepare computer simulations and analytical models of reconstructed accident circumstances; Accident reconstruction studies involving rollover, narrow object impacts, curb impacts, frontal and rear impacts; Studies of human kinematics in simulated vehicle rollover environments; Studies evaluating various restraint systems performance in rollovers, both in the laboratory as well as in real world events; Development of test methodologies and protocols for analysis of restraint systems and component tests;

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Crashworthiness evaluations of various occupant protection systems involving restraints, seat backs, door systems, interior padding and vehicle structures.

#### PROFESSIONAL HISTORY:

##### CONSULTING ENGINEER/PRINCIPAL

MEYER & ASSOCIATES - ENGINEERING CONSULTANTS, (1991 - 1993)

Consulting engineer specializing in vehicular accident reconstruction and mechanical/structural failure analysis; Hands-on analysis of vehicle dynamics and occupant protection systems; Expert witness trial and deposition testimony; Produced written technical reports.

##### ADMINISTRATIVE ASSISTANT/LAW CLERK

LAW OFFICES OF EDWARD B. CHATOIAN, (1991 - 1992)

Hearing representative for Workers Compensation claimants. Actively represented clients at the Workers Compensation Appeals Board.

##### FORENSIC CONSULTING ENGINEER

BLAIR, CHURCH & FLYNN CONSULTING ENGINEERS, (1989 - 1991)

Specialized in vehicular accident reconstruction, conducted analysis of mechanical/structural failure as well as product liability investigations; Conducted over 500 motor vehicle accident reconstructions; Collected and analyzed field data for vehicular accident reconstruction investigations; Performed system analysis and stress analysis; Employed conservation of energy and momentum methods to define vehicular dynamics; Produced technical reports leading to expert witness testimony and participated in every aspect of trial preparation.

##### MECHANICAL DESIGN ENGINEER/LEAD ENGINEER

LOCKHEED AIRCRAFT SERVICE CO., (1986 - 1989)

Security Clearance: Secret

Technical member of Weapon Systems Engineering; All projects included creating initial design concepts, development of detail design and first article/prototype production and installation support; Designed and modified primary and secondary aircraft (C-130) structure; Created design of exterior mounted fiberglass fairings and provided liaison production and installation support; Analysis and troubleshooting of existing hydraulic systems and plumbing designs; Engineered installation of various avionic equipment and electronic racks; Performed stress and heat/flow analysis as well as first article/prototype production support.

##### MECHANICAL DESIGN ENGINEER

LINDSEY MANUFACTURING, (1984 - 1986)

Hands-on design evaluation via on-site ultimate failure testing; Designed tensile testing machine for testing of transmission tower hardware; Created control system design and structural design; Defined safety features and produced complete cost estimate; Designed sand cast and forged component hardware.

##### ASSOCIATE ENGINEER

CONTOUR COMPANY, (1983 - 1984)

Assisted in design of a high-speed wind tunnel model. Developed both detail part drawings and major assembly drawings, Compilation of data for stress reports.

#### PROFESSIONAL AFFILIATIONS:

- American Society of Mechanical Engineers
- Society of Automotive Engineers
- National Society of Professional Engineers
- California Society of Professional Engineers
- National Academy of Forensic Engineers

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- Pi Tau Sigma, National Honorary Engineering Fraternity

#### PUBLICATIONS AND INVITED LECTURES:

Invited Lecturer at the University of California at Santa Barbara, Forensic Engineering, Mechanical Engineering Department, 1994.

"Enhanced Safety for Light Trucks and Vans," 14th Experimental Safety Vehicle Conference, Munich, Germany, 1994.

"Restraint Effectiveness During Rollover Motion," 1996 International Conference on the Biomechanics of Impact International Conference on the Biomechanics of Impact (IRCOBI) September 11 - 13, 1996, Ireland.

"The Effects of Pretensioning on 3-Point Safety Belts on Occupants in Rollover Crashes," NAFE Conference, 1997.

"Strength Improvements to Automotive Roof Components," SAE 980209, SAE International Congress & Exposition, 1998.

"Head Injury Reduction with Roll Bar Padding," IEEE - Biomedical Engineering Society/Engineering in Medicine and Biology Society, 1st Joint Conference, Atlanta, GA, October, 1999.

"Biomechanical Analysis of Padding," Advances in Bioengineering, ASME, BED Volume 43, 1999.

"Modeling of Frontal and Rollover Collisions and Restraint Analysis," 12<sup>th</sup> International Conference on Mathematical and Computer Modeling and Scientific Computing, Chicago, IL, 1999.

"Three-Point Restraint System Design Considerations for Reducing Vertical Occupant Excursion in Rollover Environments," SAE 2000-01-0605, 2000 SAE International Congress and Exposition, Detroit, MI, 2000.

"Accident Reconstruction of Rollovers - A Methodology," SAE 2000-01-0853, 2000 SAE International Congress and Exposition, Detroit, MI, 2000.

"Vehicular Padding and Head Injury," Seoul, Korea, 2000 FISITA World Automotive Conference, 2000.

"Reinforcing Automotive Roofs with Composite Materials," Paper No. 00SAF008, ISATA 2000, Dublin, Ireland, 2000.

"An Analytical Method for Calculating Roof Stiffness Factors From Roof Performance During Dynamic and Quasi-Static Loading Tests," Paper No. 00SAF007, ISATA 2000, Dublin, Ireland, 2000.

"Studies of Vehicular Padding Materials," 44th Annual Proceedings of the Association for the Advancement of Automotive Medicine, Chicago, Illinois, 2000.

"Vehicle Crashworthiness in Vertical Drop Tests," ASME 2000 International Mechanical Engineering Congress & Exposition, Orlando, Florida, 2000.

"The Effect of Vertical Acceleration on Emergency Locking Seatbelt Retractors," ASME 2000 International Congress & Exposition, Orlando, Florida, 2000.

"The Relationship of Roof Crush and Head Clearance on Neck Injuries in Rollovers," 10th International Conference on Biomedical Engineering, Singapore, 2000.

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"Failure of Seatbelt Retractors with Vertical Acceleration," 10th International Conference on Biomedical Engineering, Singapore, 2000.

"An Assessment of Narrow Object Frontal Impact Calculation Methods," SAE 2001 International Congress and Exposition, Detroit, MI, 2001.

"Test Methods for Evaluating Seatbelt Retractor Response in Multiplanar Acceleration Environments," Bioengineering Conference, American Society of Mechanical Engineers (ASME), BED-Vol. 50, 2001.

"An Analytical Method of Calculating Dynamic Roof Strength Characteristics and Equivalent Drop Height", AIRIL 2001 4th International Conference on Accident Investigation, Reconstruction, Interpretation and the Law, Vancouver, British Columbia, August 13, 2001.

"Curb Impacts - A Study in Occupant Kinematics and Energy Loss," APRIL 2001 4<sup>th</sup> International Conference on Accident Investigation, Reconstruction, Interpretation and the Law, Vancouver, British Columbia, 2001.

"Dynamic Analysis of ELR Retractor Spool out," SAE 2001 Automotive and Transportation Technology Congress and Exhibition, Barcelona, Spain, October 2001.

"Improving Rollover Crashworthiness Through Inverted Drop Testing," SAE 2001 Automotive and Transportation Technology Congress and Exhibition, Barcelona, Spain, October 2001.

"Simulated Tests of Large Animal Impacts," International Mechanical Engineering Congress and Exposition American Society of Mechanical Engineers (ASME), IMECE2001/BED-23101, New York, NY, 2001.

"Biomechanical Modeling of Motor Vehicle Collision and Overview of Belt Restraint Analysis," International Conference on Biomedical Engineering, India, 2001.

"Comments to 49 CFR Part 571, Docket #1999-5572 Notice 2 on Roof Crush Resistance," December 6, 2001.

"Curb Impacts - A Continuing Study in Energy Loss and Occupant Kinematics," SAE 2002-01-0557, 2002 SAE International Congress and Exposition, Detroit, MI, 2002.

"Restraints And Occupant Kinematics In Vehicular Rollovers," 39th Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 38, ISA Volume 419, Copper Mountain, Colorado, April 2002.

"Alternative Roof Crush Resistance Testing with Production and Reinforced Roof Structures," SAE 2002-01-2076, International Body Engineering Conference and Exhibition, (IBEC), Paris, July 9-11, 2002.

"Analysis of Structural Deformation in Vehicular Drop Studies," International Mechanical Engineering Congress & Exposition, American Society of Mechanical Engineers (ASME), IMECE2002-32644, New Orleans, Louisiana, 2002.

"Comments to 49 CFR Part 571, Docket #1999-5572 Notice 2 on Roof Crush Resistance", February 25, 2003.

"Biomechanical Analysis of Motor Vehicle Seat Belt Buckles," 40th Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 39, ISA Volume 437, Biloxi, Mississippi, April 2003.

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"Motor Vehicle Seat Belt Restraint System Analysis During Rollover," 40th Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 39, ISA Volume 437, Biloxi, Mississippi, April 2003.

"Biomechanical Injury Evaluation of Laminated Side Door Windows and Sunroof During Rollover Accidents," 40th Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 39, ISA Volume 437, Biloxi, Mississippi, April 2003.

"Inverted Drop Testing and Neck Injury Potential," 40th Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 39, ISA Volume 437, Biloxi, Mississippi, April 2003.

"Biomechanical Analysis of Motor Vehicle Seat Belt Restraint Spool Out," American Society of Mechanical Engineers (ASME), Summer Bioengineering Conference, Key Biscayne, Florida, June 25-29, 2003.

"Evaluating 'Real World' Roof Strength Through Inverted Drop Testing," American Society of Mechanical Engineers (ASME), Summer Bioengineering Conference, Key Biscayne, Florida, June 25-29, 2003.

"Factors in Rollover Neck Injury Potential," American Society of Mechanical Engineers (ASME), Summer Bioengineering Conference, Key Biscayne, Florida, June 25-29, 2003.

"Biomechanical Analysis of Seatbelt Restraint Deformation," 22<sup>nd</sup> Southern Biomedical Engineering Conference, Charlotte, North Carolina, September 26 – 28, 2003. (Paper presented at conference, abstract only, published.)

"Biomechanics of Occupant Ejection During Rollover Accidents," 22<sup>nd</sup> Southern Biomedical Engineering Conference, Charlotte, North Carolina, September 26 – 28, 2003. (Paper presented at conference, abstract only, published.)

"Design and Evaluation of a System for Testing and Analysis of Rollovers with Narrow Objects," 2003 ASME International Mechanical Engineering Congress & Exposition, Washington, D.C., IMECE2003-43104, November 16 – 21, 2003.

"Acceleration Amplification in Safety Belt Buckle Systems," 2003 ASME International Mechanical Engineering Congress & Exposition, Washington, D.C., IMECE2003-43159, November 16 – 21, 2003.

"Biomechanical Study of Rear Child Chest Injury Measures Related to Collapsing Front Seats in Rear Impacts," 2003 ASME International Mechanical Engineering Congress & Exposition, Washington, D.C., IMECE2003-43061, November 16 – 21, 2003.

"Biomechanics of Seat Belt Restraint System," 41<sup>st</sup> Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 40, ISA Volume 449, Fort Collins, Colorado, April 2004.

"Testing and Injury Potential Analysis of Rollovers with Narrow Object Impacts," 41<sup>st</sup> Annual Rocky Mountain Bioengineering Symposium, Biomedical Sciences Instrumentation, Volume 40, ISA Volume 449, Fort Collins, Colorado, April 2004.

"Accident Reconstruction of Under-ride Impacts," International Crashworthiness Conference ICrash 2004, San Francisco, California, July 2004.

"Evaluation of Motor Vehicle Seatbelt Retractor Locking Devices," International Mechanical Engineering Congress, IMECE2004 ASME, Anaheim, California, November 13-19, 2004.

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"Epoxy Reinforcing for Rollover Safety," International Mechanical Engineering Congress, IMECE2004 ASME, Anaheim, California, November 13-19, 2004.

"Roof Crush Mitigation Techniques to Enhance Occupant Protection," International Symposium on Biomedical Engineering 2004, Bangkok, Thailand, November 16-18, 2004.

"Biomechanical Analysis of Occupant Kinematics in Rollover Motor Vehicle Accidents - Dynamic Spit Test," 2005 ISA Rocky Mountain Bioengineering Symposium, Cooper Mountain, Colorado, April 8 -10, 2005.

"The Effect of Roof Strength on Reducing Occupant Injury in Rollovers," 2005 ISA Rocky Mountain Bioengineering Symposium, Cooper Mountain, Colorado, April 8 -10, 2005.

"The Influence of Roof Crush on Glazing Retention and Occupant Containment in Rollovers," 2005 Summer Bioengineering Conference, Vail, Colorado, June 22-26, 2005.

"Comments to DOT Docket No. NHTSA-2005-22904: Safety Analysis and Forensic Engineering (SAFE) Petition for Review of Ford Motor Company Compliance with FMVSS 216," September 2005.

"Comments to DOT Docket No. NHTSA-2005-22143 (FMVSS 216: Roof Crush Resistance (NPRM))", November 20, 2005.

"Comments to DOT Docket No. NHTSA-2005-22143 (FMVSS 216: Roof Crush Resistance (NPRM))", November 21, 2005.

"Comments to DOT Docket No. NHTSA-2005-22904: Additional Information Regarding Previous Petition for Review of 1999-2001 Ford Explorer Compliance with FMVSS 216 Submitted to the NHTSA in September 2005", January 2006.

"Investigation of Injury Potential Through Matched Pair Drop Testing," 2006 ISA Rocky Mountain Bioengineering Symposium & International ISA Biomedical Sciences Instrumentation Symposium, Terre Haute, Indiana, April 7-9, 2006.

"90-day follow-up for previously submitted petition for review of Ford Explorer Compliance with FMVSS 216- Docket No. NHTSA-2005-22904," April 11, 2006.

"Additional Comments to DOT Docket No. NHTSA-2005-22143 (FMVSS 216: Roof Crush Resistance) – Potential Roof Rack Issue", April 12, 2006.

"Restraint System Performance and Injury Potential to Belted Occupants in Automobile Rollover Crashes", IMECE2006-16068, Proceedings of IMECE2006, 2006 ASME International Mechanical Engineering Congress and Exposition, November 5-10, 2006, Chicago, Illinois, USA.

"Assessing Rollover Protection through the Deformable Occupant Compartment Impact Tester (DOCIT)", IMECE2006-16076, Proceedings of IMECE2006, 2006 ASME International Mechanical Engineering Congress and Exposition, November 5-10, 2006, Chicago, Illinois, USA.

"Inverted Drop Testing as a Mechanism to Evaluate Rollover Occupant Injury Potential" presented at Rocky Mountain Bioengineering Symposium & International ISA Biomedical Sciences Instrumentation Symposium 13-15 April 2007, Denver, Colorado, USA.

"Head and Neck Injury Potential In Inverted Impact Tests", ESV 07-0371-W, 20<sup>th</sup> International Technical Conference on the Enhanced Safety of Vehicles, June 18-21, 2007, Lyon, France.

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“Parametric Analysis of Rollover Occupant Protection Using a Deformable Occupant Compartment Testing Device”, ESV 07-0378-W, 20<sup>th</sup> International Technical Conference on the Enhanced Safety of Vehicles, June 18-21, 2007, Lyon, France.

“A Critical Need for Children Ages 9 to 12 in the Rear Seat”, 5th International Conference on Protection of Children in Cars, December 6, 2007; Munich, Germany.

“A Methodology for Defining a Real World Accident Specific Acceleration Pulse for the Assessment of Occupant Kinematics and Injury Level”, ICrash 2008, July 22-25, 2008, Kyoto, Japan.

“Rollover Roof Strength Improvements Using Epoxy Reinforcement”, ICrash 2008, July 22-25, 2008, Kyoto, Japan.

“Quasi-Static and Dynamic Testing as a Basis for Determining Seat Back Strength,” IMECE2008-66222, Proceedings of IMECE2008, 2008 ASME International Mechanical Engineering Congress and Exposition, October 31-November 6, 2008, Boston, Massachusetts, USA.

“The Effect of Vertical and Multiplanar Accelerations on Differing Production Seat Belt Sensor Designs,” IMECE2008-68931, Proceedings of IMECE2008, 2008 ASME International Mechanical Engineering Congress and Exposition, October 31-November 6, 2008, Boston, Massachusetts, USA.

“Rear Impact Test Methodologies: Quasistatic and Dynamic,” 09-0533-O, 21<sup>st</sup> ESV Conference, June 16, 2009; Stuttgart, Germany.

“Webbing Sensitivity as a Means for Limiting Occupant Excursion in Rollovers,” 09-0501-O, 21<sup>st</sup> ESV Conference, June 16, 2009; Stuttgart, Germany.

“Pendulum Animal Impact Testing,” USAIMECE2009-13057, ASME 2009 International Mechanical Engineering Congress & Exposition, November 13-19, 2009, Lake Buena Vista, Florida, USA.

“Occupant Excursion and Restraint System Performance in Rollover Testing,” C31, American Academy of Forensic Sciences Annual Scientific Meeting 2010, February 22-27, 2010, Seattle, Washington, USA.

“Containment Potential of Laminated Glazing in High Speed Rollover Testing,” C33, American Academy of Forensic Sciences Annual Scientific Meeting 2010, February 22-27, 2010, Seattle, Washington, USA.