

Kilpatrick Forensics

Motor Vehicle Crash Reconstruction





KILPATRICK FORENSICS ENGINEERING SERVICES



Who is Kilpatrick Forensics?

Kilpatrick Forensics is a forensic engineering firm that provides forensic engineering investigation and analyses services for our legal and insurance clients. Mr. Kilpatrick travels throughout the United States in order to investigate motor vehicle crashes and product defects and failure claims resulting in personal injury or death. Mr. Kilpatrick is a board certified vehicle crash reconstruction engineer through the National Academy of Forensic Engineers (NAFE) and is a Diplomat Forensic Engineer (DFE). He is also a regional instructor for Northwestern University Center For Public Safety and is a firm believer in continuing education.

The Mission of Kilpatrick Forensics:

Mr. Kilpatrick's mission is to provide to you forensic engineering services that are dedicated to the application of the art, science and methodology of engineering and the scientific method in order to answer questions of fact in the jurisprudence system to assist the trier of fact concerning motor vehicle accidents and motor vehicle product defect and failure claims. Mr. Kilpatrick utilizes his engineering knowledge, skill, experience, training and education to give you an objective professional opinion that is thorough and comprehensive, understandable and timely. He has submitted written expert reports in state and federal court and has given sworn expert testimony under oath during both deposition and trial.

What services does Kilpatrick Forensics provide? (also see the following pages)

- At-Scene Investigation and Evidence Mapping
- Motor Vehicle Crash Reconstruction
- Vehicle Crash Testing
- Vehicle Skid Testing
- Pedestrian Vehicle Crash Reconstruction
- Image and Analyze a Vehicle's Crash Data Report (CDR) stored in the Vehicle's Event Data Recorder
- Photogrammetry Studies of Police Photographs
- Airbag and Seat Belt Inspections
- School Bus Crash Reconstruction
- Tractor Trailer/Heavy Trucks Crash Reconstruction
- Motorcycle Crash Reconstruction
- ATV and ROHV Crash Reconstruction
- Computer Based Dynamic Motor Vehicle Crash Simulations Videos
- Standards of Care for Motor Vehicles
- SAE Standards
- National Highway Traffic and Safety Administration (NHTSA) Regulations
- Federal Motor Vehicle Safety Regulations
- Product Defect and Failure Analyses
- Machine Design and Analyses
- Computer Aided Design (CAD)

Who are the clients of Kilpatrick Forensics?

Mr. Kilpatrick works with law firms, public defenders and insurance companies on civil plaintiff, civil defendant, criminal and insurance claimant cases.

How can you contact Kilpatrick Forensics?

Mr. Kilpatrick's corporate office is located in Jamestown North Carolina. Visit our website at www.kilpatrickforensics.com. Please feel free to contact him any time at office at 336-841-6354 or cell phone at 336-803-1639.



MOTOR VEHICLE CRASH TESTING FOR RESEARCH





Mr. Kilpatrick participates in motor vehicle crash testing for research by attending the largest motor vehicle crash conference in the world organized by Collision Publishing and ARC-CSI. The purpose is to experience live real-time motor vehicle crashes to observe how each vehicle responds dynamically, and to observe pedestrian and occupant dynamics. From this, Mr. Kilpatrick observes how motor vehicles, occupants and pedestrians actually respond to high speed and slow speed collisions. The vehicles involved in these crash tests are commercially available cars and light trucks, motorcycles, emergency vehicles such as ambulances and fire trucks, tractor trailer trucks and anamorphic crash test dummies. Mr. Kilpatrick also observes and studies motor vehicle crash testing conducted by the Insurance Institute For Highway Safety and the Highway Loss Data Institute.



MOTOR VEHICLE CRASH RECONSTRUCTION





Mr. Kilpatrick provides motor vehicle crash reconstruction of motor vehicles. Mr. Kilpatrick investigates crashes involving cars, light trucks and commercial heavy trucks. His services include:

- •At-Scene Investigation and Evidence Mapping
- •Vehicle Inspections to Measure Crush Damage and to Determine a Product Defect or Failure
- •Lamp Filament Analyses (determine whether vehicle's lamps were on during impact)
- •Air Bags, Seat Belts and Seat Belt Pretentioners Inspection and Failure Analyses
- •Event Data Recorder (EDR) Crash Data Report (CDR) Download and Analyses
- •Product Defect and Failure Analyses
- •Impact, Velocity, Force, Time, Distance and Cause Analyses
- •Flip, Vaught and Rollover Analyses
- •Photogrammetry Studies of Police Photographs
- •Computer Generated Dynamic Vehicle Crash Video Simulation
- •Human Factors and Occupant Dynamics
- •Steering Mechanism Failure Analyses
- •Air Brake System Investigations and Analyses
- •Brake Shoe and Slack Adjuster Investigations and Analyses
- •Braking and Skid Analyses
- •Suspension System Failure Analyses
- •Structural System Failure Analyses
- •Engine Failure Analyses
- •Standards of Care and Maintenance
- •Vehicle Research
- •Surveying/Total Station Accident Scene Situation Map Support
- •Forensic Accident Scene Photography and Mapping
- •Safety Warranty-Recall Investigations



PUBLIC SCHOOL BUS CRASH RECONSTRUCTION





Mr. Kilpatrick provides crash reconstruction investigation and analyses of public school bus crashes. His services include:

- •At-Scene Investigation and Evidence Mapping
- •Impact, Velocity, Force, Time, Distance and Cause Analyses
- •Flip, Vaught and Rollover Analyses
- •Photogrammetry Studies of Police Photographs
- •Product Defect and Failure Analyses
- •Lamp Filament Analyses (determine whether vehicle's lamps were on during impact)
- •Air Bags, Seat Belts and Seat Belt Pretentioners Failure Analyses
- •Event Data Recorder (EDR) Crash Data Report (CDR) Download and Analyses
- •Computer Generated Dynamic Vehicle Crash Video Simulation
- •Human Factors and Occupant Dynamics
- •Steering Mechanism Failure Analyses
- •Air Brake System Investigations and Analyses
- •Brake Shoe and Slack Adjuster Investigations and Analyses
- •Braking and Skid Analyses
- •Suspension System Failure Analyses
- •Structural System Failure Analyses
- •Engine Failure Analyses
- •Standards of Care and Maintenance and Analyses
- •Vehicle Research
- •Surveying/Total Station Accident Scene Situation Map Support
- •Forensic Accident Scene Photography and Mapping
- •Safety Warranty-Recall Investigations



TRACTOR TRAILER CRASH RECONSTRUCTION





Mr. Kilpatrick provides crash reconstruction investigation and analyses of tractor trailer crashes. His services include:

- •At-Scene Investigation and Evidence Mapping
- •Impact, Velocity, Force, Time, Distance and Cause Analyses
- •Flip, Vaught and Rollover Analyses
- •Photogrammetry Studies of Police Photographs
- •Product Defect and Failure Analyses
- •Lamp Filament Analyses (determine whether vehicle's lamps were on during impact)
- •Road Tractor Recorder Support
- •Event Data Recorder (EDR) Crash Data Report (CDR) Download and Analyses
- •Computer Generated Dynamic Vehicle Crash Video Simulation
- •Human Factors and Occupant Dynamics
- •Steering Mechanism Failure Analyses
- •Air Brake System Investigations and Analyses
- •Brake Shoe and Slack Adjuster Investigations and Analyses
- •Braking and Skid Analyses
- •Suspension System Failure Analyses
- •Structural System Failure Analyses
- •Engine Failure Analyses
- •Standards of Care and Maintenance
- •Vehicle Research
- •Surveying/Total Station Accident Scene Situation Map Support
- •Forensic Accident Scene Photography and Mapping
- •Safety Warranty-Recall Investigations



EVENT DATA RECORDER'S CRASH DATA RETRIEVAL





Mr. Kilpatrick can download a vehicle's Crash Data Report (CDR) from the Event Data Recorder (EDR) and review and interpret the report's information to determine the vehicle's speed during a crash as well as many other data stored within the report. This can be performed if and only if the vehicle is equipped with occupant restraint system technology (having an Airbag Control Module (ACM) with airbags and seatbelt pretentioners) and is accessible by our Bosch Diagnostics CDR computer system. Mr. Kilpatrick has specialized training and experience to download and interpret these reports. He attends annual CDR Summits in Houston Texas that are three day programs which include meetings and discussions with automotive factory engineers about this and future technology as well as participating in presentations by engineers around the United States who share what they have learned and research they have performed. Our services include:

•Accessing a vehicle when permission is granted by the vehicle's owner and legal counsel

- •Vehicle Inspections
- •Vehicle Crush Measurements
- •Vehicle Photography and Video
- •Vehicle Research
- •Download a vehicle's Crash Data Report (CDR) from its Event Data Recorder (EDR)
- •Review and interpret the crash data and other information stored in the crash data report
- •Printout of the crash data report and share it with counsel



MOTORCYCLE CRASH RECONSTRUCTION





Mr. Kilpatrick provides a detailed and thorough engineering investigation and analyses of motorcycle crashes. Mr. Kilpatrick has been an avid motorcycle rider for over 30 years. He began his motorcycle riding experience in the dirt at age 12 and by the time he was 16 had logged thousands of hours of off-road trail riding and motocross racing. He and others designed and built a motocross track for competition. At age 17, he transitioned to road bikes and has been riding them ever since. Mr. Kilpatrick has advanced motorcycle riders training through the Motorcycle Safety Foundation (MSF) and is an avid motorcycle rider, enthusiast and is card carrying member of the American Motorcycle Association (AMA) and the Harley Owners Group (HOG). His services include:

•At-Scene Investigation and Evidence Mapping

- •Impact, Velocity, Force, Time, Distance and Cause Analyses
- •Skid and Motion Analyses
- •Photogrammetry Studies of Police Photographs
- •Product Defect and Failure Analyses
- •Lamp Filament Analyses (determine whether vehicle's lamps were on during impact)
- •Computer Generated Dynamic Vehicle Crash Video Simulation
- •Human Factors and Rider Dynamics
- •Handling and Steering Dynamics Analyses
- •Frontend Fork and Steering Mechanism Analyses
- •Suspension System Failure Analyses
- •Structural System Failure Analyses
- •Braking System Failure Analyses
- •Braking and Skid Analyses
- •Engine and Drive Train Failure Analyses
- •Standards of Care and Motorcycle Maintenance
- •Motorcycle Safety Warranty-Recall Investigations
- •Motorcycle Research
- •Motorcycle Testing
- •Forensic Accident Scene Photography and Mapping
- •Vehicle Crash Testing For Research
- •Safety Warranty-Recall Investigations



PEDESTRIAN VEHICLE CRASH RECONSTRUCTION





Mr. Kilpatrick provides motor vehicle pedestrian crash reconstruction for large and small cars, light trucks, large trucks, buses and tractor trailers:



- Forward Projection Pedestrian Trajectory Impacts
- Wrap Pedestrian Trajectory Impacts
- Fender Vault Pedestrian Trajectory Impacts
- Roof Vault Pedestrian Trajectory Impacts
- Somersault Pedestrian Trajectory Impacts



ATV and ROHV ACCIDENT RECONSTRUCTION





Mr. Kilpatrick provides a detailed and thorough engineering investigation and analyses of All-Terrain Vehicles (ATV) and Recreational Off-Highway Vehicle (ROHV) crashes. Mr. Kilpatrick owns and rides an ATV and is an ATV enthusiast who is experienced and trained to safely operate ATVs. He completed his ATV rider's training through the ATV Safety Institute. His services include:

•At-Scene Investigation and Evidence Mapping

•Impact, Velocity, Force, Time, Distance and Cause Analyses

•Flip, Vaught and Rollover Analyses

•Product Defect and Failure Analyses

•SVIA/ANSI ATV Standard Interpretations

•ANSI/ROHVA Standard Interpretations

•Lamp Filament Analyses (determine whether vehicle's lamps were on or off during impact)

•Computer Generated Dynamic Vehicle Crash Video Simulation

- •ATV Roll-Over Analyses
- •Human Factors and Rider Dynamics
- •Handling and Steering Mechanism Analyses
- •Braking and Skid Analyses
- •Suspension System Failure Analyses
- •Structural System Failure Analyses
- •Engine and Drivetrain Failure Analyses
- •Standards of Care and Maintenance
- •ATV Research
- •Forensic Accident Scene Photography and Mapping
- •Safety Warranty-Recall Investigations



PRODUCT DEFECT AND FAILURE ANALYSES





Mr. Kilpatrick provides a detailed and thorough engineering investigation for product defects and failures that either cause serious accidents resulting in injury, death or does not perform to manufacturers' specifications. His services include:

- •At-Scene Investigation and Evidence Mapping
- •Accident Scene Documentation Videography and Photography
- •Evidence Chain of Custody
- •Design Defect and Failure Analyses
- •Standards of Care
- •Product Testing and Failure Analyses
- •Digital Microscope Imaging
- •Root Cause Analyses
- •Laboratory Support For:
 - »Materials and Metallurgical Investigation and Testing
 - »Material Damage Mechanism Determination
 - »Scanning Electron Microscope
 - »X-Ray Microanalyses
 - »Electron Microscope Examination and Imaging
 - »Fatigue Failure Fractography Investigation and Imaging

Examples of Prior Motor Vehicle Product Failures Analyses Cases:

- •Automotive Coil Spring Compression Tool Failure
- •ATV Recoil Starter Accident
- •ROHV Suspension System Failure
- •Motorcycle Engine Valve Train Failure
- •Motorcycle/ATV Throttle Malfunction
- •Motorcycle Primary Chain Failure
- •Motorcycle Voltage Regulator Failure
- •Motor Vehicle Ball Joint Failure
- •Heavy Truck Brake Systems



COMPUTER AIDED DESIGN AND GRAPHICS





Mr. Kilpatrick provides Computer Aided Design (CAD) engineering services to our clients. His clients call on us to prepare exhibits and visual aids for trial. His services include:

- •CAD Engineering Drawings
- •3D CAD Modeling
- •CAD Drawings
- •CAD Generated Finite Element Analyses
- •Courtroom Presentations and Demonstrative Aids Any Size
- •Scale Model Design and Building
- •Engineering and Scientific Displays and Illustrations
- •Reconstruction of Traffic Accidents: Motor Vehicle Dynamic Video Simulations/Animations with an Analysis of Time Sequence
- •Scanning and Plotting Support
- •Machine Design

TRAINING AND PROFESSIONAL DEVELOPMENT



Mr. Kilpatrick is available to present and train your employees and provide continuing education and development seminars for insurance adjusters, paralegal secretaries, attorneys, engineers and scientist. We are also available to serve as a guest speaker at meetings. If you would like one of our engineers to present at your function, please call him at 336-841-6354 to make arrangements for a location, day and time. Our presentation topics include:

- •Motor vehicle crash reconstruction
- •Crash testing for research
- •Motor Vehicle Event Data Recorder (ECM) Crash Data Report (CDR) Technology
- •Braking and skid testing
- Vehicle crash testing
- •Motorcycle design and handling
- •All-Terrain Vehicles (ATVs) and Recreational Off-Highway Vehicles (ROHV)
- •Motor vehicle engines and drive-trains; how they work
- •Braking and Hydraulics systems
- •Airbag Control Modules and How They Work



Gary E. Kilpatrick, PE, DFE

When you think of Gary, know that he is a:

- Licensed Professional Engineer
- Mechanical Engineer
- Diplomat Forensic Engineer
- Machine Design Engineer
- Automotive Manufacturing, Process and Quality Control Engineer
- Motorcyclist and ATV Expert, Rider and Enthusiast
- Traffic Crash Reconstruction Engineer

Bachelor of Science Degree in Mechanical Engineering from North Carolina State University (Emphasis in Machine Design and Design Safety) Class of 1990.

Licensed Professional Engineer in 12 states and the District of Columbia currently: NC, SC, VA, WV, GA, FL, TN, NJ, MI, MD, LA, MS and Washington DC.

Traffic crash reconstruction engineer and expert concerning cars, light trucks, buses, commercial heavy trucks, motorcycles and ATVs..

Motorcycle expert in crash reconstruction, motorcycle safety and product defect and failure analyses. Avid motorcycle rider and enthusiast for over 30 years. Has logged thousands of hours of off-road trail riding and motocross racing. Member of the American Motorcyclist Association (AMA) and the Harley Owners Group (HOG).

ATV expert in accident reconstruction, ATV safety and product defect and failure analyses. Avid ATV rider and enthusiast for several years. Member of the All-Terrain Vehicle Association (ATVA).

Investigated many cases involving:

Motor Vehicle Crash Reconstruction Motorcycle Crash Reconstruction ATV/ROHV Crash Reconstruction Heavy Commercial Crash Reconstruction

Submitted written reports in both state and federal court cases. Testified as an expert witness in both deposition and trial.

Mr. Kilpatrick has prepared and given presentations on forensic engineering topics to professional engineering societies, community colleges, university student engineering societies, paralegal associations, and casualty insurance adjusters. Mr. Kilpatrick has written technical papers some of which have been peer reviewed published.