

Subject: Motor Vehicle Accident Reconstruction

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Text: Motor Vehicle Accident Reconstruction and Cause Analysis, 5<sup>th</sup> Edition by Rudy Limpert & Short Papers 1 through 11, e-published by PC-Brake, Inc.

Software: MARC 1, distributed by PC-Brake, Inc.

Text and MARC 1 orders, or free downloads of Short Papers, visit: [www.pcbrakeinc.com](http://www.pcbrakeinc.com)

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## Five-Day Motor Vehicle Accident Reconstruction Seminar (40 hours)

Day 1: Objectives, Autopsy of a Crash, Critical Scene Data, Motion Analysis

- 1.1. Objectives and Elements of Accident Investigation and Reconstruction
- 1.2. Accident Reconstruction Quality: Scientific and Practical Side
- 1.3. The Autopsy of a Crash
- 1.4. Accident Scene Data Collection - Recognizing Critical Data
  - 1.4.1. Accident Scene Data
    - 1.4.1.1. Descriptive
    - 1.4.1.2. Measurable
    - 1.4.1.3. Determinable
- 1.5. Speed, Time and Distance Analysis Made Easy – The Velocity/Time Diagram
- 1.6. EDR Records Made Clear with the Velocity/Time Diagram
- 1.7. Braking to Avoid Crash: Stop at POI or Arrive Too Late
- 1.8. View Obstruction Time Analysis
- 1.9. Driver Reaction Time
- 1.10. Fundamentals and Limitations of Computerized Accident Reconstruction
- 1.11. Applications/MARC 1

Day 2: Pre-Crash Braking, Turning; Rollover

- 2.1 Braking Analysis of Cars
- 2.2 Braking Analysis of Heavy Trucks and Trailers
- 2.3 Skid Marks, Brake Maintenance, ABS and Wheel Hop
- 2.4 Steering to Avoid
- 2.5 Speed from Yaw Marks/Mistakes to Avoid
- 2.6 Speed from Spin Marks
- 2.7 Car/SUV Rollover
- 2.8 Truck/Trailer Rollover
- 2.9 Data Collection in Turning/Rollover Accidents
- 2.10 Applications/MARC 1

### Day 3: Crash Physics, Inline Collisions, Car-Pedestrian Crash

- 3.1 Collision Analysis – Energy Balance and Linear Momentum
- 3.2 Inline Collisions – Elastic versus Plastic
- 3.3 Fixed Barrier Impact
- 3.4 How to Access NHTSA Crash Data
- 3.5 A and B Stiffness Coefficients
- 3.6 Crush Damage, Crush Measurements, Crush Energy and Delta-V
- 3.7 Head-on Collision
- 3.8 Rear-end Collision/Under-ride Crash
- 3.9 Review of Low-Speed Rear Impact Physics with Braking
- 3.10 Car-Pedestrian Accident
- 3.11 Applications/MARC 1

### Day 4: Sideswipe, Linear Momentum, Delta-V and PDOF

- 4.1 Sideswipe with Fixed Object (wall/guard rail)
- 4.2 Frontal Side (Under) Swipe/ Vehicle-to-Vehicle
- 4.3 Trailer Side Under-Ride Crash
- 4.4 Accident Scene and Vehicle Data Measurement in Sideswipe Accidents
- 4.5 Linear Momentum Method (LMM)
- 4.6 Delta-V and PDOF Calculations in Linear Momentum Analysis
- 4.7 Crush Damage Evaluation for Delta-V and PDOF
- 4.8 Limitations of Standard Linear Momentum Method
- 4.9 When Weight Differences and Departure Angles are Critical
- 4.10 Accident Scene and Vehicle Data Measurement for LMM
- 4.11 Applications/MARC 1

### Day 5: Linear and Rotational Momentum, When Scene Data Are Missing

- 5.1 Linear and Rotational Momentum (LRMM)
- 5.2 Car-Motorcycle Crash With LRMM
- 5.3 Impact Speed Analysis When Critical After-Impact Data are Missing
- 5.4 Rest Position of one Vehicle Unknown – Car in the Wrong Quadrant!
- 5.5 Only Angles Rotated After Impact are Known
- 5.6 Calculate After-Impact Data from Known Impact Speeds – “Crash Test on Paper”
- 5.7 Accident Scene and Vehicle Data Measurement for LRMM
- 5.8 The Unique Crash – What to Do When Nothing Seems to Work
- 5.9 Fundamentals for Questioning Witnesses/Tool for Reconstruction Data Collection
- 5.10 Applications/MARC 1
- 5.11 Written Review Test

