

THE RECONSTRUCTIONIST

AN ACCIDENT RECONSTRUCTION NEWSLETTER

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Collisions - Matching the Damage

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When vehicles collide, the damage patterns indicate the vehicle's position relative to each other during the collision. A recent case involved a same direction collision on an interstate highway. The passenger side of an automobile contacted the driver side tires of a tractor-trailer. There was tire contact at the passenger front and the passenger rear of the automobile. Following the collision, both vehicles swerved off the roadway to the right. The tractor-trailer rolled over the top of the automobile fatally injuring the automobile driver.

It was obvious that the damage at the front of the automobile was caused as the left front wheel of the truck and the passenger front of the automobile collided. The truck lug nuts protrude from the wheel leaving a distinct pattern on the passenger front fender and wheel of the automobile. However, the damage pattern occurred with the vehicles approximately 20° from parallel indicating that the



Fig. 1. Automobile and tractor trailer came to rest off the roadway



Using the gauge and an exemplar undamaged automobile illustrated that the damage profile on the side of the automobile had to have been made after the tractor-trailer had begun to overturn.

Fig. 3. Using a "homemade" profile gauge to match the truck tire



Fig. 2. Measuring the damage pattern on the automobile



Fig. 4. Matching the profile gauge and a truck against an undamaged exemplar automobile

automobile was already "out of control" when this damage occurred.

At issue was whether the damage at the rear occurred during an initial sideswipe contact or as the tractor-trailer began to overturn as it traveled off the roadway. A large profile gauge was constructed and matched to the side of the truck tire. Using the gauge and an exemplar undamaged automobile illustrated that the damage on the side of the automobile had to have been made after the tractor-trailer had begun to overturn. This eliminated this damage pattern as the initial contact.

It was therefore concluded that all of the collision damage occurred after the driver lost control of the automobile.

(See the complete article at wpoplin.com)



SERVICES

Vehicle Accident Analysis and Reconstruction

- | | | |
|------------------------------|------------------------|--------------------------|
| t Vehicle/Scene Photographs | t Headlamp Analysis | t Vehicle Dynamics |
| t Vehicle/Scene Measurements | t Skidmark Analysis | t Timing Issues |
| t Vehicle/Scene Analysis | t Occupant Dynamics | t Braking Distances |
| t Mechanical Examination | t Pedestrian Dynamics | t Rigging Procedures |
| t Structural Examination | t Overturn Analysis | t Welding Practices |
| t Technical Analysis | t Visibility Issues | t Cargo Securement |
| t Speed Evaluation | t Event Data Retrieval | t FMVSS & SAE Compliance |

Event Data Supported Vehicles

(List of supported automobiles by year and make is available online at wpoplin.com)

AUTOMOBILES

- | | | | |
|------------|--------------|----------|------------|
| t GM | t FORD | t ISUZU | t STERLING |
| t CHRYSLER | t MITSUBISHI | t SUZUKI | |

COMMERCIAL VEHICLES

- | | | |
|--------------|------------------|----------|
| t CUMMINGS | t MACK | t VOVOLO |
| t CATEPILLAR | t DETROIT DIESEL | |

Methods of Documentation

- t CAD Drawings
- t Animation Coordination
- t Total Station Site Documentation
- t Photogrammetry
- t Microscopic Examination
- t Black Box Data Retrieval



Vehicle Accident Analysis Examples

- t Use of Skid Marks, Road Gouges and Vehicle Damage
- t Microscopic Examination of Headlamp Filaments
- t Lighting/Conspicuity Issues—Line of Sight/Visibility
- t Timing Issues
- t Occupant Ejection
- t Pedestrian Accidents



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