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Low Speed Accident Reconstruction

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The Stop and Go Traffic Fender Bender

By Bradley C. Reckamp, P.E.

It's an all too common story on our American roadways: "The Stop and Go Traffic Fender Bender." We all see them on the shoulder of the road or in a nearby parking lot, exchanging insurance information and looking at their bumpers and fenders. Many of us have been there; I've been there too, on both sides, more than once.

Rear-end collisions can, and do, result in serious and lasting injuries to the involved vehicle occupants. On the other hand, many rear-end collisions are no more injurious to the involved occupants than being jostled in a crowd or riding a roller-coaster at Walt Disney World. The big question is, "how can we tell the difference?" This very question is often posed to AEGI professionals by clients who need to make informed decisions.

Inside This Issue

First Steps…

The first step in answering such a question is to determine the forces, accelerations, and changes in velocity of the involved vehicles and occupants. Specialized tools and analytical methods are available to the reconstructionist in establishing the magnitude of a low speed collision. Based upon a set of reasonable engineering assumptions along with the physical dimensions, weights, and residual damages of each vehicle, conclusions can usually be drawn regarding the accelerations experienced during the motor vehicle collision. Furthermore, an ever increasing percentage of vehicles on the road are equipped with crash data recording capabilities. Access to this data provides an excellent tool for the reconstructionist to include in their analysis.

It is usually preferable for the reconstructionist to examine the damage on the involved vehicles directly; however, it is recognized that this is not always practical and sometimes even impossible.

When direct inspections cannot be performed, supportable conclusions can still be drawn regarding upper and/or lower limits of collision severity based upon client supplied photographs and/or documented damage estimates. It should be noted that the quality of the photographs/documents can affect the upper-limit calculation and may not be sufficient to provide any useful opinion.

Misconceptions

Among many, there has been a prevalent misconception regarding the 2.5 mile-per-hour bumper safety standard. Some believe that damage to the bumper system is an indication that the change in velocity of the subject vehicle is greater than 2.5 miles-per-hour when this is not at all what the standard is meant to indicate.

Current bumper safety standards, which have been in effect since model year 1983, essentially require that a non-exempt vehicle's safety-related parts must not be compromised in a 2.5 mile-per-hour test; the test for which is performed and self-reported by the automobile manufacturer. There is no prohibition against damage to the bumper system in the current standard.

In fact, bumper systems can be, and often are, damaged by collisions with changes in velocity of less than 2.5 miles-per-hour; especially exempt vehicles such as pick-up trucks and SUVs which are not even required to meet the bumper safety standard. Some manufacturers report that their bumpers meet a previous 5 mph bumper standard. Again, the standard allowed bumper damage in 5 mph barrier impact tests. Bumper testing conducted by the Insurance Institute for Highway Safety demonstrates that very few modern vehicles are undamaged in barrier impacts at 5 mph.

FAQ's

Q. Even though the airbags didn't deploy, might there still be recoverable data relevant to the subject collision?

A. The short answer is, yes. Many cars are equipped with some crash data recording capabilities, even in the event of a non-deployment. However, depending on the vehicle and the circumstances of the collision, pertinent data could be overwritten and lost if timely action is not taken to collect and save the information.

Don't forget that either or both of the involved vehicles may have saved useful and important data.

Collision Magnitude

Once the magnitude of the collision has been established, a biomechanical analysis can be performed to determine if the injury claims are consistent with the collision. Comparisons can be made to common activities for reference.

For example, research has been published regarding the forces experienced from a slap on the back, a hop off a step, a quick look over the shoulder, a sneeze, plopping down into a chair, and bumper car rides, to name a few. Much research has also been conducted with live human subjects in full scale crash tests. We at AEGI have conducted our own full scale human occupant crash tests and published the results and conclusions in a peer reviewed research paper.

When the cause and effect of impact forces, as they relate to a particular injury, need to be more rigorously investigated, such as in cases involving individuals in increased risk categories or with preexisting conditions, AEGI biomechanists can review the pertinent medical records. The forces on the human body from the impact can be modeled and analyzed using well known software commonly used by automotive manufacturer safety systems designers. These forces are compared to established injury thresholds.

A solid accident reconstruction, by a licensed professional engineer, can be just the tool you need to make a good faith decision regarding a low speed motor vehicle collision claim.

In Closing: A Brief Background of AEGI

AEGI was established in 1994 in Jacksonville, Florida. Since then, we have analyzed and reported scientific conclusions on thousands of cases. Our experts have provided expert testimony at over one hundred depositions and court trials. We have investigated accidents and failures for national insurance companies, independent adjusters, state and federal agencies, attorneys, and private clients.

In every one of our technical services, we hold to ideals of excellence, professionalism, and engineering as well as scientific integrity. We are dedicated to providing our clients with the best and most up to date services available to the industry today.

Please contact us to be added to our mailing list and with any feedback. Download any of our newsletters from our library at: www.aegiforensics.com

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Education:
B.S. Mechanical Engineering – University of Florida, 1997

Core Focus:
Forensic Engineering: Causation and contributing factor determination in accident and failure issues. Specific projects have included Motor vehicle collision reconstruction, including passenger vehicles, motorcycles, heavy trucks, buses, bicycles, and pedestrians; occupant kinematics and human tolerance to impact forces in vehicular accidents including restraint systems; vehicular structural and mechanical analysis; scene documentation; and slip resistance measurement and trip / slip and fall analysis.

Job Description:
Motor vehicle accident analysis for use in litigation as an expert witness

Professional Registrations & Memberships:

- Registered Professional Engineer (Florida #60979)
- American Society for Testing and Materials (ASTM)
- Society of Automotive Engineers (SAE)
- Order of the Engineer

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