

Crash tests show how autobrake can mitigate crash severity, damage costs



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The Mercedes-Benz C-Class and Chevrolet Malibu after the 25 mph test

The idea of an autobrake system is to prevent a front-to-rear impact or reduce speeds to mitigate the crash. To show why reducing speed is important, IIHS conducted two demonstration crash tests at different speeds. In each test, a 2013 Mercedes-Benz C-Class ran into the back of a stationary 2012 Chevrolet Malibu. The tests illustrate what happens in a 25 mph crash when the striking vehicle doesn't have autobrake, compared with what happens when autobrake reduces the speed by 13 mph. This is how much the C-Class's autobrake system reduced the car's speed in IIHS track testing.

Total damage in the higher speed crash test was about \$28,000. The Malibu was a complete loss. Lowering the speed to 12 mph trimmed the damage to \$5,700. Since these were relatively low-speed tests, it's no surprise that dummies in both vehicles indicated low injury risk and airbags didn't deploy. A similar speed reduction in a higher speed crash would significantly reduce injury risk, as well as vehicle damage.

Personal injury the way that we know it will be changing with the advancement of autobrake systems injury mechanics but even with this example above, injuries will still be significant.

Vehicle Damage and Whiplash Injury

It has been documented in both medical and scientific studies that the damage to the vehicle is not related to the whiplash injuries suffered by the passengers of the vehicle. Vehicle damage is not proportional to passenger injury. Vehicle damage does not predict the degree of whiplash injury, the severity of symptoms, the duration of required treatment, the probability of suffering from chronic pain, or the acceleration of arthritis to the joints of the neck.

Research has proven that vehicles that do not bend (sustain damage) in a collision will move more. The more a vehicle moves during a collision, the greater the inertial loads to the cervical spine. The larger the inertial loads to the cervical spine, the greater the soft tissue injuries to the joints of the neck.

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Allstate's Soft Tissue program Minor Impact Soft Tissue (MIST), The Core Claims Process Redesign (CCPR) Implementation Training Manual identified injury claims resulting from motor vehicle crashes with US\$1000 or less in claimant's vehicle damage as those that should be categorized, or "segmented" separately from all other injury claims.

Claims adjusters were instructed that, as a general precept, crashes with minimal damage are unlikely to, or cannot cause significant or permanent injury. Thus, any claim for injury in the presence of minimal vehicle damage was to be handled as a type of fraudulent claim and claims

adjustors were instructed that, regardless of medical evidence of injury, the injury should not or could not have occurred because of the nature of the crash, and the claim goal is to "CWP" (close without payment).

The MIST claims segmenting protocol continues to be used up to the present time, and many other insurers have adopted similar claims handling practices based on an assumed lack of relationship between vehicle damage below a certain monetary level and the potential for injury.

The MIST protocol uses vehicle damage as a construct for injury presence rather than probability, as all injury claims in the presence of <\$US1500 vehicle damage are considered to be false, while crashes with >\$US1500 vehicle damage are considered as possibly injury producing, with the medical records used as the determinant of injury presence and severity. We have recently demonstrated, however, that the MIST segmentation lacks any scientific validity.

In a strange irony, however, it is the insurance industry that has taken a leading role in whiplash research. The International Insurance Whiplash Protection Group (IIWPG) is formed by a consortium of insurers around the world and is at the vanguard of this research today. The Insurance Institute for Highway Safety (a member of the IIWPG) now conducts static and dynamic seat back/head restraint tests and reports their findings on their website at www.iihs.org.

Property Damage Photos

Another tactic that is commonly employed by defense lawyers relies on the intuitive assumption by lay jurors that there must be a direct relationship between vehicle damage and the likelihood for injury--one of the biggest and most successful bamboozles in the history of legal medicine.

Generally, the defense obtains a photograph of the plaintiff's vehicle (see below) depicting little or no property damage and blows it up to the size of a poster. He/she then attempts to display it to the jury throughout the trial as a subtle persuader. Yet, in another very successful move in the state of Delaware, based upon a motion in limine, it is now not permissible to show vehicle damage photographs to the jury unless you have an expert there to comment directly on their significance or lack thereof. This, of course, can also be debated by opposing experts if need be.

Another subject begging for motions in limine include limitations as to what can be done when crash photos are available for only one subject vehicle. I'd argue that photos of only one vehicle can be relatively meaningless. Moreover, their prejudicial effect is not likely outweighed by any probative value they may have. It would also help to have the literature demonstrating the lack of correlation between injury risk (or outcome) and property damage, along with the literature which shows that a substantial proportion of injuries occur in crashes with little or no property damage.



Above: 12 mph test

Mercedes-Benz C-Class into rear of Chevrolet Malibu

Speed	Mercedes C-Class	Chevrolet Malibu	Total
12 mph	\$3,438	\$2,277	\$5,715
25 mph	\$9,457	\$18,674	\$28,131

DAMAGE ESTIMATES:

Mercedes C-Class into Chevrolet Malibu

Below: 25 mph test



The Law of Inertia

It is Newton's Laws of Motion that explain contemporary whiplash trauma and subsequent injury. The most important Law is his first, often referred to as the Law of Inertia. Simply stated in the context of whiplash trauma, things at rest tend to remain at rest, and different parts of the same object can have different inertias. The larger the part and the more it weighs, the larger the inertia, or the greater its tendency to not want to move.

The object in question in a whiplash trauma is a human body. The human body has two large parts that have their own separate inertia, the trunk and the head. These two large pieces of inertial mass (the head and the trunk) are connected by a thin pole, the neck.

Upon impact, the target vehicle begins to move forward into the occupant, making contact chiefly through the seat back. In accordance with Newton's 1st law of motion, the occupant's inertia resists this motion.

As the seat back continues to move forward, the occupant must yield. Initially, the thoracic curve is flattened by the seat back. This results in a vertical compressive force which is transmitted through the spine. Even with the forces being mitigated there will be injury from low speed collisions (10 mph or under).