



Engineering Sciences Section – 2004

C17 Air Bag Data: Useful for More Than Air Bag Cases

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After attending this presentation, attendees will understand how to use the data stored in the air bag computer to prove other facets of an accident, such as sudden acceleration claims, whether or not cruise control was activated, and identifying a spontaneous or inadvertent air bag deployment.

This presentation will impact the forensic community and/or humanity by providing a greater understanding of the information contained in automobile air bag computers.

THEORY OF THE ANALYSIS: As most of the participants are aware, passenger vehicles equipped with air bags contain a computer as part of the system that, depending on the make and model year, saves various amounts of data. The earliest versions were simply diagnostic units that monitored the air bag components, illuminated a light in the dash and saved a fault code (DTC or diagnostic trouble code) if there was a problem. This first generation also saved a history of the warning lamp ON time. The next generation saves additional information relevant to the deployment of the air bags. This includes sensor closure timing (which equates to air bag deployment timing) and the driver's seatbelt status.

The third generation of air bag computers saves Delta V (change in velocity) or acceleration for the crash event. This technology employs an accelerometer and a deployment algorithm to determine if the air bags should deploy. Vehicles manufactured in the mid-1990s began to use these systems, which are sometimes referred to as single point sensing systems because many of them eliminated forward crush sensors. By the 21st century, this third generation of sensing systems/software has been upgraded to include pre-crash data (GM only). Pre-crash data is a record of the vehicle's speed (both mph and rpm), throttle application and braking (on or off) for a predetermined amount of time *before* the crash event. This data has become extremely useful to reconstructionists to verify their analysis of the accident sequence.

With the advent of more sophisticated safety technologies, such as side air bags, dual stage air bags and occupant sensing, more information will become available from the air bag computer. Items such as the front passenger's seatbelt status and the front seat occupant's proximity to the air bag will be saved in order to allow the air bag computer to make the decision whether or not to deploy the air bags. This will also mean that having only one frontal air bag deploy in a crash is not necessarily an automatic defect.

Several case studies will be presented in which the air bag computer contained information helpful to a case in which the air bag was not necessarily the primary focus.

Case 1 involved an elderly driver in a parking lot of a post office. The subject vehicle went out of control, through the post office window and pinned another elderly person to the wall, causing fatal injuries to the postal customer. The driver insisted that the vehicle took off and, despite pressing hard on the brake, could not be stopped. The data stored in the subject vehicle proved otherwise.

Case 2 involved a vehicle that became disabled on the highway in a travel lane with no electrical power, hence, no hazard lights. The driver of the disabled vehicle got out of the vehicle and went to the shoulder of the road. The driver witnessed her vehicle get side-swiped twice. A third vehicle (an SUV) came up behind her disabled vehicle and swerved onto the shoulder instead of the other lane. The SUV hit the driver of the vehicle and killed her. The driver of the SUV swore he was going the speed limit and that the cruise control was off. The data stored in the subject vehicle proved otherwise.

Case 3 involved a vehicle driving down a well-traveled dirt and gravel road. The driver claimed that the air bags just went off, causing a loss of control, but ultimately no subsequent accident. The lack of damage to the vehicle and the data stored in the subject vehicle proved that the driver was telling the truth.

Air Bag, Data, Interpretation