C40 A Review of the Current Data Available in GM SDMs and the Positive and Negative Aspects of the Data

Kurt D. Weiss, MS, Automotive Safety Research, Inc., 5350 Hollister Avenue, Suite D, Santa Barbara, CA 93111-2326; and Holly A. Adams, BS, Automotive Data Consultants, 15439 Smithaven Place, Centreville, VA 20120*

At the end of this presentation, attendees will learn about the new information stored in GM airbag computers and the accuracy of this data.

This presentation will impact the forensic science community by educating the attendees about the information that can be obtained from the latest GM air bag computers.

The next generation of GM SDMs has the ability to contain several more crash relevant data parameters than the previous generation. Some of these parameters are extremely useful, while some may appear to be useful, but need to be fully understood before taking them at face value. As with any data collection system, the sample rate can influence the veracity of the data. Additionally, how the data is processed before it is recorded can also influ- ence how much weight should be given to the data.

The majority of the new data comes from the vehicle's engine computer. Items such as the vehicle's power mode status (on, start, run) at algorithm enable, transmission gear, and engine MIL status. Several new parameters have been added to the pre-crash data: engine power mode, cruise control status, accelerator pedal position, antilock braking system status, lateral acceleration, yaw rate, and steering wheel angle.

The deployment and non-deployment data has also been augmented. Several parameters that help to determine the number of events and their order are now recorded. Additionally, the lateral Delta-V also has the capa- bility to be recorded. The most controversial piece of new data is the estimated Principal Direction of Force, or PDOF.

PDOF is defined as the angle at which the vector representing the summation of all impact forces acting on the vehicle occurs. This angle can be used with simple trigonometric functions to resolve the resultant Delta-V into the lateral and longitudinal components, where the longitudinal component (Delta-Vx) is the front-to-back portion, and the lateral component (Delta-Vy) is the side-to-side portion. However, if the determination of the PDOF is inaccurate, then resolving the Delta-V into its two components becomes inaccurate as well.

The method by which the SDM calculates PDOF is wrong. This may seem like a surprising concept, but attendees of the first annual CDR User's Conference were treated with this insight. The SDM used the maximum recorded Delta-Vx and the maximum recorded Delta-Vy to calculate the PDOF. However, it is unlikely the two maximum values and Delta-Vx and Delta-Vy occur at the same point in time. Knowing the calculation method- ology used will assist the engineer in determining the accuracy of the PDOF data reported by the SDM.

The method employed by the new generation SDMs to calculate the PDOF can generate inaccurate results. One must use traditional reconstruction concepts to determine the most accurate PDOF, and the SDM-calculated PDOF may be listed purely to complete the analysis.

Air Bag, Crash Data, Data Accuracy

 ** Presenting Author*