

## **Ralph's Accident Reconstruction Newsletter**

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73 mph at impact was inserted into the conservation of momentum equation for this collision, the resulting speed for the other vehicle was, again, similar to but slightly lower than the speed which was calculated using conservation of energy principles and crush coefficients. But both vehicles were traveling at a speed which was significantly above the posted speed limit.

While many General Motors products made since 1994 have an EDR of some type, virtually all GM products made in this century have an advanced EDR, and many of those EDRs feature pre-crash data recording/storing capability. At the very least, the data recorders in GM products and selected products of the Ford Motor Company contain data regarding the delta-v, which can be an extremely useful bit of information to an accident reconstructionist. Fair warnings to those who believe that a data download is a substitute for a reconstruction: many vehicles with EDRs do not incorporate a pre-crash record, and corruption of data (due to loss of electrical power or to data buffering, to name two causes of loss or corruption) can result in a data set which is invalid for the collision in question. An EDR download should always be considered an augmentation to a reconstruction, not a substitute for a reconstruction.

Ford products which currently contain EDRs with downloadable data do not contain the same type of pre-crash data shown in the chart on the other side of this newsletter. These Ford products, however, contain an advanced Occupant Protection System (OPS) which incorporates many features and a complex algorithm. The OPS in many late-model Ford products includes seat-belt pretensioners, which fire if the seat belt is being worn but will not fire if the seat belt is not in use, and seat switches. There is a position sensor on the driver's seat which detects the proximity of the seat to the steering wheel; this will generally prevent a two-stage (more violent) deployment of the driver's airbag if the seat is too close to the steering wheel. (Close proximity to the steering wheel during airbag deployment has been a source of injury causation in first-generation airbags installed in the automobiles of most, perhaps all, manufacturers.) The right front seat often has a weight sensor, to determine if that seat is empty or is occupied by a small person or object, to adjust the deployment of that air bag appropriately. The status of these various switches and sensors is saved in the EDR for download and analysis in two tables; these tables can be very helpful in evaluating what happened inside the vehicle at the time of the collision. Interestingly, in some moderate crashes which would have once fired the air bag, a seat-belted occupant in a Ford product may not get an airbag deployment; sometimes, the algorithm decides that the seat belt alone (with pretensioner firing) is enough crash protection.

Many vehicles now have dual-stage airbags. When a full deployment is necessary, both squibs will fire simultaneously, or within a few milliseconds of each other. If only a single-stage deployment is called for, the other squib will fire later, typically 100 milliseconds after the first, so that no live pyrotechnic material will remain under the deployed bag after the crash.

I welcome your inquiries concerning the many vehicle-related services I offer. Please contact me whenever you have a question.

**Ralph Cunningham, Inc.**  
**Accident Reconstruction**  
**[www.RalphCunningham.net](http://www.RalphCunningham.net)**

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