

Ralph's Accident Reconstruction Newsletter—Volume 6, Number 1—January 2007

In December of 2006 I linked my truck telephone to Verizon Wireless, which resulted in a new truck telephone number. That new number is 678-206-6042. As before, there is no messaging service associated with that number, but the transmitter has more power and is virtually always available when the ignition is on, making that number the best to use when trying to contact me while I'm on the road.

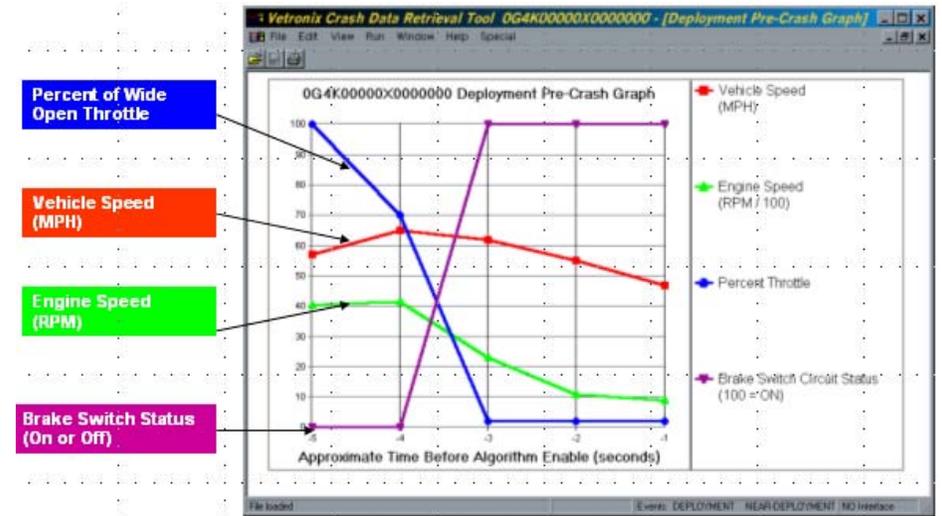


There has been a large volume of incorrect information regarding event data recorders and what data they contain disseminated by some of the media. I have written about Crash Data Retrieval (CDR) and Event Data Recorders (EDRs) before; this newsletter will revisit the topic.

The picture at left shows an airbag module from a General Motors product. GM calls this a Sensing and Diagnostic Module (SDM). Its primary function is to fire the airbags in the vehicle; event data recording is secondary.

That the primary function of these modules is to fire the airbags is true for all EDRs which are currently in use and can be downloaded by the Vetronix Crash Data Retrieval system. The data set contained in the box is secondary. If there remains sufficient power after the airbags have been fired, the module will record a set of data; this data set varies from one brand of vehicle to another and even among different models from the same manufacturer. All of these modules are manufactured by outside suppliers; the data set contained in each module depends on the hardware and software incorporated into the module. Access to each module requires that Vetronix be provided with the appropriate hardware and software requirements specific to each such module. In general, these modules keep a running record of certain parameters of vehicle operation; in the event of a crash or other event which “awakens” the module, a set of those data elements is stored in (generally) non-volatile memory. For most modules, perhaps all, a collision event which results in airbag deployment will lock the data set into that non-volatile memory, allowing the data to be extracted at virtually any later date, as long as the module has not been severely damaged by fire, direct physical damage, or long-term exposure to water and the generally associated corrosion which occurs during that exposure. So, in general, once the data set is recorded, it's there forever and cannot be overwritten or deleted.

Algorithm Enable (AE) is the term used to describe the instant when the airbag module experiences sufficient deceleration to “wake up” and begin the process of deciding whether or not the event will require an airbag deployment. This decision has to be anticipatory, since collisions are often over in 100 to 150 milliseconds. (There are 1000 milliseconds in one second.) That is why there will be a very few crashes in which it seems that the airbags should not have fired but did, and a very few in which it seems that the airbags should have fired but didn't. When there is an AE which does not result in an airbag deployment, a data set similar to that provided for a deployment will be saved in non-volatile memory in some modules; those records are generally not locked—they can be overwritten by a subsequent AE event. This record is commonly called a non-deployment (ND) file.



The image above shows a part of a typical data file from an SDM in a late-model GM vehicle. Throttle position, vehicle speed, engine speed, and brake switch condition are shown in one-second increments for the five seconds preceding AE. There is also other information stored in the module, such as whether or not the seat-belt-switch and airbag-system warning lights were on at impact. Some newer modules contain even more information, such as the angular orientation of the steering system; steering angles are typically shown in 16-degree increments. There are many modules which record significantly less data. It is entirely possible that some modules will record even more data in the future, but that depends on the manufacturers and the government. The National Highway Traffic Safety Administration (NHTSA) has established a rule for EDRs in cars and light trucks: 49 CFR Part 563, Docket