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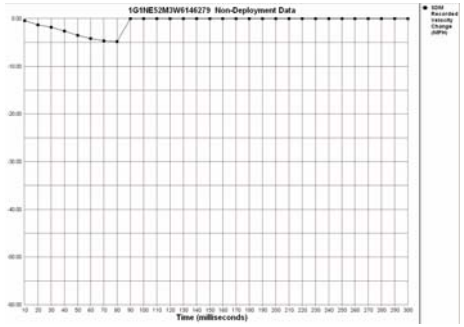
The Applicability of Retrieved Crash Data



The chart to the left is from a non-deployment file in a case where a Chevrolet Malibu gave a minor bump to the rear of a Lincoln Navigator. This graph shows that the speed lost by the Malibu from the instant of algorithm enablement to the point of rest was 4.83 mph. In knowing this speed loss and the weights of the Malibu and the Navigator, various aspects of this minor incident can be numerically evaluated.

The maximum delta-v imparted to the Navigator in this collision was 3.3 mph. As we who keep track of the relationships between delta-v and injury all know, a delta-v of that amount will create annoyance but no injury. In this case, there was no damage to the Lincoln and minor cosmetic damage to the Malibu. The driver of the Navigator was its only occupant, and she has not (yet) filed suit for pain and suffering.

With the presence of event data recorders (EDRs) in more and more vehicles, numerical evaluation of such events should become common. The chart above is from a non-deployment event, meaning one in which the algorithm which evaluates the severity of the crash in anticipation of firing the airbags was initiated but did not fire those airbags because the available data did not indicate a likelihood of a crash severe enough to warrant such action. Had the airbags been fired, this would have been categorized as a deployment event, and there would (probably) be other data stored with it. Many of the EDRs in cars and light trucks have the capability to record some data for a non-deployment event, and some do not. Virtually all General Motors products, some late-model Ford products, and some Isuzu products have EDRs which can be accessed by the Vetronix Crash Data Retrieval system for downloading and analysis. All such EDRs will record some critical data (such as delta-v recorded in increments, usually of about 10 milliseconds each), and many will record other data. Most of the EDRs in General Motors products keep a running memory of certain operational parameters.

When the module has fired the airbag(s) in a typical late-model General Motors vehicle, it will try to write the five-second history for the period immediately preceding algorithm enablement. Unless system power is lost, this module will store the values of vehicle speed, engine speed, percent throttle, and brake switch condition (on or off) which were recorded in one-second intervals for five such intervals preceding the sensing of the impending crash. If the collision is such that the vehicle's battery is taken out very early in the collision or there is other catastrophic damage to the electrical system, the energy reserve in the airbag module may only be able to fire the airbags, recording little or none of those pre-impact data points in non-volatile memory. It is for this and other, more technical reasons that the data set contained in the airbag module is not adequate to prove operational parameters which immediately preceded the collision, but that data can often be both an augmentation and a supplement to a reconstruction. As one minor example, consider the case where the driver of a vehicle without anti-lock brakes uses hard braking as an evasive maneuver; the stored data set will show the brake switch in an "on"

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