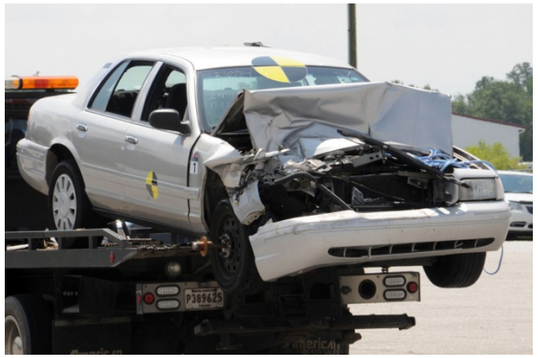
In this my final newsletter of 2013, I hope that each of you had a safe and happy Thanksgiving and are experiencing a joyous holiday season. This usually seems like the happiest part of the year.

The crash conference held in Charleston in July featured two rear underride crashes in which Ford Crown Victoria sedans were towed into the rear of a semi-trailer. One of those crashes occurred at a relatively low speed, while the other was at higher speed.

The first rear trailer underride involved a 2007 Crown Victoria striking the rear of a 2001 Wabash 53-foot van trailer. The impact speed was 19 mph. The photograph to the left below was taken during the crash; the photograph on the right shows the damage at the front of the Ford.

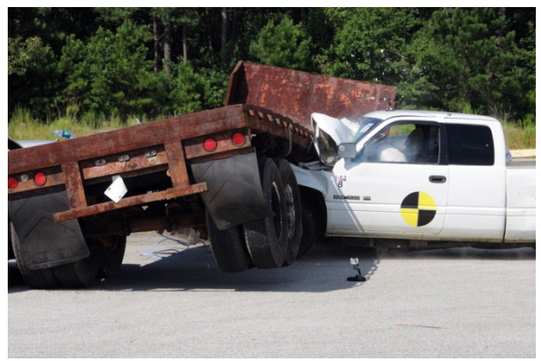


For many years, Ford vehicles which stored crash data used the Powertrain Control Module (PCM). The PCM was supposed to freeze a complex set of data upon receiving a Restraint Deployment Signal (RDS) from the Restraint Control Module (RCM), which was the unit which fired airbags (and pre-tensioners, if the vehicle had them) whenever there was a deployment. Often, however, no RDS was received by the PCM after a deployment, which meant that the PCM would continue to record data, overwriting the crash event typically in about 20 seconds, unless someone turned off the vehicle's ignition switch. For the two Ford underride crashes, a man was standing nearby, ready to run and turn off the ignition to preserve crash data in the PCM. For this first crash, the impact speed was 19 mph. There was no deployment of pre-tensioners or airbags, so no RDS was sent. The semi-trailer, which was coupled to a truck tractor at the time of this impact, was moved forward a few inches when the Ford struck it in the rear, indicating a delta-v for the tractor-trailer combination of two mph.

The second collision occurred at twice the speed of the first: 38 mph. The photograph on the left side at the top of the column of text to the right was taken during the collision, before motion stopped; the photograph to the right of it shows the damages to the Ford. As you can see by comparing damages, penetration in the first collision did not reach the windshield, whereas the penetration experienced during the second collision includes the right A pillar, the windshield, and the roof. The airbag in this vehicle deployed, but not until the Ford reached the left rear tires of the trailer. The RDS which was supposed to have been sent by the RCM after the deployment was not received by the PCM, but the runner with a mission turned off the key in time to preserve

data in the PCM. The tractor-trailer was moved 21 inches by this second impact, indicating a delta-v for that truck of 4.5 mph. Interestingly, the speedometer of the second Ford involved in the rear underride testing was found stuck at 52 mph after the crash, although its impact speed of 38 mph was well-documented and verified. Sometimes a stuck speedometer or tachometer needle means something, sometimes it doesn't.

There was a third staged underride crash on Monday. This involved a Dodge Ram pickup truck which struck the side of a flatbed semi-trailer. Those of you who have been reading my newsletters for a while probably recognize the trailer as the same one which was used in some crash testing at the 2012 seminar. The photograph on the left, below, shows the Ram at maximum engagement with the semi-trailer. The photograph on the right shows the other side of the Ram at rest after the impact. The 37-mph impact by the 4500-pound pickup truck may have rendered this semi-trailer unfit for future crash tests at subsequent seminars.



As I've written before, staged collisions such as the ones conducted at this and other crash seminars provide experimental substantiation of the accuracy and validity of the various methods in use today to reconstruct crashes. Another benefit of staged collisions in which a live person is driving the bullet vehicle is substantial proof of the efficacy of seat belts and airbags. By now, Rusty Haight has probably conducted over 1000 crash tests (the count was well over 900 the last time I checked) in which he drove the bullet vehicle. He always made sure that the airbag

system in the bullet vehicle was fully functional and that the seat belt was in good condition. For many of the staged collisions in which he drove the bullet vehicle, the delta-v of the bullet vehicle at impact was in the range of 20 to 25 mph; a few were higher. In none of the staged collisions in which he drove the bullet vehicle did he receive any injury, except for an occasional minor cut from flying glass or from the plastic cover of a deploying airbag. That is clear evidence to me that a 25-mph delta-v in a frontal collision should not result in any serious injuries to a seat-belted driver whose airbag deployed; most people in that situation would simply walk away from the wreck with no injuries—maybe some light bruising from the webbing of the seat belt.

On the other hand, that's not to say that a 25-mph delta-v can't result in injury to a seat-belted driver whose airbag deployed. There can be unique conditions and circumstances which can create unusual injuries in some cases. A vehicle involved in a collision of that magnitude should have the interior checked for indications of occupant impact(s), intrusion(s), and other manifestations of possible injury locations, mechanisms, and sources. For example, there are some vehicle owners who have large, heavy objects in the passenger compartment which are not securely attached to a structurally sound part, and those objects can become injury-producing projectiles in an otherwise relatively minor crash. Also, some drivers sit very close to the steering wheel. Short people obviously have to sit closer to the steering wheel than taller people (in most personal vehicles), but I have seen many drivers of average stature sitting very close to the steering wheel. Proximity to the steering wheel increases the likelihood of personal injury in any significant crash, whether or not that vehicle has an airbag, or whether or not the airbag deployed.

I now have the second Bosch cable for accessing the airbag control modules in late-model Mercedes Benz vehicles. I haven't investigated a crash involving a Mercedes Benz vehicle in quite a while—I'm ready to interrogate the airbag control module in a covered Mercedes, if and when necessary. I did have a recent case which involved a late-model Kia, but, because of issues with Kia (and Hyundai) EDR methods and equipment which I discussed in some detail in a previous newsletter, I did not pursue a data extraction from that Kia. Maybe they'll get their ducks properly aligned in the near future. ☺

As many of you probably know, Fiat has introduced a larger version of the Fiat 500, called the Fiat 500L. It's not surprising that the airbag control module in the 500L is different than the ACM in the 500. Introduction of the 2014 Fiat 500L required an additional ACM cable from Bosch; I have that cable, too. Almost seems like there are more specialty cables than there are cars! ☺

I am grateful to all who have used my motor-vehicle related services, and I look forward to many more years of providing service in this field. I am also grateful for those who read my newsletters; I try to keep current topics in print.

Happy New Year!

Ralph Cunningham, Inc.
Accident Reconstruction
www.RalphCunningham.net

Collision Analysis

On-road/Off-road

Pedestrian/Bicyclist

Motorcycle Collisions

Bosch Crash Data Retrieval

Lamp Filament Evaluations

Conspicuity Evaluations

Tire Failure Evaluations

Brake/Steering Evaluations

Seat Belts/Airbags

1804 Thornhill Pass, SE
Conyers, GA 30013
770.918.0973
Fax: 770.918.8076

Ralph Cunningham, Inc.
1804 Thornhill Pass, SE
Conyers, GA 30013