Fatal Collision on Highway 8 South of Cambridge, May 30th, 2010 - Review of Evidence

Thirty-two-year-old Laurie Banks of Troy, Ontario was fatally injured in a head-on collision on Highway 8, just south of Cambridge, Ontario on Sunday, May 30th, 2010. It was reported that a Mercedes 500 SL, driven by 77-year-old Richard Schiedel, was travelling westbound and the vehicle cross the roadway centre-line and collided with Ms. Banks' eastbound Hyundai Accent. Remarkably, a toddler in Ms. Banks' vehicle only sustained minor injuries. I will review the evidence at the site and provide some comments about its meaning.

First, here is a view looking westbound at the area of impact in the eastbound lane of Highway 8. The photo was taken on May 31st or just less than 24 hours after the occurrence.

You will note an area of prominant gouges in the eastbound lane in the foreground indicating the point of impact. You will also see a variety of fluid stains in the background where the Mercedes came to rest.

Below is another view of the gouges at the point of impact taken from the south

shoulder, looking northward.

Upon impact the Hyundai was pushed toward the bottom right of the photo, or toward the south shoulder. The evidence you see here is very typical of what you would expect in a major head-on collision on a rural highway.

Below is a view looking westward at the evidence at the final rest position of the Mercedes in the eastbound lane.

When examining this evidence the investigator must come to understand what was created as a result of the impact versus what was created by emergency or towing personnel. Sometimes that is not easy. But here it is fairly obvious that the Mercedes came to rest in the eastbound lane and the tow truck than pulled the vehicle across into the westbound lane and then westbound. The white colour material you see is often an absorbent that is placed by emergency or towing personnel to soak up any greasy or oily substances that could be slippery.

The evidence of the Mercedes being towed away is clearly visible in the photo below which is a view looking on a diagonal from the Mercedes rest position along a dark, narrow trail of fluid which is likely the engine oil from the front of the Mercedes.

The scraping you see on the asphalt is from some part of the Mercedes underside which was dragging while the vehicle was being moved. It is not surprising that persons coming onto the accident scene might be confused and believe that this gouging would indicate the area of impact.

Below is another view, looking toward the south shoulder where the Hyundai came to rest.

The scraping that you see in the gravel of this south shoulder is from towing personnel as they pulled the Hyundai out of the ditch. This is fairly typical of what you would expect to see.

The more educational evidence is revealed when we look at some of the debris that was left scattered on the ground. For example, below is the energy absorbing filler (foam core) that forms part of the front bumper of the Hyundai. This would be the foam-like material that would be located just behind the plastic facia of the front bumper. What should attract you is that this energy-absorbing material is essentially intact.

Now recall that this is supposed to be a head-on collision that resulted in fatal injuries to the driver of the Hyundai. So the front of the Hyundai should be receiving the brunt of the impact force. Yet there appears to be no deformation/fracture of this material.

Alas, after careful study you discover that indeed there is some damage to the left end of this foam core. But is it consistent with a major frontal impact that would cause the death of a young driver? Let's look at the backside of this foam core, as shown below.

Above we are showing the backside of the left end of the foam core. Again, some damage is visible at the left end, but not much. I would think you should be questioning why this is so.

Think about a Mercedes approaching at highway speed supposedly into the front end of this Hyundai and assume that the Hyundai is equipped with functioning air bags and a driver's seat belt (which we will assume for now was worn properly by the young woman). How does the Mercedes cause so much injury to this woman yet the foam core at the front of her car is relatively undamaged? Let me show you another piece of debris lying on the roadside. The photo below is of a hub cover, likely from the left front wheel of the Hyundai.

If you look closely at the transfers onto this plastic you will likely observe a distinctive blue colour of some of those transfers. Investigators in Ontario recognize this blue colour because it comes from the blue colour of Ontario license plates. Ah, the plot thickens.

Why are there blue license plate transfers on the hub cover of the Hyundai left front wheel? This can only come from the centre of the front end of the Mercedes. But why is the centre of the front end of the Mercedes located at the left front wheel of the Hyundai in this severe head-on collision? Let me give you a likely explanation that matches what has been observed at the foam core of the Hyundai.

The young driver of the Hyundai attempted to avoid the Mercedes by steering toward the right, or toward the south shoulder. This caused the Hyundai to be pointing at a slight angle toward the right shoulder. The two vehicles made initial contact such that only a small portion of the Mercedes left-front end made direct contact with a small portion of the Hyundai's left-front end. This was a very narrow zone of direct contact that would likely be coded something like 12FLEE-? in the Collision Deformation Classification (CDC). I use the "?" mark in the deformation extent zone because the rearward displacement of the direct contact along the Hyundai's front left side could be substantial and could result in structural intrusion into the driver's space.

We commonly see fatal injuries to drivers such as Ms. Banks in these types of collisions. Often the collisions occur when the offending driver (Mercedes) loses directional control of his vehicle but that may not be the case here as it could also be a simple passing action by that driver. Further analysis including examination of the damage patterns to both vehicles would reveal what actually caused this.

What is more relevant is that many manufacturers and government agencies are slow at responding to this type of occurrence. For decades these agencies have been conducting full-frontal crash tests into immovable barriers that are completely devoid of any relationship to real-life collisions. This was necessary in preliminary years when researchers were attempting to relate vehicle crush to energy dissipation, change-in-velocity and injury potential. But the thought should have been there long ago that these tests were not going to replicate actual, real-life collisions and some kind of meshing of the different results should have been made. Certainly NHTSA,
Transport Canada and others have been collecting data on real-life collisions for decades. As an example, the U.S. NASS program confirms that it contains data on something like 150,000 real life collisions since 1979. Thousands upon thousands of crash tests were performed with little focus on matching them to real-life incidents.

Only recently have I seen a research paper entitled "Fatalities in Frontal Crashes Despite Seat Belts and Air Bags" (by Bean, et. al., 2009) that admits the following:

"..the main reason people are still dying in because so many crashes involve poor structural engagement between the vehicle and its collision partner: corner impacts, oblique crashes, impacts with narrow objects, and under-rides."

"...few if any ...crashes were full-frontal or offset-frontal impacts with good structural engagement."

Just yesterday (June 8th, 2010) I referred to this paper while presenting my own at the Canadian Multi-Disciplinary Road Safety Conference in Niagara Falls. There I indicated that we apply too much focus on documenting the crush in order to estimate the amount of energy dissipated by the vehicle structure. Instead, we should be focusing on the deformation of the vehicle by documenting how the vehicle shape has changed compared to its undamaged state. Focusing on deformation still allows us to identify the crush, but more importantly, deformation analysis allows you to understand the type of collision that the vehicle was involved in by marrying the characteristics to the physical evidence including the scene evidence. Thus we no longer simply talk about a head-on collision but we become more specific and separate head-on collisions into their many types.

It is akin to the observation that eskimos have many words to describe "snow' while in the English language one can say there is only a single word. It comes from being familiar with the physical evidence and appreciating that there are many different kinds of head-on collisions like there are many different kinds of snow. The pattern of damage in one type of head-on collision is different from another and this is important. It is not to say that change-in-velocity is not an important factor. But we can better understand how and when structural intrusion occurs and defeats air bags and seat belts, if we gather information about the actual deformation of the vehicle. This is something that I have preached since I began studying the details of vehicle deformation at the UWO Accident Research Team in the 1980s. But I've yet to see any movement in the official research communities toward that thinking.