Review of Physical Evidence of Double Fatal Collision on Coatsworth Road, Essex County, Ontario

Posting Date: 09 Feb 2012

An unfortunate set of events led to the loss of life of two young men on in the early hours of Sunday, February 5, 2012 on Coatsworth Road in Essex County. A third occupant of the single vehicle collision sustained grave injuries, including burns as a result of the subsequent fire that ignited following the collision. It has been reported that Jake Fast, 18 and Frank Wiebe, 17, both of Leamington, Ontario were the two victims while the identity of the surviving third occupant has not been released. This article will review some of the physical evidence at the accident site.

It was reported that the area where the collision occurred was shrouded in fog shortly after midnight. Emergency crews were called to site at approximately 12:20 A.M.

The physical evidence indicates that the vehicle carrying the three occupants was travelling northwest, or toward Tilbury, Ontario. The photo below is taken from the intersection about a kilometre south of the site at Goodreau and Kemp Lines. We are looking northwest in the direction that the vehicle was travelling.

The road is flat and the road surface is in good condition. In the far distance you may be able to tell that the roadway bends toward the right. As we get closer to that bend we can see in the photo below that the bend is just slight before the road straightens out again as it approaches the accident site.

As the roadway straightens out the centre-line marking changes. Where the marking was a single solid line in the curve it then changes into a hatched line indicating that passing is allowed from both directions of travel, as shown in the top photo on the following page. This change in the roadway marking is more clearly seen in the bottom photo on that following a page.

One must imagine the scenario at night-time. There is fog in the area although the density of that fog is unknown. There are no overhead street lights. There are no white, painted edge lines to inform the driver where the edges of the pavement are located. So essentially the only guide for the driver would be the single centre-line in the middle of the road. We are not naive to think that speed was not a factor in this collision as the physical evidence would suggest so. But let us consider what the driver could see.

At low beam headlights a driver could probably distinguish the roadway centreline beyond the 50 metres that those headlights would normally illuminate less reflective materials. But in fog that visibility distance would be expected to be shorter, or much shorter. With high beams at visibility distance rises to about 110 metres for most objects, but again, that is without the presence of fog. Now consider that at 100 km/h a vehicle travels about 28 metres every second while at 120 km/h that becomes just over 33 metres per second. It is customary for vehicles on a Saturday night, or an early Sunday morning to travel at elevated speed. If one were to consider the probability that three young males were in a vehicle at this late hour the probability that they would be travelling quickly would rise substantially. But in foggy visibility conditions that is a deadly mix.

We will demonstrate shortly that the physical evidence supports a high speed, too high even if the area was not surrounded by fog.

As we approach the accident site we see that the collision occurred at a point where the road curves sharply to the right. There is a warning sign depicting the status of the curve and it can be seen in the photo below.

Not only does the warning sign indicate the extremity of the curve but there is a "Speed Advisory Tab" which indicates "50 km/h". That tab is supposed to tell the driver that indeed you should be reducing your speed dramatically if you are travelling at the posted maximum of 80 km/h, and if you are travelling 20 or even 40 km/h above that maximum, and if you are travelling in fog, then clearly it should register that disaster awaits you if you do not do something very quickly to reduce your speed. A warning sign like this is usually posted between 140 and 200 metres prior the curve in question and there is no reason to believe that it has not been posted at the correct location.

There are other warnings available to the driver about the approach of the curve. On the right side of the lane there is a white edge line that has been painted to help the driver through the curve.

Also, in the background, on the opposite side of the road, several chevron arrow signs are posted to direct the driver to the right. The positioning of these arrow chevrons is the one criticism we have about the condition of the site. These chevrons are positioned too far apart . As we get closer to the curve we see that there should be a chevron sign positioned so that it is directly in the middle of the travel lane as the driver is approaching so that the pointing of the vehicle headlights will reflect the light off the sign back to the driver's eyes in the most efficient manner. But as we see in the top photo on the following page, the chevrons are to the left and right of the pointing angle of the headlights. In

limited visibility that slight inappropriateness of location of the signs could make a difference in whether the driver appreciates where the curve is located.

In the top photo on the following page is the first indication of a tire mark caused by the accident involved vehicle. The orange paint identifies the position of the left side tires of the vehicle as it approaches the curve. This tire mark is about 1 metre to the right of the roadway centre-line or just slightly further away than would be expected if a vehicle was travelling down a straight roadway. The reason for this might be because the driver was beginning his steering into the curve.

But we might ask: Why is there a visible tire mark at this location? Well, no, the mark is not very visible now but it was obviously visible about 24 hours earlier when the police marked this point. When we travel around a curve our vehicle does not normally produce visible tire marks. But we know that, if our vehicle travels around a curve fast enough our tires begin to slip slightly and that slippage produces the visible tire mark. So the presence of a visible tire mark at this point tells us that the vehicle is already showing signs of lateral slipping, but it really has not entered the curve. So why is that occurring? Speed? Well, yes, to an extent. But the vehicle is not yet in a location where it is supposed to be changing direction in any substantial way.

To demonstrate our point, we can turn around and look at the beginning of the tire mark with respect to the road along which the vehicle approaches the curve and this is shown in the bottom photograph on the following page. Clearly, as the vehicle travels to the point where it begins to produce the visible tire mark the road is essentially straight. So why do we see a tire mark starting at this location? The vehicle should not be changing its direction of travel at this location, at least not to any significant degree.

Before commenting on a possible cause, let us first continue to show the evidence to the vehicle's final rest position.

As we proceed further into the curve we can see where the two tires on the left side of the vehicle begin to diverge onto their separate paths as shown in the middle of the photo below. You may also see the orange paint near the right edge of the lane where one of the tire marks from the right side of the vehicle has been identified.

So clearly this vehicle is beginning a clockwise rotation, or yaw, in preparation toward sliding off the road surface. You should now be able to see a number of orange cones in the background on the left roadside where we will show you the tire marks of the vehicle as it slid off the road surface. However, at this point, on the pavement, the tire marks are not particularly visible. Generally they tend to become more visible as the vehicle rotates further into the yaw.

At the top of the following page you can clearly see the tire marks and the associated orange markings that were painted by the police to help visualize their location. The two left side tire marks are caused by the left tires of the vehicle, the outermost tire mark is caused by the left rear tire so you can visualize the angle of the vehicle as it is sliding off the road surface and into the ditch. To help you visualize the motion we have also placed some orange cones along the left rear tire mark on the roadside in the background. At this point however the tire marks are fairly obvious.

In the bottom photo of the following page you can see how the vehicle continues its clockwise rotation and heads toward a culvert which abuts an intersecting, secondary roadway. As the vehicle approaches that culvert you may be able to detect how the mark produced by the left front tire crosses with the mark produced by the right rear tire. Just look in the centre of the tire marks and you should be able to see how the left front tire mark starts to divert from the

right rear. This is an indication of the extent of the rotation and that, by the time the vehicle reaches the culvert it is essentially sliding sideways, leading with its left side.

The sideways slide continues until the vehicle reaches the area of the culvert as shown in the two photos on the following page.

The black and grey deposits indicate where the vehicle came to rest on the wall of the culvert and then caught fire.

Below is a view from the opposite side of the culvert and looking back at the tire marks as they approach that culvert . You should be able to recognize how the two tire marks from the front tires of the vehicle are located on the left of this view and the tire marks caused by the rear wheels are on the right side of this view as the marks approach the culvert.

If you look into the ditch area you should be able to detect the orange paint markings that outline the final rest position of the vehicle in the above photo.

It is an unfortunate turn of events that the vehicle entered into this deep crevice because this caused the vehicle to strike a fairly vertical wall of stone and frozen sand bags. This caused the vehicle to come to a sudden stop. We can recall that the change in velocity or "Delta-V" of an impact is related to injury. The higher the change-in-velocity the higher the probability that there will be more severe injuries. Of course, there are some caveats. It is actually how quickly the "change-in-velocity" occurs that is the real determiner of injury. Thus if we reduce our velocity rather slowly the rate of acceleration (deceleration) is lower and there is less probability of incurring the more severe levels of injury. But when a vehicle comes into an immovable barrier such as the wall of this culvert the change-in-velocity occurs rather suddenly. So both the vehicle structure and the occupants within have to deal with dissipating all that kinetic energy they possess and this is done in a very short time, thus the accelerations are high. The result is that damage to the vehicle structure is different than if the velocity change occurred over a different time and that cannot always be controlled by a manufacturer of a vehicle.

So, yes, vehicles should not catch fire. There are federal safety standards that govern that. But it is difficult to prevent the rupture of fuel lines and gas tanks or to prevent the sparking that could commence a small fire that then engulfs the full vehicle when the environment in which a collision can occur is vastly different. Generally, once a small fire erupts and it is not dealt with it will eventually incinerate the complete vehicle.

An important aspect of the investigation of this incident involves the visibility available to the driver of the upcoming danger. The police can document the site characteristics including the geometry of the curve, any maintenance issues and the painting and signage. But it is also important to examine the condition of the headlights on the vehicle. We have observed on numerous occasions that collisions with immovable objects such as ditches and walls give the investigator the opportunity to search through the rubble to uncover the headlight bulbs to determine what headlights were on or off. The present case is no exception.

Below is a photo of one of the head-light bulbs that was lying on the wall of the culvert.

It only requires that the soot clinging to the exterior glass be brushed away to expose the condition of the bulb filament as demonstrated in the top photograph on the following page.

In some instances the search for a bulb is not that obvious. In a fire scenario various debris becomes melted and cakes onto the important evidence that you are after. Consider the photo below.

There is nothing particularly obvious about the piece of melted material that I have lifted off the ground. But as we lift that material and look at it more closely you begin to recognize that it contains the other headlight filament, as shown in the two photos below.

There is nothing revolutionary about what we have done. It is just a case of gaining familiarity with the evidence you seek and understanding what it should look like and where it is likely to be. When we remove the glass casing of the bulb the filament is exposed and its characteristics can be interpreted, as shown in the photograph below.

We appreciate that you may want to know our opinion about whether the evidence indicates anything peculiar but this is not an official investigation that we are involved in and those who may examine this evidence who are a part of any official investigation can proceed to draw their own conclusions. We are simply discussing methods of approach toward the investigation of collisions such as this.

We now want to return you attention to the discussion we had earlier about the location of the beginning of the tire marks which indicated that the vehicle was commencing a clockwise yaw. We stated that the commencement of the tire marks appeared to be too early because they occurred before the vehicle reached the curve. So why did they occur where they did?

This cannot be answered definitively without being able to study the rest of the collision evidence. Hopefully the police investigators will be mindful of this peculiarity. But working just from the site evidence we can say that certain possibilities exist. Let us state that, in most loss of control events the actual cause of a reaction by a driver occurs a long distance away from the first piece of visible evidence on the road. So just because we see the beginning of a tire mark does not mean that the important events occurred where the tire mark began. Something unusual happens with the vehicle and the driver reacts. Something enters the road and the driver reacts. But these driver reactions do not necessarily result in physical evidence being created on a road way that can be detected.

A classic example is when a vehicle travels onto a gravel shoulder and produces yaw-type tire marks. A good Samaritan pulls over on the same shoulder, followed by another and another. Soon the tire marks are completely obliterated before an investigator has a chance to witness them.

We will demonstrate one possibility, although that is not to say that we have evidence that it caused this collision.

The drop off of a pavement edge into a lower gravel shoulder has been noted as one of the factors that can cause a driver lose directional control when the wheels of the vehicle pass over that drop off. The detection of significant edge drop offs is not easy. Consider the photograph below which is looking back toward the direction from which the vehicle came, and it shows the east shoulder of Coastsworth Road just prior to the noted curve. Is there a significant drop off of the gravel shoulder from that asphalt edge?

Now consider the opposite shoulder, as shown in the photo below.

What if we said that one of these shoulders contained a significant edge drop off. Which would it be?

We believe you would be more likely to say that the edge drop off was at the east shoulder in the first photo. You might say this because you can see the shadow that is cast onto the shoulder at the edge of the pavement and that same

shadow is not visible on the west shoulder. And here is where the problem lies. The sun plays tricks on us. It is the west shoulder that contains the significant drop off. The shadow is not present because of the orientation of the sun with respect to the drop off. We can prove this by placing a carpenter's level next to the edge drop off and measuring the vertical height. The drop off was 4 inches or 10 centimetres. The location where we took that measurement is shown below and the view is pointing back in the direction of the curve. But as you can see, the edge drop off is not very noticeable.

Unfortunately we ran out of battery power on our camera before we could take a photo of us taking that measurement. However, we grabbed a video camera and recorded this procedure and we will attempt to place the video on the You-Tube site for your evaluation.

So why is it important that there is an edge drop off on the opposite site of the road from where the loss-of-control car would be? Well, imagine that there was another vehicle travelling south-east and had passed by the curve but inadvertently the driver allowed the right side wheels of his/her vehicle to enter the drop off and there was a momentary loss of control which brought that vehicle into the path of our speeding vehicle coming the other way. A collision need not have taken place. But it could have been enough to cause our speeding driver to steer to the right to avoid a possible collision. Remember it is night-time and foggy and there is very little light from any other source so things can appear to come upon you rather quickly and unexpectedly. Our speeding vehicle might even travel partly onto the gravel shoulder but there might be very little evidence of that because at this point the car is still travelling under relative control. Our speeding driver's initial reaction is too sudden and therefore his response to steer to the left is also too sudden and he makes the problem worse. When he steers the vehicle back toward the right again the vehicle's suspension is already having difficulty dealing with the sudden shifts of weight from the previous steering

motions such that, we see the first visible tire marks as the driver steers back to the right again and the vehicle goes out of control.

This explanation is favourable because of the location of the edge drop off and because the distance needed for these events to take place is also appears reasonable. Although the collision might be related to the existence of the curve and the edge drop off it is not related to the typical scenario where a vehicle is exceeding the critical speed of the curve. The loss of control occurs for a different reason.

It is quite possible that the driver who might have interfered with our speeding driver might not even have realized that he/she caused a collision because of the poor visibility conditions. That driver might only be thankful that a near miss occurred but there was no impact. Upon later receiving the news that a collision took place such a driver might be in a difficult situation because it would appear that he or she left the scene of a fatal collision while in fact, that driver might not have known that a collision occurred. That unknown driver might now fail to report him or herself to the police because of the difficulty of explaining what really occurred and the difficulty in explaining that he or she was not aware that a collision had taken place.

As a further complication, if the occupants of our speeding vehicle had been impaired by alcohol and the police could demonstrate that they were speeding, how much additional investigation would take place to determine that speed and alcohol were not the only factors in this case? We suggest that if a collision such as this was caused by an unknown driver it would be unlikely that further investigation would be carried out. Because it is not that easy to look at the tire marks and reason out that they appear to begin at an unusual location.

Now, we agree that this is a hypothetical scenario and we have no proof that any of this happened. It is food for your thought. In many situations collisions and their causes are more complicated than the simple and obvious facts that appear to blind us from taking a closer look.

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