

## Woman Dies in Single-Vehicle Collision on Kent Bridge Road East of Chatham, Ontario

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It has been reported that a 56-year-old woman from the Chatham-Kent region died as a result of serious head injuries suffered in a single-vehicle collision on Kent Bridge Road, just south of Front Line in the Harwich Township area. The collision occurred yesterday, October 14, 2010.

The Chatham Daily News described the facts as follows:

*"Police said the woman was travelling southbound on Kent Bridge Road shortly after 5 p.m. on Thursday when she lost control of the Pontiac Sunbird she was driving. At this stage of the investigation, police said it is believed the vehicle came into contact with the east gravel shoulder of the road causing the vehicle to rotate out of control and slide across the west side of the road before striking a hydro pole on the passenger side.*

*The woman, who was the lone occupant, sustained serious head injuries and was unconscious when emergency crews arrived, police said. She was transported to the Chatham-Kent Health Alliance and later transferred by land ambulance to a London Hospital, before succumbing to her injuries later in the evening, police said."*

I travelled to the accident site this afternoon and have a number of photos that will be presented in the following days. First, I want to show you a view looking approximately northeast from just beyond the pole that was struck.



The tire marks leading to the pole impact have been outlined in orange paint by the police during their investigation. Note that it was the right side of the vehicle that collided with the pole, so what you are seeing is the marks from the rear tires on the left side of the pole and the marks from the front tires are on the right side of the pole. Note the spacing of the tire marks with respect to the pole and you will realize that the pole impact was approximately in the middle of the wheelbase and therefore the pole impact was likely near the right B-pillar.

You can also decipher that the left side tires were following the path of the right side tires. In other words the vehicle was sliding directly sideways when the impact occurred. What I can tell you from experience is that by the time a vehicle reaches this point (of sliding directly sideways) it will undoubtedly rollover if it does not strike something beforehand. There was a steep-sided culvert directly behind the camera in the above photo therefore if the vehicle did not hit the pole it would have begun to rollover as it approached the steep-sided culvert. I can also tell you that, in a rollover scenario, a vehicle leading with its right side will generally make first contact with the ground with the upper corner of the left roof side rail. The left roof side rail is that portion of the roof that is just above a driver's head but at the top of the driver's door. I am saying all this because regardless of whether the pole was struck this driver would still have been in a difficult situation if the pole had not been there.

Now let's follow the tire marks away from the area of impact and out toward the road from which the vehicle came. Below you can see a photo showing the curved tire marks as they come off the roadway and into the east roadside. The struck pole is directly behind the camera.



Note above how the tire marks are curved, this is an indication that the vehicle is rotating about its vertical axis. One might say it is rotating counter-clockwise. These curved tire marks are typical of what you would expect from a loss-of-control vehicle and we call them "yaw" marks. The two tire marks on the left are from the rear of the vehicle and the two on the right are from the front of the vehicle. The rear tire marks are converging because the vehicle is rotating and approaching a condition where it is sliding directly sideways. Similarly the two front tire marks are doing the same.

The angle at which all the tire marks are coming off the road surface should be an indication to you of the speed of the vehicle. A fast-moving vehicle does not change direction "very much" in a "short distance". So this amount of curvature and this amount of change in direction indicates a relatively slower speed compared to other loss of control collisions. But don't let my comment fool you, many vehicles are out of control because their drivers are going too fast and therefore most yaw marks are observed when vehicles are travelling at high speed. Let's look further up the road.

The photo below shows the tire marks further onto the road and you can see that the vehicle came from the southbound lane before travelling off the road.



The above is interesting because in many loss-of-control collision scenarios this is the only physical evidence that is visible: the tire marks come out of the proper, southbound lane and the conclusion is drawn that the driver simply lost control at that point. But in this case that is not the end of the story because there is additional physical evidence as demonstrated in the following photos.

In the photo below we see how the Sunbird came close to the southbound lane but in the background you can see that the tire marks actually originate from the northbound lane and that there is something on the east shoulder.



And as we look further northward along the road we can see in the photo below what appear to be additional tire marks near the driveway on the east side of the road.



And as we look in the photo below we can clearly see that the police have outlined additional tire marks on the east shoulder.



Note in the above photo that the tire marks on this east shoulder are also curved and therefore they are also yaw marks and they indicate the vehicle is rotating.

The photo below looks toward the beginning of those tire marks as outlined by the orange paint markers.



And the photo below shows the first orange paint marker on the east shoulder and in the background you can see the conditions of the road. The road appears straight, level and the surface appears to be in good condition.



And below is another, similar, view looking northward from the point where the Sunbird began to exit onto the east shoulder.



There is no additional physical evidence yet one would question why the vehicle would be on the wrong side of the road without producing any other physical evidence. I think this is why the newspaper article quoted the police with the words "At this stage in the investigation, police said they believed the vehicle came into contact with the east shoulder of the road causing the vehicle to rotate..."

Frankly, just because there is no other physical evidence does not mean that the incident was caused at the beginning of the visible evidence. And this is one of the problems that I have been complaining about when we come to decide why something occurred. Many times in a high speed loss of control scenario the loss of control occurs a long distance away from the observable physical evidence. This would seem logical because a loss of control rarely occurs instantaneously, it is progressive, and during that progression the vehicle is moving quickly and covers a lot of distance. And one should not expect the physical evidence to come jumping out at you at the beginning of this loss of control because the disturbance of the site at this initial stage would be expected to be minimal.

My advice had been to study the road some distance further from the beginning of the physical evidence. In the present case the physical evidence was laid out as follows. From the struck pole northward the point where the vehicle came of the east shoulder was distance of about 48 metres. Then the tire mark on the east shoulder was about 50 metres long. So the distance from the pole to where the vehicle entered the east shoulder was about 98 metres. I took the length of the tire marks on the east shoulder, about 50 metres, and I walked that distance northward on the west shoulder such that I took up a position about 148 metres north of the struck pole. From this position of 148 metres north of the pole I laid out markers on the west shoulder, six equal distance of 20 metres each. From each of these positions I took measurements of the condition of the west shoulder. Below is an example of the apparatus I used at one of these measurement stations.



As noted above I took measurements of the edge drop off from the asphalt edge. But I also took a measurement at the far end of the carpenter's level to determine the slope of the shoulder.

My measurements indicated that the drop off from the asphalt edge was in the range between 2.5 and 4.0 centimetres - not great, but certainly within a reasonable range

since a drop off of about 5 centimetres (2 inches) is a value that is often quoted as something that should be repaired.

My measurements of the slope of the west shoulder however indicated values of 10.75, 7.5, 9.5, 9.25, 10.0 and 8.5 centimetres at each of the measurement stations. Noting that my length of the carpenter's level was 120 centimetres, the resultant slope in percent was 9.0, 6.25, 7.9, 7.7, 8.3 and 7.1 centimetres. These slopes are excessive. Particularly so because a typical cross-slope of a travel lane is about 2.0 percent. Next you consider that a vehicle's right side tires fall off the asphalt edge about 2.5 to 4.0 centimetres thus increasing the angle at which the vehicle is tilted onto its right side wheels. And finally you introduce a slope of the shoulder that could be in the range of 9.0 percent. That is not a good thing, even if one believes the vehicle should be travelling straight ahead.

But consider the scenario where a driver is not paying particular attention to the road due to its low traffic volume and the good surface characteristics allow the driver to travel at an increased speed. This is a common situation. People chose such back roads because they are straight, level and well-paved with little traffic volume so that they can travel quite quickly. Now imagine that the driver strays onto this right shoulder. The loose gravel retards the forward travel of the right wheels so there is an additional drag on those wheels. The driver then counters this by trying to steer back onto the road at a point when the slope of the shoulder is excessive. At high speed the evidence of a minimal slip and commencement of a yaw will not be visible because there is a long distance travelled and the disruption in the gravel surface is distributed over that long distance. At high speed that small angle of rotation and the small angle of change in direction means that you cross to the other side of the road in a relatively hurried fashion without any noticeable evidence. The evidence only becomes visible once the vehicle crosses onto the east gravel shoulder when the driver must make a significant correction in the vehicle's travel direction and so the tire marks first become visible.

These words are a lot to conclude from just an examination of a site. The actual event might have been completely different. The driver may have been interfered with by an animal or another vehicle and I would not be able to determine this. The police investigators will have the full package of evidence but unfortunately the level of experience and skill varies quite a bit from one officer to the next. I only put out this discussion because one of key issues is that too often we do not look beyond the location of the most obvious evidence and consider how the real cause might be several hundred metres up the road from where we first see the beginning of the physical evidence.