Glanworth Curve - Conclusions About Need For Guard Rail Are Numerous But Lack Of Supportive Information Continues

Posting Date: 18 September 2012

View, looking north-east along Glanworth curve toward the area (background) where a double-fatal collision occurred on February 11, 2012.

The London Free Press newspaper published two articles on September 14, 2012 discussing efforts to have the City of London install a guard-rail system at the site of a fatal collision that occurred on Glanworth Curve in south London on February 11, 2012 wherein James Thomson, 38, and fifteen-month-old Rayne Bogart were killed. Amanda Sararas the driver in the fatal crash, and also the mother of Rayne, has been featured in the articles and has been one of the petitioners of the City in favour of installing the guard rail. The articles indicate that a "Glanworth community organization" and the property owner where the collision occurred are also calling for the guard rail installation.

A former mayor of Westminster Township (Don Budden) where the accident occurred is also reportedly in favour of the guard rail (Westminster Township was swallowed up in the annexation of lands by the City approximately 20 years ago and thus the accident site became the property of the City of London at that time). Budden was quoted by the Loondon Free Press as indicating that:

> *"The salt and beet juice (used to fight ice and snow) might not have had time to erode it yet. Maybe there was too much speed; maybe the new pavement affected it."*

Budden was quoted by the London Free Press that he thought the fatal colllision was the result of a combination of factors, including slippery conditions on top of a smooth, recently resurfaced road.

The London Free Press also interviewed another former mayor of Westminster Township, Dave Murray. Mr. Murray indicated that the curve had a questionable safety record and that he recalled "back to since I was a teenager".

The London Free Press indicated that it also is "urging" the City to install the guard rail system. With expressions such as "Dangerous curve with deadly results" and "infamous Glanworth curve" the London Free Press is indicating to the public that this site requires immediate attention, yet persons are frustrated that the City is doing nothing about it.

An unidentified City of London spokesperson indicated shortly after the collision that the City was waiting for the completion of the final police investigation before determining if further action is necessary. So everyone waited...

Finally, in a news release dated April 20th, 2012, Sgt. Tom O'Brien of the London Police Traffic Management Unit indicated the following:

> *"London Police have completed the investigation into the crash on Wellington Road at Glanworth Drive that occurred on Saturday, February 11, 2012 claiming the lives of two people. As a result of the investigation no charges will be laid against the 20-year-old female driver.*
>
> *Police have determined that the cause of the collision was a combination of a number of factors including driver experience, vehicle equipment issues, weather and weather related road conditions."*

However the meaning of the last sentence, regarding the factors that caused the collision, was very sparce on detail to the point that it really did not reveal anything of substance. There was nothing from the London Free Press or any other news media who wrote or presented any information about a follow up to the police comments to inform the public as to what was meant by the police press release. For example, what was meant by "vehicle equipment issues"? The actions of the London Free Press would make it appear that they indeed had a full understanding of the results of the investigation as their articles discussed the issue with an air of expertise.

For example, in their original article, a day after the crash, the London Free Press reported that "the roads were snow-covered and icy at the time of the crash". To be certain that this comment was factual, the writer would have had to be at the site even though the police had it closed for about 9 hours. Optionally the writer could have obtained that information from a police source who was at the scene, or perhaps from one of the occupants or witnesses to the crash. But the source for that information was not provided. If this comment was made without care for its implications then it was not helpful as the presence of snow and ice on the road surface is an important fact that needed to be determined.

As another example, again taken from a London Free Press article published a day after the collision, the writer concluded "Winter roared back with a vengeance on the weekend...causing...a deadly rollover in Glanworth". Again, this may be poetic license that sells newspapers but it is important to distinguish whether in fact the weather could be blamed for the accident or whether it occurred for another reason or an additional, and more important, reason.

And further in the same London Free Press article the writer indicated "The stretch of road in the community at the south end of London is dangerous because vehicles travel at high speeds on a wide curve". But is that truly the reason? Did the writer conduct some scientific research or interview someone with an expertise in the matter? If it is just poetic license again then it only confuses an important issue.

A London Free Press article also suggested:

> *"Another issue that may have factored into the crash is the fact that it has snowed so infrequently this winter that naturally-made walls of snowbanks weren't there to slow the vehicle down."*

It was not indicated however if indeed "naturally-made" snow banks are useful in slowing vehicles or whether they vault vehicles over top of them and cause a chaotic motion of the vehicle afterwards. Again the London Free Press did not indicate where they obtained this apparently authoritative understanding of the benefits of snow banks.

And in one of the recent articles of September 14th, 2012, the London Free Press indicated:

> *"The curve is situated between London and St. Thomas and catches drivers by surprise. there are signs in each direction warning motorists that a bend in the road is coming, but some react too slowly, especially when the road is slick."*

The Free Press reporter writes with an air of authority on why collisions occur at this curve, but we question what real research he has collected which would support these conclusions. Where is the research or testing that indicates that the curve "catches drivers by surprise" or that drivers "react too slowly, especially when the road is slick"? If the reporter is using more poetic license then these comments are more damaging than helpful.

An informative piece of fact that goes to the credit of the London Free Press is that they interviewed a meteorologist with Environment Canada, Glenn Robinson. It was confirmed that "London was under a snow squall watch from Environment Canada for most of the weekend, with squalls finally moving through the city on Sunday morning (February 12th) and into the afternoon". But the collision was reported to occur "just before 1 p.m. Saturday". So, if that information was true then it would appear to be questionable if poor weather conditions were to blame since the collision would have occurred perhaps 18 hours before the snow squalls arrived. We are not saying that the collision was unrelated to the weather conditions, it is just that the reported information causes confusion.

Since the collision occurred there has been a continual lack of information about what happened, why and what steps should be taken, if any, if a problem truly exists.

The former mayors of Westminster Township confirmed that the curve had been recently re-surfaced. While that may be so, there is little information about what was done regarding the geometry of the curve at that time. In our experience of documentation of a great many collisions in the London area we can confirm that the Glanworth curve had a notorious reputation in the past. However, it was our observation that the so-called "resurfacing " also improved the layout and width of the road such that many of the earlier safety issues were improved. However this is only from our unofficial observations and we have not specific information about what changes were made. The fact that there is no specific information about what was done is, in our opinion, part of the problem.

The London Free Press reporter in one of the recent articles provided some helpful information about the traffic conditions and accident history at the near the curve. For example an portion entitled "BY THE NUMBERS" provided the following data, gathered from a City of London source:

> ***85****: crashes on Wellington Rd. between Manning and Harry White drives (about 3.5 km) between Jan. 1, 2005 and March 1, 2112*
>
> ***12****: average per year*
>
> ***81%****: collisions with property damage exceeding $1,000 and no injuries*
>
> ***18%****: collisions resulting in injuries*
>
> ***1%****: collisions resulting in fatal injuries*
>
> *Source: The City of London*

But these numbers still fall short of providing useful information. The 85 collisions were documented over a distance of 3.5 kilometres but that is a very long distance. What number of these collisions actually occurred in the similar location where the fatal accident occurred and where the guard rail is being proposed? Did the City conduct any

review of the specific accident reports pertaining to the 85 collisions and what was the result of that review?

In a February 13, 2012 London Free Press article, London Police were quoted as saying that "officially there have only been seven reports of crashes in the area since 2003". Yet the above numbers discuss 85 collisions. So what is it? Does "the area" mean some distance much closer to the accident site than the 3.5 kilometres mentioned in the above figures? We do not know and this is part of the problem, and it is confusing.

The owner of the property where the fatal accident occurred, Jamie Fraser, complained of numerous incidents where vehicles travelled off the roadway and onto his property. Can the City of London confirm that there is a high rate of this occurrence? Again, some of the comments of Sgt. Tom O'Brien were provided in the February 13th, 2012 London Free Press article as noted below:

> *Still, Sgt. Tom O'Brien said many instances of cars that spin off the road into the ditch go unreported.*
> *"Lots of times, when somebody leaves the roadway, if they can get out themselves before police arrive, there's no report. Most reports involve multiple vehicles."*

Does it sound plausible that the City of London does not have firm information on the number of single-vehicle loss-of-control collisions that occur on Mr. Fraser's property or any curves in the City of London? By the comments of Sgt. O'Brien this would seem plausible. But this needs to be confirmed by the City. What information does the City actually have and how good is it?

In the latest London Free Press article about the SUV in the fatal crash, Amanda Sararas, confirmed that she did not have a good memory of the events before the crash but that "She found some slush, the SUV began to slide...". So how much "slush" was actually on the road and why was it there? The defensive response is that slush and snow should be expected in winter on Canadian roads but that is not exactly the case. There is a duty by the City to take pre-emptive actions to minimize the possibility that unsafe road conditions will occur and if conditions worsen beyond acceptable levels then a road needs to be closed. So what were the conditions on the Glanworth curve before the accident and at the time of the accident. The two official entities in this investigation, the London City Police and the Municipality of London are the only ones with that information but they have not revealed it. Yet, it is obvious that both of these entities stand the chance of being sued in a civil court if it is deemed that their actions were not what they should be. So this is likely why information about the cause of this accident has not been made available.

But just because the police and city have not released specific information about the findings of the crash investigation does not mean that investigative news media such as the London Free Press should simply fail to investigate why the information has not

been revealed, while banging the drum that there is an obvious need for a guard rail on Glanworth curve.

In the absence of any meaningful analysis and testing we have set out to conduct our own preliminary work and to report on it in this article.

Gorski Consulting has been involved in the analysis of loss-of-control collisions for over 30 years. In recent years we have been working on procedures using multiple video cameras, simple, on-board instruments and video-editing equipment to study traffic and how drivers and vehicles behave on highway curves. More recently we have been examining the functioning of the accelerometers encased in the iPhone smartphone as a tool in studying the forces experienced as vehicles pass through roadway curves. We have been testing this equipment at other sites but have decided to conduct a study on the Glanworth curve.

Thus on September 17th, 2012 we used an iPhone application called XSensor which displays the real-time readings from the iPhone's accelerometer in several test drives along the Glanworth curve. A video-camera pointing on the face of the iPhone captured the real -time accelerometer data and this video was eventually analysed and transferred to an Excel spreadsheet. A chart was subsequently created from that data and will be discussed shortly. Besides the mentioned video camera we also placed another one pointing straight through the windshield of our vehicle so that we could document the position of our vehicle within the curve. We also attached a third camera to point at the speedometer and other instruments of our vehicle so we would have a full documentation of that display.

Upon synchronizing the views of the three cameras using video-editing software we were able to extract the noted accelerometer data as well as the position and speed of our vehicle as it passed through the curve. For the purposes of the discussion we will only present the results of one northbound drive through the curve as it passed through the south (right) curve and then subsequently as it passed through the north (left) curve where the actual fatal collision occurred.

The chart positioned a couple pages below is a summary of the data that was collected. It contains about 33 seconds of data from each of the two curves of Glanworth curve. In other words it took our vehicle about 33 seconds to complete its travel through each curve with our cruise control set at a speed of 80 km/h.

Since at 80 km/h a vehicle travels about 22.2 metres per second, it would indicate that our vehicle travelled about 733 metres through each curve. Granted some of this data includes a preparatory distance of travel before reaching each curve but it also provides an indication that each curve is quite long.

In the chart, the blue line of data refers to our initial, northbound travel through the south curve which is a right curve. The red/orange line refers to our northbound travel through

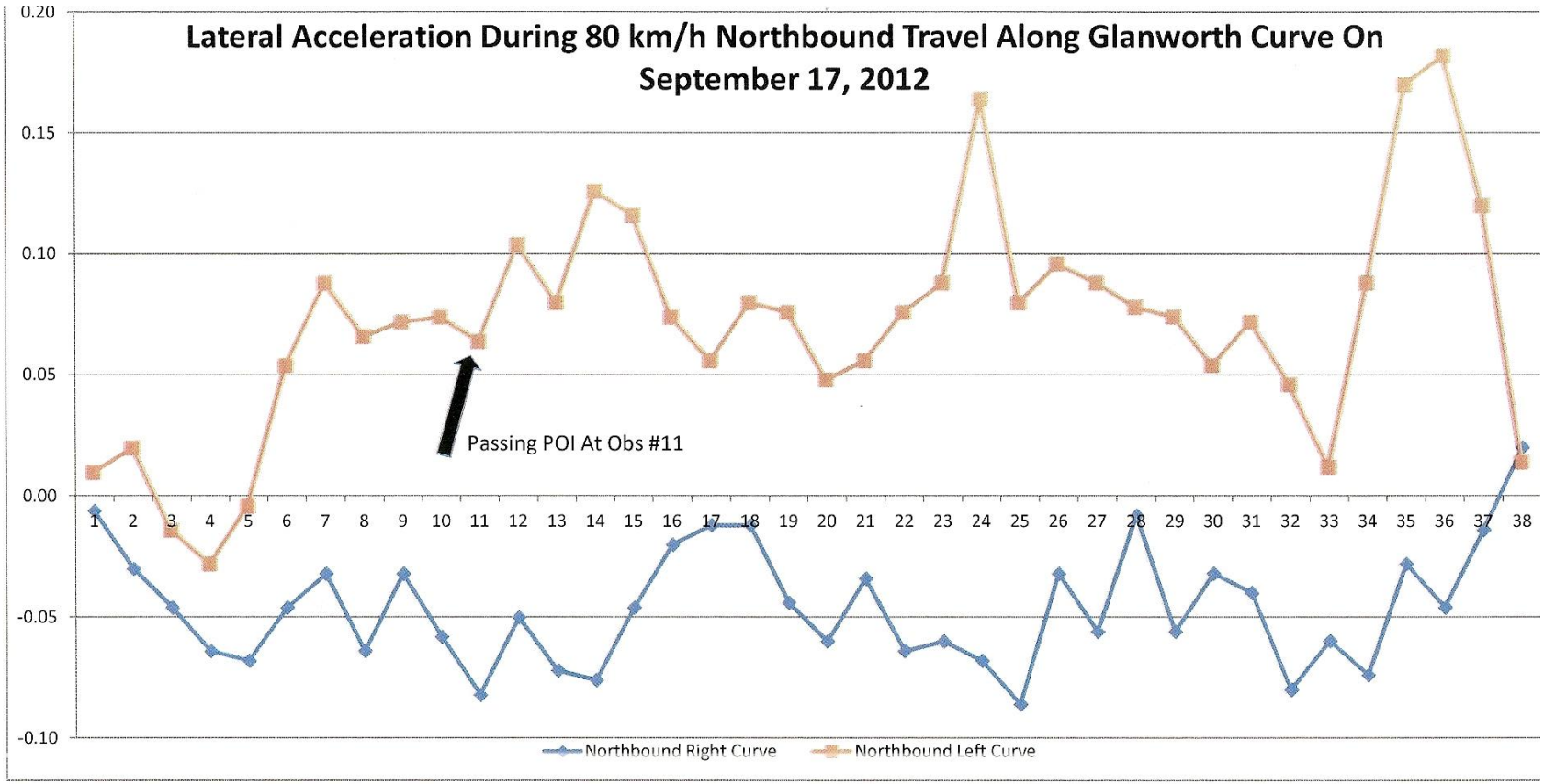
the second (left) curve where the fatal accident occurred. We included the data from our travel from both sets of curves so that one can compare the results between the two curves.

Now for some explanation of the data. The chart is indicating the value of the lateral acceleration experienced by our vehicle as it travels through the curve. The magnitude of the lateral acceleration is that value that tells how much force there is pulling the vehicle toward the outside of the curve. So, in the initial right curve, the lateral acceleration is telling us how much force there is pulling the vehicle toward the centre-line of the road. In the second, left curve of Glanworth the lateral acceleration value is indicating how much force there is pulling the vehicle toward the right edge of the road or away from the centre-line of the road. Think of yourself seated in a vehicle that is travelling quickly around a sharp bend in a road and recall how your body wants to be pulled to one side of the interior of the vehicle. This is exactly the same force that is being documented in this chart only it is documenting the force on the test vehicle.

Do not be bothered with the fact that the blue line is in the negative range while the red line is in the positive range of the chart. Think about what this means. The vehicle is travelling through opposite curves so naturally the lateral acceleration will be negative in one curve and positive in the other. Do not look at whether the values are negative or positive but rather look at the actual magnitude of the lateral acceleration number.

Each data point represents the average lateral acceleration over one second of the vehicle's travel. We collected data over much smaller increments but this would be impossible to show because the chart would be too wide to show in this article. So this is our reasoning.

Since the data in the chart is only from a single test you should expect to see some individual variance in the acceleration values as the test driver may have induced certain results by the manner in which he steered and due to the specific position of the vehicle within the lane. If the drive-through test had been performed a number of times those individual variances would be reduced and we would get an indication of what "typically" occurs to a vehicle as it goes through the curves.


Lateral Acceleration During 80 km/h Northbound Travel Along Glanworth Curve On September 17, 2012
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
Passing POI At Obs #11
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
Northbound Right Curve
Northbound Left Curve

The results in the chart show that the value of the lateral acceleration during the initial, right curve was relatively minor, constantly falling below -0.10 g. As an aside, traffic engineers generally want to see a lateral acceleration that is less than 0.15 g. Also note that the data in the first (right) curve is generally in a consistent range. Conversely, the data in the second (left) curve, where the accident occurred shows periods of higher lateral acceleration with spikes over 0.15 g.

Note that we have attached a black arrow to the red/orange line of data to indicate when the vehicle passes the area where the fatality vehicle travelled off the road before it struck the tree. This arrow refers to the data point around Observation 11. Note that at 7 seconds before that location, at around Observation 4 the test vehicle begins to experience a progressively higher lateral acceleration pulling the vehicle toward the right edge of the road. Then, at approximately 4 seconds before that point (at approximately Observation 7) the lateral acceleration stops increasing briefly.

If this data was believable (and it could be with further testing) then it could help to explain what might be causing the vehicle to slide to the right and off the road. One would want to explore the cross-slope if the road and how that changes along the length of the road because that could change the value of the lateral acceleration and in some cases it could destabilize a vehicle. One should be particularly careful in situations like the present where another roadway comes to intersect with the Glanworth curve at the location where the fatality vehicle left the road. Changes in super-elevation or cross-slope often occur in these areas.

Other factors such as differences in wetness or locations of icy patches could also explain why a vehicle would leave the road surface. Normally, on dry roads the force that keeps a vehicle on the road is more than sufficient to counter the lateral acceleration that wants to push the vehicle off the road. But as roads become wet or icy that countering force diminishes and critical point could be reached where the "centrifugal" force becomes larger than the "centripetal" force and the vehicle slides out and crashes. That is why it matters what was on the road surface at the time of the crash.

The accelerometer application that we used also documents the forward/backward acceleration as well as the vertical acceleration values but these have not been shown here to simplify the discussion.

In actual testing we also use other instruments. We videotape a large protractor that is attached to the steering hub of the test vehicle so that we can observe the driver's steering actions. We also videotape the driver's brake and accelerator pedals for indications of their use.

The data obtained from such testing is very valuable in understanding what problems may be encountered by drivers on the curves of rural highways. In the present case, such objective testing would help to evaluate if drivers are experiencing difficulties negotiating Glanworth curve. The decision to construct a guard rail or other devise should not be made without similar objective testing. Certainly, the City of London needs to step forward and provide more meaningful information about what they have done to study Glanworth curve and what further actions, if any, can be expected.

Gorski Consulting
London, Ontario, Canada