Clarke Road - Seven Years of Independent Research into Loss-of-Control Events

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This fall marks the end of a seven year period of our continual examinations and testing at the Gorski Consulting "Laboratory", more commonly known as the "S" curve on Clarke Road, in north-eastern London, Ontario.

It was about this time in 2009 that we decided to conduct some formal testing on the S-curve on Clarke Road, just north of Fanshawe Park Road. We had observed that the curve was challenging in that it contained an undesirable combination of horizontal and vertical curves. We observed that this resulted in a number of loss-of-control events and it gave us an opportunity to attempt to capture those events through the set-up of multiple video cameras. Several such videotaping sessions were completed over the years and we gained some useful insight into how vehicles stray out of their travel lanes, their speeds, and other similar data.

In these last seven years we have maintained a regular inspection of the S-curve for evidence of loss-of-control events. Figures 1 through 3 show an example of loss-of-control event that did not result in a collision however it commenced when the vehicle entered the east gravel shoulder and crossed into the west roadside.

Figure 1: View of loss-of-control tire marks from a northbound vehicle and its rest position from an incident on August 5, 2014.

Figure 2: View, looking south from the west shoulder of the S-curve showing the rest position of the loss-of-control vehicle in the foreground and the yaw marks on the road surface.

Figure 3: View of black yaw marks on the roadway centre-line suggesting the loss-of-control event occurred when the road surface was wet.

This event was most certainly not documented in any official records, such as a police report. This fact is clear when we take a close examination of the tire marks at the vehicle's rest position, as shown in Figures 4 and 5.

Figure 4: View at the final rest position of the vehicle showing the loss-of control tire marks and those produced subsequently as the vehicle left the site under its own power.

Figure 5: Close-up view of tire marks at rest position, showing the mark produced during loss-of-control and the mark produced afterwards when the vehicle left the site.

Experience in the interpretation of tire marks on gravel can clearly separate the loss-of-control tire marks from the subsequent marks produced by the vehicle as it left the site, under its own power, after sliding to a stop on the roadside. The reason why this event did not result in a collision has nothing to do with the severity of the event or its potential consequences. It just so happened that, as the vehicle slid across the road, there was no other vehicle travelling in the opposing lane. If the vehicle had been occupied by four persons and was struck by a large truck the results could easily have produced multiple fatalities. Therefore the suggestion that this event is unimportant or unworthy of official documentation must be false. There are many incidents like these that have occurred during the five year period of our study.

In September, 2014 we uploaded an article to the Gorski Consulting website entitled "Clarke Road - Five Years of Independent Research into Loss-of-Control Events". Here we reviewed the numbers of collisions and loss of control events as well as where they were located with the S-curve on Clarke Road. We made the following observations:

"Our latest data shows that in 2013 there were 10 events documented and so far in 2014 there were only 4 events up through to the middle of September. While these numbers are small it might suggest an overall downward trend for these occurrences. This is interesting because of the advent of electronic stability control (ESC) being installed on newer vehicles. As indicated on the Transport Canada website:

"Transport Canada has introduced the new Canada Motor Vehicle Safety Standard 126 that requires an ESC system on all passenger cars, multi-purpose vehicles, trucks and buses with a Gross Vehicle Weight Rating of 4536 kg or less, and manufactured on or after September 1st, 2011."

As time passes it is expected that the population of vehicles with ESC should increase and we should see its effect in the numbers of loss-of-control events. Therefore it would be expected that our data on the S-curve should reflect that. Even more interesting will be the types of loss-of-control events that remain, even when ESC is available. Therefore our data should prove interesting for the future."

We are now in a position to update our data. Below Table 1 provides the full set of collisions and incidents that have been documented since the fall of 2009 up to mid-August, 2016.

The results to date do not appear to be as conclusive with respect to the expected reduction in collisions/incidents two years previous. However, we have also made the informal observation that there is an apparent increase in the traffic volume on this road, particularly during rush hour periods. Without this specific information we are unable to explore this relationship more fully.

Table 1: Collisions & Incidents At S-Curve of Clarke Road

Year	Number of documented Collisions & Incidents
2009 (from fall)	9
2010	15
2011	21
2012	11
2013	10
2014	4
2015	9
2016 (Up to mid-August)	5
Total All Years =	**84**

Despite the number of collisions we have also made an informal observation that there may be less incidents of yawing as would be the case if electronic stability control (ESC) was having an effect on the types of collisions. It may be recalled that ESC is designed to prevent yaw (rotation about the vertical axis) thus causing vehicles to point in the direction that they are travelling. Even though a vehicle may egress from the road surface it would be expected that we should see the characteristic evidence of the path of just two tire marks travelling in a straight line versus the curved marks of four tires that would evidence of vehicle yaw. This is informally apparent in some of the incidents.

As an example, in May of 2015, a southbound vehicle travelling extremely quickly exited the east side of the road just south of the north portion the S-Curve. Figure 6 shows the view of the tire marks as the vehicle approaches the camera. One can see that the tire marks are straight and parallel and not curved. These are characteristics of a vehicle that is plowing straight ahead without yaw. This is what would be expected if ESC was in effect. Thus although the egress from the road was not prevented, at least the vehicle was pointing in the direction it was travelling.

Figure 7 is a view looking the opposite way (southward) where the speeding vehicle just grazed by a utility pole (see Figure 8) and then struck an earth embankment in the distant background. The tire marks become very faint and became invisible to the investigator.

Figure 6: View of non-yawing vehicle that left the S-Curve in May of 2015.

Figure 7: View of tire marks of the non-yawing vehicle that become "invisible" as the vehicle passes by a utility pole in the background.

Figure 8: View of some minor disturbances in the grass as the speeding vehicle just grazes past the utility pole and then strikes an earth embankment in the background.

Similarly, in October of 2015, another southbound vehicle travelled almost the same path as the one in May. Figure 9 shows its tire marks that are very well defined as the grass has been torn by likely hard braking. Interestingly, one can observe in Figure 10 that, as the vehicle was exiting the roadway there is evidence of some yawing but then the vehicle straightens out. This is a classic indication that ESC could be in effect.

Figure 11 shows that the vehicle comes to rest in the grass just before the parked vehicle shown in the background. Thus the vehicle in October did not travel anywhere near as far as the one from May.

Thus there is some support to the possibility that ESC may be having an effect on the types of loss-of-control collisions occurring on this S-curve of Clarke Road.

The argument remains however, as to the benefit of ESC in individual collisions. As we pointed out in the classic and tragic death of Princess Diana in the Alma tunnel in Paris, France, straightening out of a loss-of-control vehicle is not always beneficial. In the Princess Diana case, straightening out of the vehicle possibly caused the impact of the tunnel pillar closer to the centre-of-gravity of the Mercedes and this caused a higher severity impact. Had the Mercedes not straightened out in this specific instance, there could have been several, less-severe collisions that could have made the difference in the survival of the occupants. Thus perhaps in the future a "smart" ESC might be able to "think" about how it is activated and maybe come even more life-saving than it is.

Figure 9: Tire marks from October, 2015, from a southbound vehicle that shows no evidence of yaw as it travels toward the camera.

Figure 10: View of a slight separation in the travel paths of the tire marks indicating that there is a slight amount of yawing before the vehicle straightens out.

Figure 11: View of the tire marks from the incident in October where the vehicle came to rest just before reaching the location of the parked car. The vehicle in the May incident travelled well past this location as it struck the earth embankment shown in the background of this photo.

A hypothetical possibility is whether utility poles and trees could have markers placed on their stems so that radar/lidar/video could detect their presence and then the "brains" of a module could evaluate how to adjust the path and rotation of the vehicle to evade the narrow object. Information on the markers could provide specifics of its structure such as whether it is a breakaway lamp standard. One must observe that actual prevention of an impact may not be necessary. If the vehicle's path and rotation can be altered such that the impact is not to the greenhouse area of the occupant seats then that is all that may be required to prevent a fatality or serious injury.