Tire Marks from Reversing on a Loose-Gravel Shoulder

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Why should we care about the details of seemingly rare evidence? As investigators and reconstructionists of motor vehicle accidents we look at rare and unusual evidence because motor vehicle collisions are unique and, sooner or later, one will need to depend on that knowledge to uncover how a collision occurred.

Such is the reasoning for our preparation of this article that deals specifically with the characteristics of tire marks produced on a gravel shoulder by a vehicle that, veered off the roadway, began to back-up along a gravel shoulder, stopped, re-entered the roadway and continued on its journey.

Figure 1 shows an overall view of the tire marks produced by this vehicle as it passed through the S-curve on Clarke Road, in north-eastern London, Ontario, Canada, shortly before August 8, 2014.

Figure 1: View, looking southbound along the S-curve of Clarke Road, north of Fanshawe Park Road in London, Ontario. Tire marks on the east shoulder indicate a reversing motion of a vehicle on the loose gravel.

This is the same location where, only a few days previous, we reported on another set of tire marks on this shoulder, where a northbound vehicle rotated out of control and came to rest on the opposite (west) shoulder. The discussion of those tire marks is found in the article "Review of Loss-of-Control Tire Marks on a Gravel Shoulder" which was posted onto the Gorski Consulting website on August 5, 2014. In fact, if one were to look closely into the gravel shoulder of Figure 1 one might still be able to detect the curving yaw mark from that previous episode.

If the reader has examined our previous articles discussing the re-grading of this shoulder then it should also be possible to detect the straight and broad tire mark of the right wheels of the northbound road grader that passed by the site on July 31, 2014, or approximately one week before these photos were taken. It is because the road grader loosened up the gravel that made the various tire marks so visible.

Looking at the meandering tire marks one might judge that there was something peculiar taking place and that it might be difficult to uncover the vehicle's motions. However that is not the case. One merely needs to look at the north (closer) end of the tire marks to detect that they seem to "end" as if the vehicle has just lifted off the planet, and this is a telltale sign that the vehicle has stopped and begun to move backwards, generally along the same path as where it entered the shoulder.

Figure 2 shows a closer view of the north end of the tire marks and we can clearly see the loose gravel in the vicinity and therefore the characteristics of the tire marks are well-defined.

Figure 2: Closer view of the north end of the tire marks that indicate the vehicle has stopped and begun to reverse backwards along the shoulder.

Again we see the broad and straight tire mark of the road grader. We also might begin to appreciate the wavy character of the reversing tire marks as the driver adjusts his/her steering input at low speed. Such adjustments are not typical of a vehicle travelling forward to a stopped position so, again, it confirms that the vehicle is reversing.

In Figure 3 we change our viewing direction to look south at that north end of the tire marks. We point out that the characteristics of the tire marks are not as clearly visible from this direction because of the position of the sun which is somewhat behind the camera. It is often the case that the visibility of tire marks and other roadway evidence is often dictated by the observer's position with respect to the sun and that, in many instances, an investigator should return to an accident site at dawn or dusk if those observations were being made in mid-day. Similarly, if the investigation was being conducted in sunny conditions then the investigator should return to the site on the earliest cloudy day. These changes in the sun's position and cloud cover will often expose additional evidence that was masked by the bright sun.

Figure 3: View, looking north, along the north end of the tire marks. The marks are not as easily visible from this viewing direction.

Figure 4 returns us to a southward view along the north end of the west tire mark that was caused by the left side tires of the vehicle. We can see the meandering character of the mark. We can also see the imprint of the tread of the tire. If we look more closely we might also be able to detect the edges of the tire mark and note that the reversing tire mark overlaps the mark that was made when the vehicle was travelling forward and exiting the road surface. Figure 5 shows the tire mark caused by the right side tires.

Figure 4: Southward view of tire mark caused by the left side tires of the vehicle.

Figure 5: Southward view showing the tire mark caused by the right side tires of the vehicle.

Figure 6: Southward view of right-side tire mark showing the area where the right tire came to a halt before reversing.

Figure 6 shows a southward view of the right-side tire mark near the point where the right rear tire came to a stop before the vehicle began to reverse its motion. Figure 7 shows a view further southward along that tire mark.

Figure 7: View of right tire mark as the vehicle reverses.

In Figure 7 it should be possible to detect four tire marks side-by-side. First it should be possible to detect the two tire marks of the vehicle as it exits from the road surface and travels toward the camera, then one should be able to detect the two tire marks as the vehicle reverses and erases the original marks as it moves away from the camera. In the process of reversing the vehicle follows a similar path to its motion when it exited the road. So, while reversing, the left side tires of the vehicle actually re-enter onto the pavement for a short distance before returning back onto the shoulder in the distant background. The various tire marks may be differentiated further in Figure 8.

Figure 8: Southward view of tire marks caused by the right tires of the vehicle.

As we progress further southward Figure 9 shows the tire marks of the right side tires of the vehicle in the foreground while the left side tires are travelling on the pavement. In the distance it may be possible to detect where the left side tires return to the shoulder as the vehicle continues its reversing motion.

Figure 9: Southward view showing the right side tire marks of the reversing vehicle.

As the vehicle continues its reversing motion Figure 10 shows how the left side tires return to the gravel shoulder. The vehicle then moves so far away from the pavement that the right side tires travel onto the grass roadside in the background.

Figure 10: Location where left side tires return to the gravel shoulder.

The driver then makes a correction in the vehicle's path from continuing into the grass as evidenced by the front tires following a different path than the rear tires, as shown in Figure 11.

Figure 11: The driver makes a steering correction as evidenced by the separation in the travel path between the front and rear tires.

After this correction the vehicle continues reversing with the right side tires travelling on the grass while the left side tires travel roughly in the middle of the shoulder, as shown in Figure 12.

Figure 12: View of left side tires travelling in the middle of the shoulder while the right side tires are travelling in the grass roadside as the vehicle continues reversing.

After reversing for a further, short distance the vehicle comes to a halt and then accelerates forward, toward the camera, and onto the pavement for the final time, as shown in Figure 13.

Figure 13: The tire marks terminate in the background where the vehicle stops its reversing and then accelerates forward toward the camera and back onto the road.

The location where the vehicle stops its reversing and accelerates forward is more visible in Figure 14 although the presence of the older tire mark from the road grader might complicate that visualization.

Figure 14: View of location where the vehicle stops its reversing motion and accelerates forward toward the camera.

In summary, this review of the tire marks of a reversing vehicle should provide investigators with a visual specimen of what tire marks should look like during this type of motion. Anything is possible however, it is unlikely that a vehicle travelling forward

would produce the type of change-in-direction of its path as often as when it is reversing. This is just another telltale sign of the travel direction of the vehicle.

One might stop to ponder about what the driver in this scenario was attempting to achieve. This portion of the S-curve on Clarke Road is notorious for northbound vehicles travelling off the pavement and onto the east shoulder. So, in normal circumstances, the driver would be conducting a dangerous action by reversing here, and, temporarily, actually re-entering a part of the northbound lane. If for no other reason it is another reason why this set of tire marks is worthy of this close scrutiny.

In general, one must recognize that tire marks left by a collision-involved vehicle are not the only ones that investigators need to study. When an investigator arrives at the site of an accident on a rural highway there are often numerous tire marks on the shoulders. Even when the investigator is a police officer who is the first official to arrive at such a site. Many of these tire marks will be related to the tires of other vehicles that have stopped in order to provide assistance. However, some of these tire marks may be related to an important mystery vehicle that could have been the cause of the accident. Even if the investigator is the police Accident Reconstructionist who arrives at the site several hours later, or if that investigator is a reconstruction expert who examines the site hours later, there is great importance in being able to decipher the meaning of tire marks independent of what the investigator is told. Thus well-meaning "witnesses" may have their story, but that story may not be accurate. Even first-responding police officers may not have the full understanding when they relate their information to the Reconstructionist who arrives at a site several hours afterward. Those that must examine the site hours or days later must be able to differentiate between all the many sources of tire marks caused by emergency personnel and others who come upon the scene. This deciphering must come from a scientific basis that does not always come from a formal education. In fact, many scouts and trackers of the old days were extremely accurate in their ability to track the evidence left by animals that they were hunting, or in detecting the actions of humans for various reasons.

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