Incomplete Road Repairs - Part I - Site Descriptions

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The severe winter of 2013-14 in Southern Ontario took a toll on most roads. When emergency situations arose municipalities made temporary repairs while waiting for warmer weather to complete their work. This presented a problem because, during this delay, the temporary patches were sunk, often compressed by traffic, such that depressions developed. While much public discussion during this winter was with respect to pot-holes that were created by nature, depressions within incomplete road repairs were an equally important safety issue in some jurisdictions.

As a result of this lack of awareness Gorski Consulting set out to examine the issue through further research. A brief survey of incomplete road repairs was made in east London, Ontario.

The present article will provide a pictorial summary of the characteristics of each site. In a second article we will present the results of tests where we documented the effect that each site had on the motion of a test vehicle.

1. Southbound Curb Lane of Clarke Road South of Oxford Street, London, Ontario

Work was initially commenced in the southbound curb lane of Clarke Road, south of Oxford Street, on January 7, 2014. A patch was added to the asphalt surface in that southbound curb lane. This patch became depressed, likely due to the weight of the continual road traffic. However, shortly after the road work was completed there was no warning of the presence of this depression except for a couple of large traffic cones that were placed on the nearby curb.

Figures 1, 2 and 3 are frames from video taken on January 12, 2014 showing a black southbound vehicle as it crosses over the depression. The extent of the effect on the vehicle's travel can be detected by comparing the height of the bottom of the front bumper in relation to the road surface. In Figure 1 we can see the normal height as the vehicle approaches the depression. Figure 2 shows how the vehicle collapses down into the depression so that the height between the bottom of the front bumper and the road surface is minimal. Figure 3 shows how the vehicle is then propelled upward as it leaves the depression and the bottom of the vehicle's front bumper is much higher compared to the road beneath it.

Figures 4 through 7 provide a chronology of the site's changes.



Figure 1: Southbound vehicle approaching the depression on January 12, 2014.



Figure 2: Front suspension of southbound vehicle being compressed just before reaching the back wall of the depression.



Figure 3: View of southbound vehicle being propelled into the air as it leaves the depressed area on January 12, 2014



Figure 4: Video frame showing southward view of depression after it was filled in on January 13, 2014



Figure 5: Southward view of depression on January 22, 2014, showing evidence of additional patching.



Figure 6: Southward view of depression on March 25, 2014, showing evidence of further patching.



Figure 7: Southward view of depression on April 17, 2014.

2. Curve of Wavell (Brydges Street) At Spruce Street, London, Ontario

Road construction was commenced on Wavell Street (Brydges Street) at the intersection with Spruce Street on approximately August 7, 2013. Figures 8, 9 and 10 show the conditions on Wavell, looking westward, on August 7th. It can be seen that a channel of uneven road surface was produced at the curve of Wavell at the location where it intersected with Spruce Street. After the channel was created there was no signage erected to warn drivers of the new surface conditions. This situation existed for almost six months until January 27, 2014 when "Bump" warning signs were erected on each side of the depression, as shown in Figure 11.

Figure 12 shows the unevenness of the patched area from a westward view taken on January 27, 2014.



Figure 8: View looking westward along Wavell toward the intersection with Spruce Street shortly after road work was commenced on August 7, 2013.



Figure 9: Although a number of construction barrels are seen along the roadside, there is nothing present to warn drivers that the uneven section of road surface exists at the curve ahead.



Figure 10: View, looking west, showing the newly-created channel of uneven road surface at the curve of Wavell.



Figure 11: View of site on January 27, 2014 when orange "Bump" signs were erected to warn drivers of the uneven road surface conditions.



Figure 12: View, looking west, at the large patch of uneven and depressed road surface on Wavell Street at its curve with Spruce Street in London, Ontario. This photo was taken on January 27, 2014.

3. Park Avenue, London, Ontario

Little is unknown about the commencement of work at this site. The patch and its depression was observed on April 16, 2014. Due to the low volume of traffic on this local road it was possible to take a closer look at its features and the evidence around it.

Figures 13 and 14 are eastward views of the patch taken on April 16, 2014. The patch consumed most of the road width. A closer look reveals several layers of asphalt had been applied indicating that, as the patch became depressed, the road maintenance personnel applied additional material to level the surface.

Figures 15, 16 and 17 are westward views of the patch. The close-up view shown in Figure 17 shows that there have been numerous incidents where the underside of passing vehicles made contact with the patch in the vicinity of the man-hole cover. Although there are a couple of traffic cones on the roadside the required "Bump" sign is non-existent.

It is important to recognize, particularly from the views shown in Figures 16 and 17, that the evidence of numerous impacts of the pavement occurred on top of the latest patching. In other words, all these markings that we see occurred after the last patching was performed so this should raise some concern.



Figure 13: View, looking east, along Park Avenue in London, Ontario on April 16, 2014.



Figure 14: Closer view of patch showing the presence of several layers of patching by roadway maintenance personnel.



Figure 15: View, looking west, showing the patch on Park Avenue.



Figure 16: View, looking west, at a number of markings in the pavement near the man-hole indicating that the underside of passing vehicle made contact with the surface.



Figure 17: Close-up view of the evidence of vehicle contact with the pavement.

4. Vancouver Street at Whitney Street, London, Ontario

On February 12, 2014 work was commenced on Vancouver Street at the intersection of Whitney Street. Proper signage was installed on Vancouver Street to close the road one block south of the construction as shown in Figures 18 and 19. However, when the road repairs were completed a road closure barricade remained, but in an unusual arrangement.

For example, Figure 20 shows a southward view on February 19, 2014 looking toward the area of the previous construction and the road closure barricade is placed in the northbound lane. As we come closer to the area we can see, in Figure 21, that the road closure sign only points toward southbound traffic and there is no sign for northbound traffic. This suggests to southbound drivers that the road is closed while no instruction what-so-ever is provided to northbound drivers. Drivers simply ignored the apparent road closure and drove around it using the southbound lane. We will soon discover that the additional volume of traffic onto the patch in the southbound lane likely compressed the patch much more than in the northbound lane. Of course the depth of this depression cannot be detected because of the snow covering the road surface.



Figure 18: View, looking north on Vancouver Street on February 12, 2014 when emergency road repairs were commenced.



Figure 19: View, looking north from the road closure barricade showing the work being carried out one block to the north.



Figure 20: View, looking south, along Vancouver Street, showing a road closure barricade at the intersection with Whitney Street on February 19, 2014..



Figure 21: View showing that the road closure sign is only visible for southbound traffic. Driving travelling northward were given no instruction as to the presence of a deep depression that existed near the road closure barricade.

As the weather conditions became milder and some of the snow melted it was possible to see characteristics of the patch that had been placed on the excavation. For example, Figures 22 through 25 show views looking north on February 21, 2014. These figures show that there was additional road work being conducted north of the patched area. Although signage was erected to warn drivers of that additional work, there was no signage placed at the location of the depressed patch.

Figures 26 through 28 are photos taken on February 26, 2014. Figure 26 shows the same "Construction Ahead" sign that was visible in Figure 22. However, as we look further into Figures 27 and 28 we see that there is no longer any construction activity at the site.

The depressed patch is visible in the foreground of Frame 28 however there are no warning signs or traffic cones in the area to identify its location. Furthermore, the presence of snow on the road surface further masks the depressed area's existence.



Figure 22: View, looking north on Vancouver Street, showing a "Construction Ahead" sign erected several blocks south of the depressed patch. This sign is not related to the patch but to active construction north of the patch.



Figure 23: View, looking north along Vancouver Street, from just south of the intersection with Whitney Street, showing construction vehicles north of the intersection but no signage exists to identify the depressed patch.



Figure 24: View, looking north along Vancouver Street from just south of the intersection with Whitney Street. The depressed patch can be seen on the north side of the intersection while construction vehicles can be seen in the background.



Figure 25: View, looking north on Vancouver Street at the intersection with Whitney Street. The conditions of the fresh patch can be seen in the foreground while road work vehicles and signs exist in the background with respect to other, unrelated work north of the site.



Figure 26: View, looking northward along Vancouver Street on February 26, 2014, showing the "Construction Ahead" sign but no construction activity.



Figure 27: View looking north on Vancouver Street on approach to the intersection with Whitney Street, showing no evidence of a "Bump" sign nor any evidence of any construction activity.



Figure 28: View, looking north on Vancouver Street, showing the depressed patch in the foreground and no evidence of signage or traffic cones to identify its location.

The masking of the depressed patch of pavement is further exemplified in photos taken on March 12, 2014, as shown in Figure 29. Vancouver Street is a low volume road that receives minimal snow removal and this figure shows that when a snowfall occurs it remains on the road surface and is rarely plowed. The snow sometimes becomes compacted onto the surface causing a greater unevenness of the surface. But it also causes the depressed patch to become less visible.



Figure 29: View, looking north on Vancouver Street on March 12, 2014. There is no signage erected to identify the depressed patch, although a couple of cones have been erected on the roadside. The snowfall helps to mask the existence of the depressed patch.

Description of Specific Incident

Although Gorski Consulting was planning to document the effects of isolated road depressions like these, it was a specific incident publicized on the local television news program (CTV News London) that sped up the timing of this research.

The CTV News segment was entitled "Londoner Considers Going to Small Claims Court over Pothole Damage" and aired on April 14, 2014. It described an incident on March 16, 2014, wherein a female driver, Heather Cormier, was driving her 1999 Chrysler Intrepid southbound on Vancouver Street, at the intersection with Whitney Street, when the underside of her vehicle collided with the pavement at the noted "pothole" . The impact caused so much damage that the vehicle was determined to be a an insurance write-off.

The CTV News item indicated that Cormier had just spent \$500 on suspension repairs and that, although she spent \$3000 on repairs to her vehicle in the previous year, her insurance company only gave her \$1900 in the write-off. Cormier believed the City of London should have paid her \$500 deductible however the City refused to accept that claim.

The CTV News article also made the following observation while attending the site:

"There are signs warning of the road condition. Even with those sign, CTV News spotted three drivers Monday, in half an hour span, scrape the front of their vehicles. Some were going too fast.

Cormier says she wasn't speeding and there were no signs up when she travelled the road in March."

Coincidentally, Gorski Consulting had taken photos of the site two days before Ms. Cormier's impact, on Friday, March 14th, and this confirmed that there were no warning signs erected at the site. We also took photos the day after the incident, on the morning of Monday, March 17th, and these are shown in Figures 30 and 31. These figures show that "Bump" warning signs were installed at the depression.



Figure 30: View, looking north along Vancouver Street on Monday, March 17, 2014, showing the presence of newly erected "Bump" warning signs.



Figure 31: Northward view along Vancouver Street on March 17th, 2014, showing the newly erected "Bump" warning signs.

The extent of the problem became obvious when Gorski Consulting conducted a detailed examination of the depression on April 16, 2014.

Figure 32 shows an overall view of the depressed area on April 16, 2014. Figure 33 shows the same location looking southward. Figure 34 is a view looking west, and Figure 35 is looking east.

The evidence indicated that numerous vehicles had impacted the pavement at this depression. Primarily, southbound vehicles collided with the south edge of the depression. Figure 36 is a view looking south looking toward the south lip of the depression where the majority of the evidence was located. Figures 37 and 38 provide close-up views of the evidence of contact with the pavement.

In fact, when we returned to the site on April 21, 2014 there were even more markings in the pavement indicating that this was not just a rare occurrence. Figures 39 and 40 show the evidence on April 21, 2014. Yet there was no evidence that any additional maintenance action had been made to fill the deep depression. Some observers made the comment that a "bump" sign was erected and therefore the City of London was not obligated to any further action.



Figure 32: View, looking north along Vancouver Street from just south of the road surface depression.



Figure 33: View, looking south along Vancouver Street on April 16, 2014.



Figure 34: View of depression looking west.



Figure 35: View of depression looking east.



Figure 36: View, looking south, toward the south lip of the depression where most of the evidence contact was located.



Figure 37: Close-up view of evidence of vehicle contact on the south lip of the depression.



Figure 38: Close-up view of the evidence of vehicle contact on the south lip of the depression.



Figure 39: View of evidence of vehicle contact on April 21, 2014.



Figure 40: View of evidence of vehicle contact on April 21, 2014.

These facts raise some important questions. When vehicles make contact with the pavement in depressions like these comments like those of CTV News are made that the vehicles were going too fast for the road condition. It becomes impossible to argue otherwise since clearly, if a driver had been travelling slow enough then the contact would not occur. However it is not clear what the phrase "too fast for the road conditions" really means.

If the normal speed of traffic though the site is 50 km/h does "too fast" mean that a reduction is speed to 40 km/h is needed? Or 30 km/h? or even 20 km/h? It implies that the erection of a "Bump" ahead sign provides some specific guidance about the appropriate speed reduction, however we do not believe that is the case. Furthermore when no warning signs are installed and when depressions become difficult to detect before it is too late, it becomes nonsense to blame a driver for travelling at a speed "too fast for the road conditions" if that speed is within the allowed limit and is reasonable given the information available to the driver.

The Province of Ontario has enacted laws (Minimum Maintenance Standards of the Municipal Act) that protect Municipalities from claims even when poor road conditions were the primary cause of a collision. In our opinion the reasonableness of these standards is questionable as, in many instances, they make average and innocent drivers "guilty" for collisions that are clearly not their fault.

It has been our observation that there is no guidance provided to a driver who approaches a road depression, about what speed should be suitable to pass through the depression without consequence. In many instances there is often no indication that significant depression exists. Even when a "Bump" warning sign is erected there is little information to differentiate between a relatively mild depression and one that could cause major damage to a passing vehicle.

To elaborate on this point we conducted some testing with our test vehicle and our smart phone which was set to record the motions and accelerations experienced by our test vehicle. Using a predetermined speed of 30 km/h we drove over each of the four sites mentioned above. The test was repeated 3 times at each site. The results of that testing will be discussed in our second article entitled "Incomplete Road Repairs - Part II - Test Results".

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