

ELECTRONOTES

WEBNOTE 20

11/25/2014

ENWN-20

Continuing the Casebook of Troubleshooting

Have you ever heard:

“We Apologize For Any Inconvenience This May Have Caused”

Of course you have. This one-size-fits-all apology always seems to set poorly. I live on a road that is in the process of being “rehabilitated”, and has been for 5 years or more. Associated with this there have been both scheduled and unscheduled utility interruptions (as well as road/driveway access problems). Some of the unscheduled interruptions were up and down the road. The bothersome ones are the ones that affect only your property. What a comfort it is when the power goes off to look out the window at a neighborhood of dark houses. How disconcerting when it is only you!

Previously in August of 2013 we had such a personal outage of electric power and it was reported in Webnote 12 as an interesting item in troubleshooting logic [1].

<http://electronotes.netfirms.com/ENWN12.pdf>

In fact, there had previous to August 2013 been two personal outages of natural gas due to construction equipment, but the construction workers knew immediately what they did and initiated repairs. Subsequent to August 2013, there have been two additional outages, one of the telephone/internet, and another or electric power. Unlike the gas, these were not apparent to the workers, and discovered by ourselves. The power line outages can be particularly disconcerting as they can be (both were) delayed from the time of actual digging operations. The cables are strong, so a digging operation may only nick off insulation. This means that inside the house, things look fine while down in the (now refilled) holes, electricity, water, and road salt are gradually etching out a breach.

On Oct. 31, 2014 (Halloween!), our power went out about 9 AM. That is, one phase went out. It was the same phase that went out in August of 2013. So there you have it – the previous repair failed. Our experience with troubleshooting tells us this. Same symptoms, and even the same phase (doubling the odds approximately). I thought so. But it wasn't the case. I was wrong. Logically following up on what I had written in Webnote-12, I should have been right. But I also said there (and previously [2,3]) that there is usually additional evidence. So back up a bit.

THE PHONE LINE FAILURE

On October 3, 2014, another day that I have good reason to remember, my phone and internet DSL went out. I knew exactly why. In Webnote-12 I mentioned the “relocation” of a power pole (associated with widening the road) that caused the first power failure. Coming down the same pole is my telephone line, and for ever since the pole was moved, the phone line was on top of the ground for the first 20 feet or so, lying in front of my neighbor's picket fence (that way for a year or so). Disconcerting, but at least it is right where one can see it.

My neighbor's picket fence was to be moved, so in late September (or so) the contractor took it down, added about 8-10 inches of gravel in a slope. This made my phone line disappear. I assumed they just dumped gravel over it, and that was right. So it was time to put the fence back up, and they drilled new post holes and set new posts.

Here in our area they have what is called DSNY which I believe is for Dig-Safe-New-York which is some sort of system for locating what is under the ground before digging occurs. It does not seem to work very well. Lot of stuff down there: electric wires, telephone/ internet stuff, gas lines, water mains, storm and sanitary sewers. Once things are presumably marked, the surface is often redone and it's all lost. Prior to their digging the fence post holes, I saw a “stake-out” for the phone company marking the wire coming down the pole. The line did not seem to be marked very well. So when the fence company arrived on Oct. 3, I told them where the line was, and they agreed that the last three posts holes, near the wires, would be dug by hand rather than by auger. They were. In consequence, it was a manual post-hole digger that cut my phone line! The DSL line went out and I immediately knew what had happened.

Getting a hold of the phone company repair is always difficult and even worse on Friday afternoon. They couldn't possibly get out before Monday. They did manage to verify that the line was open. So I caught the fence guy as he was about to leave and got him to help me dig around the posts. He was helpful in getting the ends loose. So I get

back on the cell phone and tell the phone company that I have found the severed line and just need someone to come by and splice it. Monday! Now, this was a day and a coming weekend where I really, REALLY needed the phone and the internet. So I asked the lady if it was okay if I spliced it myself. I had thought that might get a repairman dispatched. She said "Well – if you feel up to it."



12 conductor cable cut by contractor



Photo 1 (top)
and Photo 2 (bottom)

So what did I get myself into? Not as easy as I might have supposed. The cable was 12 conductor, and not color-coded in the same way my inside wiring was (yellow and black). The cable was copper sheathed, making it hard to peel back. It was only a foot deep, but that's still having to work in an uncomfortable position bending over. The inside

wires seemed to be greased with silicone. It was a struggle separating out an inch or so of the wires, and then I would need to find the two hot leads I needed. I had my voltmeter so would look for the 50 volts. As I stripped back the wires with a diagonal cutter, I discovered a wonderful short-cut. I knew you can get a very mild shock from the phone line 50 volts if you touched the right pair. I've done that inside the house. I should have guessed that one of the pair was a ground. Thus you can get the tingle from the hot lead if your knees are in the damp dirt. ORANGE! Nearby was White-Striped-Orange and that was the mate (or at least a ground). This made the situation easier at the other end of the cut. A pair of clip leads then came to the rescue. (I had brought out a black and yellow pair.) The voltmeter showed the 50 volts, and going back inside, to my amazement, the Internet light of the modem was on. Success. Photo 1 above shows the repair in the trench, and Photo 2 shows the severed section of the line – manual post hold diggers have two blades so took out a section. Got me through the weekend, and was officially repaired Monday, Oct. 6.

This is NOT an interesting trouble-shooting story. They were fairly likely to carelessly cut the line. They cut it exactly when and where one would have guessed. The significance is that this phone failure became evidence for the power failure of October 31. Evidence I initially did not appreciate.

THE POWER GOES OUT

Indeed it was about 9 AM that we found half our circuits were out. I went out immediately looking for smoke coming up around the pole where it had previously breached. No smoke. None the less, particularly as this was the same phase as the August 2013 break, I thought only of the splice down there as having failed.

The power company (NYSE&G) arrived early afternoon and dug up the splice, and it looked fine. They expressed the opinion that the break was in my wires, and that was my responsibility. None the less, they went well out of their way to help. After understandably running off to restore power to a fire station, they returned and did two things. They disconnected the bad line at the pole and at the meter so they could put a signal on it. Doing this they estimated the break as being near the corner fence post (see Photo 3 and orange paint). (I think they helped in part because at least one of them remembered the August 2013 incident where I had insisted I was right and I was.) This was a relief because it meant that I was very likely going to be able to blame the fence company again. It did appear, in fact, that the corner post had been moved out and away (perhaps only 4 inches) from where it tangled with the phone.



Photo 3

The second thing they did was both considerate and clever (although probably routine): They got my second phase working. They did this by leaving the busted line disconnected on both ends, but moved the good wire that had been the neutral as the second hot phase. Then they ran a replacement neutral (a copper conductor) through the trees and on the ground to the meter. Now, except for possibly tripping on the extra wire, we had full power and someone to blame for the problem.

On Nov. 4 I decided it was just not my responsibility to get a private electrical contractor, and demanded that the road contractor/fence company do that. Eventually (Nov. 13) they did, and a very good contractor (Pleasant Valley Electric) dug around the corner fence post and located the breach directly under the post (see Photo 4 on page 6).

It is curious as to exactly how the wire was nicked. As dug up, the situation was not exactly as in the photo, as the very bottom of the post was encased in concrete, and this was in very close proximity (touching?) the insulation. Clearly this could have nicked the wire as the post settled. It is not clear when the concrete was put in, as the post was out of the ground during the telephone repair. It is also possible that the wire was nicked during the original digging at the same time the phone wire was cut, but the erosion was delayed (indeed about a month). As noted it is also possible that, so as to avoid the phone line, they moved the post away from the line and hit the power then.

In any event, the private electrical contractor (coordinating with the power company) repaired the break on Nov. 18. In fact, he spliced loop in all three wires because he thought another was possibly nicked, and presumably to get all three further away from the post.

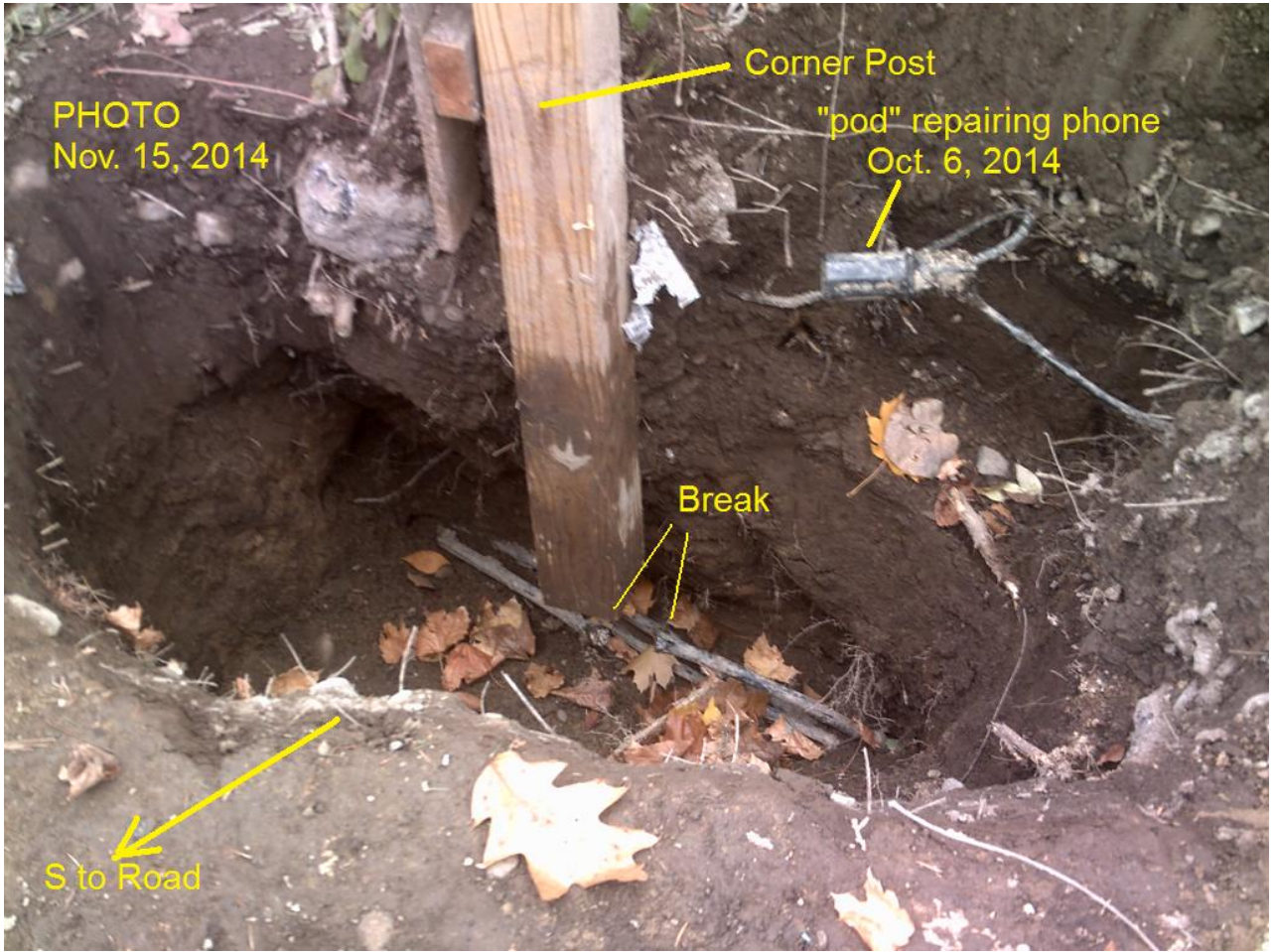


Photo 4



Photo 4 (close up of breach)

A VERY TOUGH CALL

The theme of our somewhat informal “casebook of troubleshooting” is one that suggests a refuge in logical thought, of considering all evidence, and a high regard for issues that are in close proximity of time and place which are nonetheless not obviously related. Most often this is a retrospective view. We should have known! At least we could have made a better assessment. It is almost Bayesian in insisting on the inclusion of additional evidence for making inferences.

In most of the cases we have considered, [1,2], it was the case that we neglected to suppose that something was important, or in fact, just not really noticed it. Once the full scenario was reconstructed and explained, it was more or less obvious.

In the case described here, was it the failure of a previous splice, or a new destruction? Neither was the stronger candidate. Two things, neither there, would have made the suspicion shift to the second view. First, if it had not been the same phase, failure of the original splice could have been virtually ruled out. Secondly, if the failure had been associated more closely in time (like hours at most) with the digging, we would have strongly suspected the digging.

The usual “missing evidence” (the strange connection) that we have found was in previous cases clearly the severed phone line. Possibly this should have been more strongly considered. The determining factor was the power company’s probe that, very close to the fence post, was arrow-forward and arrow-backward by moving it an inch. I will have to learn how that works.

REFERENCES:

[1] “Another One for the Casebook of Trouble Shooting”, Electronotes Webnote 12, NEWN-12, 8/7/2013
<http://electronotes.netfirms.com/ENWN12.pdf>

[2] “Troubleshooting – Always a Connection?”, *Electronotes*, Vol. 21, No. 200, Dec. 2001
<http://electronotes.netfirms.com/EN200.pdf>

[3] “Trouble Shooting” (1, 2, 3, and 4), Electronotes Application Notes 131,132,133, and 134, May 4, 11, 18, and 25, 1979