DEEDS

A Substantial Amount of Work

In our January/February *Deeds* column, we described a fairly typical suburban growth pattern from the perspective of buried utility lines along a single boulevard. Next, our March column investigated three utility damages along the boulevard which occurred nearly forty years after the roadway was built. Now, our last column featuring the *Underground Focus* three-question damage report will look at the last two hits along the boulevard, both damages to fiber optic cables.

When the cell tower was built in 2001, most cell towers connected to their carriers' aggregation point via copper cables. But this tower was fed by fiber that traveled to its source along high voltage electric transmission towers. In order to reach the electric transmission system the fiber was installed in an underground conduit running along the boulevard. The fiber was a dielectric meaning that there was no metallic content in the cable. The conduit route was made locatable by the use of a tracer wire installed with the conduit. In order to be accessible by one-call personnel, the tracer wire was brought to the surface at marker posts situated along the route. The tracer wire was actually a series of wires. A wire began at one marker post and ended at another marker post. At each marker post, the two ends were stripped of insulation and twisted together (see photo #1).

The replacement of the copper phone system with an all-new fiber system in 2008 created new challenges for locators entrusted to protect the new cables from excavation damage in 2010. The fiber drop cables were manufactured with a 24-gauge tracer wire inside the cable (see photo #2). The feeder cables were dielectric cables placed inside conduits manufactured either with aluminum sheaths (see photo #3) or with 22-gauge tracer wire embedded in the wall of the conduit (see photo #4). Due to a lack of far-end grounding as well as a lack of metallic continuity, those who performed one-calls for the phone company were in for a rude awakening.

On April 29, 2010, the fiber feed to the cell tower was severed by a backhoe digging a trench for a new drain tile. And later that afternoon, the same backhoe operator dug up a telephone company fiber feeder line serving businesses and residents along the boulevard. In both situations, the backhoe operator was digging five feet away from the nearest orange paint and flags.

What are the answers to the three-question damage report for these two accidents?

1) Could the line have been located accurately from the surface?
2) If yes, why was the line damaged?
3) If no, what can be done to keep this line from being hit again?

Well for question #1, the answer for both damages is "maybe." Both lines were marked by technicians that thought they were marking the proper fiber locations. A maybe answer to question #1 forces us to answer both questions #2 and #3.

Why were these fiber lines damaged? These fiber cables were damaged by an incomplete understanding of the ***path of least resistance*** by both the locating technician and the designer of the fiber system. A top-tier locate technician may have located both lines perfectly but with a substantial amount of work. A better designed tracing system may have allowed an average locate technician to locate the lines accurately. Tracing system design must take into account what will occur when a generated signal is placed onto the system. Metallic continuity and grounding dictate where that generated signal travels.

What about question #3? What can be done to keep these lines from being hit again? Better trained locate technicians? Sure, that would certainly help. Another answer is to retrofit existing tracing systems to enhance tracing ability. No doubt, that certainly involves a substantial amount of work. The only other option for helping avoid damage to existing lines is obtaining x-, y-, and z-coordinates of each line that is damaged or otherwise exposed and maintaining that location information in a single repository accessible by both locators and excavators. That would require an immense amount of work.

But as mentioned in an earlier column, continued use of the Underground Focus damage report is aimed at identifying long-range solutions not simple restitution for damages. All of the answers are going to require a substantial amount of work. But if all we wanted from a damage report is to determine financial responsibility, we wouldn't be in damage prevention, would we? Would we? UF


PHOTO 1


PHOTO 2


PHOTO 3


PHOTO 4