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Why Leave Things Up in the Air?

Best Practice Pole Inspections in the Digital Age

By Earle Jenkins

During a pole inspection RFP meeting with a client, a discussion concerning inspection methodologies revealed that the majority of telephone companies and electric utilities employ four basic "approved"[1] inspection methods and two types of remedial treatments that have existed for many years. Based on this finding, it seemed reasonable to expect that advancements in methods and technologies must have evolved over time that provide improved accuracy, effectiveness, and reduced cost.

Rather than bid on the project utilizing the old methods, our company, Alamon, decided to conduct an investigation to determine the "best in class" technologically updated methodology. (Alamon is a full-service contracting company with no affiliations or endorsement agreements with vendors.) This type of research is not unusual for Alamon. We routinely conduct "best practice" research in order to provide the best service to our customers and share with the industry.

Historical Best Practices

The initial step in the basic process of pole inspections calls for a visual inspection along with sound and prod testing of all poles. This is an institutionalized process within the telecommunications industry. Research of AT&T practices dated as far back as September 1975 detail the steps associated with this methodology. These steps are still used as current practices of most utilities.

Current OSHA standards also require this test sequence to be performed as a standard work process for technicians prior to working on any pole.[2] A lineman is required to:

"sound the pole with a hammer and probe it with a screw driver to determine if it is safe to climb. Poles or structures determined to be unsafe by test or observation may not be climbed until made safe by guying, bracing or other adequate means. Poles determined to be unsafe to climb shall, until they are made safe, be tagged in a conspicuous place to alert and warn all employees of the unsafe condition."

The second step of this process details an 8-to-10-year inspection cycle for all poles that are 20 years or older. This includes utilizing a visual above-ground and below-ground excavation inspection and treatment process. Here again, the goal of determining the serviceability of a pole is not only a long-standing industry practice but a National Electrical Safety Code (NESC) requirement to establish an inspection process that will determine if a pole is "serviceable" or a "reject".

This is an area where our "best practice" research uncovered the introduction of technology-based methodologies that were not available when AT&T practice 621-215-015 was issued in 1975.

Thankfully, we found that a number of electric utilities and major telcos have migrated to more advanced and accurate technological approaches to pole inspections.[3] We conducted field trials utilizing the most promising methods, and

Figure 1. Inspecting Below Ground Level

spent time with the vendors and companies that distribute and use these technologies to discuss their experience. The results of our research clearly indicated that one testing methodology should be added to the best practices list.

For Verizon and Embarq, the chronology of the adoption of this methodology began in 2006 following the severe hurricane season and related damage in Florida. The Florida PSC opened DOCKET NO. 060077-TL to investigate the pole inspection programs utilized by utilities. PSC-06-0 168-PAA-TL order issued in March of 2006:

"ORDERED that all wood pole inspections required herein shall be based on the sound and bore technique for all poles. The sound and bore technique shall include excavation for all Southern Pine poles and other pole types as appropriate, in accordance with the recommendations of the United States Department of Agriculture's Rural Utilities service for Florida's rural electric utilities."

Subsequently, Verizon and Embarq filed protests and requested hearings to review a revised inspection process utilizing a more sophisticated technology called a Resistograph, in place of the PSC's excavate and bore directive. The Resistograph methodology was approved by the Florida PSC in August 2006.[4] Discussions with Verizon in July 2008 confirmed that this methodology has been used since 2006 and is working well.

As our research progressed, we also connected with Qwest. With the assistance of Telcordia Technologies, Qwest was reengineering their pole inspection program similar to the Verizon program. The Resistograph unit was piloted in September 2007 and adopted for use in March 2008. It replaced the manually intensive below-ground excavation inspection and treatment process.

One additional finding was noteworthy. Although Alamon offers treatment programs, it was interesting that all of the companies we interviewed who have migrated from the manual excavation and boring process to processes utilizing technological measuring device methodologies have abandoned treatment programs. Companies voiced environmental, permitting and liability concerns; the drive to utilize a "green" methodology, questionable treatment effectiveness, and the improved accuracy of the electronic means of determining the remaining life of a pole as part of their rational.

In place of the treatment program many companies have incorporated an additional serviceability category, called *marginal*, into their inspection program. The marginal category applies to poles having sufficient good wood to support the present load, but there is a question as to whether or not the remaining wood is sufficient to carry it to the next regular re-inspection. Poles falling within this category are candidates for re-inspection prior to the next inspection cycle. Research of RUS guidelines and telco industry practices revealed that treatment is not a mandate and the monitoring process detailed for marginal poles is an acceptable approach.

After all of our investigation, we believe a Resistograph[5] device appears to be superior compared to a manual excavation and bore method from an accuracy, time, and cost perspective. The strength of our conclusions is also supported by the fact that Verizon, Qwest, and Embarq (now CenturyLink) have migrated to this approach.[6]

Resista-What?

The IML Resistograph provides an exact measurement of the current condition of the inspected utility pole without the need for excavation. The instrument is positioned at the base to measure wood decay at ground level. (See Figure 1.) The inspector then attaches the 45-degree adapter to measure and record the wood density below ground level. The small drilling needle extends as it penetrates the wood, measuring the resistance of the wood to reveal the relative density distribution.

The density measurements, at a scale of 1:1, are graphed and stored on pressure-sensitive strips and in an electronic unit associated with the unit. (See Figure 2.) The measurement profiles can be downloaded via the integrated Bluetooth functionality creating a means of documenting and storing the precise condition of every pole inspected.

In addition, the Bluetooth capability facilitates the ability to download and couple the measurement profiles with inspection data collected in a handheld unit. There are a number of handheld units on the market with the ability to take field notes, mark GPS locations, and store photos. The information can then be uploaded to a customer specific website, creating a permanent record of the condition of the pole and other client-specific information.

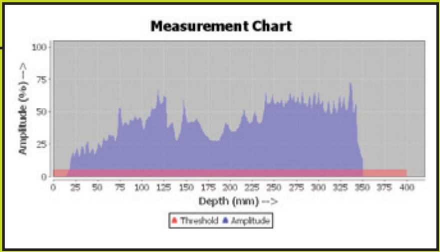

Figure 2. Digital View of Condition Below Ground.

Based on our research, we concluded that the use of the Resistograph test unit coupled with the "no excavate and treatment" policies of the utilities utilizing advanced technological measurement processes, and the ability to create and store pole specific information met our customer requirements as well as NESC standards. We coupled this technology with an internally developed web interface that provides a digital record of the inspection results for each pole combined with flexible report and mapping generation capabilities.

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Alamon Telco Inc. is a nationally certified business established in 1975 with headquarters located in Kalispell, Montana.[7] The primary and dominant focus of the business is to provide skilled contract personnel to the telecommunications industry. Customers include FairPoint, Verizon, Alcatel, Qwest, AT&T, CenturyTel, Embarq, General Dynamics, Motorola, Nextel/Sprint, Nokia, Nortel, and Tellabs. For more information visit: www.Alamon.com.

IML USA, Inc was founded in Germany in 1985. The IML Resistograph was originally designed for tree services, and later expanded its market to include inspectors in the timber bridge, building, termite, playground equipment, and utility pole industries. European Telecoms have been using the IML Resistograph for the last 10 years. T-Mobile (German Telecom) currently has 1,600 IML Resistographs in the field. For more information, visit www.imlusa.com.

Endnotes

1. Approved methodology guidance for electric utility borrowers is contained in US Department of Agriculture rural utilities service bulletin 1730B-121 dated 4/15/96 - four inspection methods are described: visual, sound & bore, excavation, and electronic device. **2.** Methods of Inspecting and Testing Wood Poles. - 1910.269 App D. **3.** Examples: NHEC uses POLUX, Verizon, Qwest & Embarq (formerly Sprint, now CenturyLink) use Resistograph. **4.** Florida PSC order PSC-06-0677-FOF-TL, issued August 7, 2006, DOCKET NO. 060077-TL, approved the modified inspection plan. **5.** IML USA, Inc. www.imlusa.com. **6.** Documented through public sources and interviews. **7.** Alamon Telco Inc., www.Alamon.com – contact: Alex Hatfield, 800.252.8838, alex@alamon.com.