Pearson Technologies Inc.

4671 Hickory Bend Dr Acworth GA 30102 770-490-9991 www.ptnowire.com fiberguru@ptnowire.com

Fiber Installers And Lawsuits

Frequently, fiber optic installation personnel damage singlemode links, either through carelessness or accidents. I see both situations in my work supporting attorneys in lawsuits involving damage and/or interruption of high capacity links.

To sensitize the fiber installer to the potential impact of his/her actions, I offer the following information. An installer works on one fiber at a time. He may be pigtail splicing or mid span splicing to add a new cable to an enclosure. Such work may lead to an attitude that any error he makes may not have much effect. I'll attempt to change that attitude.

The fiber optic cables of today can have many fibers. A recent champion is a Sumitomo Electric cable with 3456 fibers. This is a small cable, with a diameter of 1.34", slightly smaller than that of a banana. Were all fibers active, the total capacity could be extremely high. This capacity means that damage or signal interruption could impact all of the people on earth or most of people in the US!

I'm not exaggerating. This Sumitomo cable has 1728 pairs, each carrying a different set if signals [3456/2=1728]. Each pair could be carrying signals at 100 Gbps. In the near future, 100 Gbps could become 400 Gbps, but I'll stick with the lower of these two bit rates. In addition, each fiber could have multiple wavelengths, a process referred to as dense wavelength division multiplexing, DWDM. While the standard that defines DWDM allows 200 wavelengths, I'll use 128.

With 1728 signal paths and 128 wavelengths, each carrying 100 Gbps, the capacity calculation of this cable is: 1728 pairs *128 wavelengths * 100 Gbps=

22,118.4 Tbps per cable. That's 22,118,400,000,000,000 bps.

Obviously, this number is so high that we cannot easily relate to it. I'll translate this capacity into two numbers that are more easily relate able: simultaneous telephone calls and number of homes or businesses served with Internet access.

Let's look at this capacity with respect to simultaneous telephone calls. A telephone call carried by voice over Internet protocol [VOIP] requires 64,000 bps of capacity. If the cable I've presented were carrying simultaneous VOIP calls, the cable capacity would serve 345.6 billion simultaneous calls [22118 Tbps/64000 bps= 345.6 billion].

The population of earth is approximately 7570 million [http://www.worldometers.info/world-population/ accessed 9/27/17]. If every one on earth were on the telephone at the same time, we would require capacity for

3785 million calls [=7570 million/2]. This required capacity for everyone on earth on the phone at the same time is only 1.1% of the available capacity [3785 million/345.6 billion=1.1%].

Were one to damage this cable, or otherwise interfere with communication on this cable, all the people on earth would be unable to talk on the phone, at least until the cable was repaired!

This would be a nightmare for the customer service department of a telephone company!

Let's look at this capacity in a second way: Internet access. If this cable were delivering 100 Mbps to homes or businesses, the capacity of 22,118.4 Tbps could provide Internet access to 221,840,000 locations [22,118.4 Tbps/100 Mbps=221,840,000]. Interruption of the signals on this cable would upset at least 221,840,000 customers.

In other words, if all the people in the US, all 323.1 million, were on the Internet through this cable, interruption would affect two of every three people!

[221.840 million/323.1 million=68.6%]! [US population at: https://www.google.com/search?q=population+of+USA&oq=popu&aqs=chrome.0.69i59l2j69i57j69i60j69i61j0.4223j0j1&sourceid=chrome&ie=UTF-8, accessed 9/28/17]

Here, the message is not that these calculations are the correct and only ones possible. In fact, there are factors that can reduce the capacity of this Sumitomo cable from the numbers presented herein. Instead, the message is that damage to a fiber optic cable will cause a significant interruption to a large number of people and businesses. Such a large interruption gives rise to lawsuits for repair cost and loss of use, which, obviously, one wants to avoid.

How can an installer avoid such interruption? When performing construction along a path that contains an underground fiber optic cable, personnel must have the cable location marked. Failure to do so makes the contractor negligent in most cases in which I have been involved.

In addition, the construction personnel should verify the indicated location by making potholes along the cable path. Potholing must be done carefully to avoid cable damage.

I have seen situations of cable interruption in which the cable was not in the location indicated [i.e., the marking was in error], in which the cable was not at the depth indicated, and in which the cable locator could not find a cable. Regardless of the reason for damage to a fiber optic cable, the cable owner is likely to sue the company that damaged its cable. In some cases, the cable

4671 Hickory Bend Dr Acworth GA 30102 770-490-9991 www.ptnowire.com fiberguru@ptnowire.com

owner will sue for loss of use. In most of the cases in which I have been involved, the loss of use claims significantly exceed the repair costs, resulting in 6 and 7 figures claims.

In conclusion, contractors and fiber optic personnel are well advised to take the steps appropriate to avoiding damage to fiber optic cables. Preventive actions cost significantly less than repair and lawsuit costs.