Toolbox Talks

Electrical Safety - Fiber Optics

When most people think of safety in fiber optic installations, the first thing that comes to mind is eye damage from laser light in the fiber. They have an image of a laser burning holes in metal or perhaps burning off warts. While these images may be real for their applications, they have little relevance to most types of fiber optic communications. Eye safety is an issue, but usually not from light in the fiber. However, fiber optics installation is not without risks.

Eye Safety:

- Optical sources used in fiber optics, especially LEDs used in premises networks, are of much lower power levels than used for laser surgery or cutting materials. Even the output of OTDRs, WDM, & fiber amplifier systems, which are much higher than LED systems, are still well below that used in laser surgery or machining.
- The light that exits an optical fiber is also spreading out in a cone, so the farther away from the end of the fiber your eye is, the lower the amount of power your eye receives.
- The infrared light in fiber optic links is at a wavelength that cannot penetrate your eye easily because it's absorbed by the water in your eyeball. Light in the 1300-1550 nm range is unlikely to damage your retina, but might harm the cornea or lens.
- A typical laser pointer, which has a beam that is collimated (not expanding), & is at visible wavelength (650 nm) where the eye is transparent, is probably more danger to the retina than a fiber optic link.
- The real issue of eye safety is getting fiber scraps into the eye.

Bare Fiber Safety:

- The broken ends of fibers & scraps of fiber created during termination & splicing can be extremely dangerous. The ends are extremely sharp & can easily penetrate your skin. They invariably break off & are very hard to find & remove.
- Dispose of all scraps properly. Some people keep a piece of double stick tape on the bench to stick fiber scraps onto. Others use a dedicated container for all fiber scraps, which is taped up & disposed of when full.

True Story:

Fiber cables are often installed around electrical cables. Electricians are well-trained in electrical safety, but some fiber optic installers are not. We've all heard rumors of fiber installers being shocked when working around electrical cables, but there was an instance made public by OSHA where two fiber installers were killed when working on aerial cables.

These two installers were installing all-dielectric self-supporting aerial cables on poles. The hangers, however, were metal & over six feet long. Both had attached the hangers to the poles, then when installing, the fiber cables had rotated the hangers enough to contact high-voltage lines.

So even if the fiber is not conductive, fiber hardware can conduct electricity or the installer can come in contact with live electrical wires when working in proximity to AC power.

Safety Rules:

- Keep all food & beverages out of the work area. If fiber particles are ingested, they can cause internal hemorrhaging.
- Always wear safety glasses with side shields to protect your eyes from fiber shards or splinters. Treat fiber optic splinters the same as you would treat glass splinters.
- Keep track of all fiber & cable scraps, & dispose of them properly. If available, work on black work mats & wear disposable lab aprons to minimize fiber particles on your clothing. Fiber particles on your clothing can later get into food, drinks, &/or be ingested by other means.
- Never look directly into the end of fiber cables until you are positive that there is no light source at the other end – having tested it with a power meter. Use a fiber optic power meter to make certain the fiber is dark. When using an optical tracer or continuity checker, look at the fiber from an angle at least 6 inches away from your eye to determine if the visible light is present.
- Contact lens wearers must not handle their lenses until they have thoroughly washed their hands.
- Do not touch your eyes while working with fiber optic systems until your hands have been thoroughly washed.
- Only work in well-ventilated areas.
- Keep all combustible materials safely away from the curing ovens & fusion splicers.
- Dispose of all scraps properly. Put all fiber scraps in a properly marked container for disposal.
- Thoroughly clean your work area when you are done.
- Do not smoke while working with fiber optic systems.

All information found at www.theFOA.org