THE TWO BIGGEST CAUSES OF FIBER LIGHT LOSS AND HOW TO FIX THEM

Fiber optic cabling carries pulses of light between transmitters and receivers. These pulses represent the data being sent across the cable. In order for the data to be transmitted successfully, the light must arrive at the far end of the cable with enough power to be measured. Light loss between the ends of a fiber link comes from multiple sources, such as the attenuation of the fiber itself, fusion splices, macro bends, and loss through adapter couplings where end-faces meet.

Among key sources of loss that can bring a fiber network down, dirty and damaged end-faces are the most underestimated threat. Dirty end-faces are a leading cause of fiber link failure for both installers and private network owners. Contaminated end-faces were the cause of fiber links failing 85% of the time. It's easy to prevent, but there continues to be a lack of appreciation for this crucial issue and lots of misinformation about proper techniques.

There are two types of problems that will cause loss as light leaves one end-face and enters another inside an adapter: contamination and damage.

Dig up the dirt on your endfaces with this Visual Inspection Probe.

Contamination

Contamination comes in many forms, from dust to oils to buffer gel. Simply touching the ferrule will immediately deposit an unacceptable amount of body oil on the end-face. Dust and small static-charged particles float through the air and can land on any exposed termination. This can be especially true in facilities undergoing construction or renovation. In new installations, buffer gel and pulling lube can easily find its way onto an end-face.

Ironically, protective caps—also called "dust caps"—are one of the most common contributors to contamination. These caps are made in high-speed production processes that use a mold release compound that will contaminate end-faces on contact. Further, as the plastic cap ages, the plasticizers deteriorate resulting in an outgas residue. Last, airborne dust itself will find its way into the protective cap and will move to the end-face when the cap is pushed onto a ferrule. It's a very common mistake to assume that end-faces are clean when patch cords or preterminated pigtails are removed from a sealed bag with protective caps in place.

Inspection of the end-face should verify that no containments are within the field of view. The most crucial area to clean is the core of the fiber, followed by the cladding. Yet contamination on the ferrule—outside of the end face—could slide towards to core as the fiber is mated or handled. Therefore, all visible contamination should be removed if possible.

Damage

Deciding to mate every connection first and then inspecting only those that fail is a dangerous approach, as the physical contact of mated contaminants can cause permanent damage. This permanent damage would require more costly and time consuming determination or replacement of preterminated links.

Damage will appear as scratches, pits, cracks or chips. These end-face surface defects could be the result of poor termination or mated contamination. Regardless of the cause, damage must be evaluated to determine if action is required, as some of it can be ignored or remedied. Up to 5% of the outer edge of fiber cladding generally may be chipped; this is a common result of the polishing process. Any chips on the core are unacceptable. If scratches or excess epoxy bleed is found, re-polishing with fine lapping paper can eliminate the problem. If the end-face is cracked or shattered, the fiber must always be re-terminated.

In every instance, all end-faces should be inspected before insertion. If a connector is being mated to a port, then the port should be inspected as well. Inspecting one side of a connection is ineffective because contamination inside a port can not only cause damage but also migrate to the connector being inserted. Too often equipment ports are overlooked not only as contaminated themselves but also as a source of contamination for test cords.