"Clean & Inspect" for 21st Century Optical Networks

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Background

"Clean and Inspect" must be the mantra for the 21st century optical communications.

Optical networks are playing a more crucial role in our communications networks, our way of life as well as our daily lives. High definition TV, internet gaming, medical data imaging, general commerce and social networking all have increased the demand for bandwidth. Be it long haul, backhaul, FTTX, WAN or LAN, all the elements of optical networking are experiencing bandwidth growth. But, while the technology and reliability of the optical components has improved over the past decade, there still remains predictable system vulnerability at the points of interconnect.

Interconnects Are the "Weak Links" of Optical Networks

An interconnect is the point of mating two fiber optic connectors, or the mating of a fiber optic connector and an optical device. These connection points are the source of about 70% of the optical network failures and more than 70% of those failures are a result of connector contamination. This is because an interconnect is the only point in the network where the glass core of the fiber carrying the optical signal can be exposed to contamination from the external environment.

Most of the time connectors are mated and remain in physical contact within an alignment sleeve. They are held in place by springs contained within the connectors. This ensures that physical contact will be maintained, contamination will be kept out, and the integrity of the optical path will be preserved. However, during installation, maintenance, rerouting and upgrades, connectors may be demated and exposed to the environment. It is at this time when they may be contaminated by accidental human contact, such as by mating a clean connector with a contaminated test jumper, or by coming in contact with airborne contaminates.
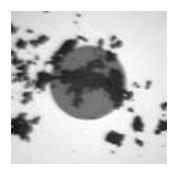
Inspection Scopes Are Essential

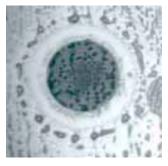Today's scopes can be stand-alone devices or more sophisticated tools that plug into a laptop and automatically perform pass/fail tests on the cleanliness of connector end-faces. These probes can "see" an end-face within an alignment sleeve (port or bulkhead adaptor) or an exposed end-face of a jumper. Also, the end-face images can be preserved to document the quality of the installation or maintenance procedure.

Across this industry, companies and fiber optic technicians must begin to focus on the need to clean. The fastest installation or repair is not always the best. The job needs to be done right, which means techs must take a few more seconds to "Clean and Inspect" both sides of every connection, every time.

When we are taking a test in school, if we guess at the multiple choice answers, we can finish very quickly, hand in our test and get out the door. However, we are not likely to receive a passing grade. Conditions are similar for a fiber optic installation, repair and maintenance. You need to know the condition of your end-faces: *clean and inspect every time.*

Photos illustrate the types of contamination often found on connector end-faces. Top to bottom, left to right: particulate on an end-face; lint from cotton clothing; oil on a connector end-face after mating with another dirty connector; and a clean end-face.

Do It Right

The whole industry needs to focus on what really needs to happen to establish a reliable optical network. The fiber optic technician may need to pause and breathe in saying the word "Clean" and breathe out saying the word "Inspect". Slow down and do it right. Time is money, but the cost of repair and recovery of an out-of-service optical network is even more costly.

We all know habits are hard to change, and farsightedness is not the strong suit of a credit card economy. Therefore, network managers and fiber team leaders must insist that every installation and repair contract should state: "Clean and Inspect, every connection, every time.