Cleaning Up After Disaster: How to Get Fiber Networks Back on Track

Fiber networks are susceptible to failure when damaged by extreme weather such as hurricanes, floods, fires, snowstorms and earthquakes. Disaster recovery plans that include proper procedures and tools are essential to keep networks functioning.

By Jay Tourigny / *MicroCare*

Climate change already has increased the number and strength of some extreme weather events. Over the last 50 years, the United States has seen increases in prolonged periods of excessively high temperatures, heavy downpours and, in some regions, severe floods and droughts. These adverse conditions will only continue as the population grows. Increased greenhouse gas emissions, expanded developments and land-use changes add to the threat.

Here's the problem: The increase in extreme weather conditions can negatively affect fiber networks. Although fiber is usually rugged and damage resistant, disasters will require different responses to repair, restore and refurbish fiber networks. Preparation is key. To support billions of devices and increasing amounts of data and to keep networks functioning, disaster recovery plans are essential.

It is also essential that service providers implement cleaning procedures to guarantee system performance after a disaster. Contamination is the most common threat to an optical network. The smallest particle of contamination on a fiber is detrimental to its signal path and can cause back reflection, insertion loss and equipment damage. Dirty water from a flood or snow melt and soot and dust from a fire also pose contamination risks. To keep networks running efficiently, service providers should put specific tools and procedures in place.

PLAN FOR THE WORST

Nothing can prevent adverse weather conditions, but being ready with a recovery and restoration plan can help stem the damage they may cause. If a rehearsed strategy is in place, the effect on a network can be minimized.

It's important that all technicians be fully trained in recovery to get networks up and running as soon as possible. This depends on rapidly identifying the problem, knowing how to repair it and having the correct tools to get the job done quickly and efficiently. If a technician fails to effectively inspect and clean during an initial repair, it could cause system failure – ultimately resulting in more time and costs to rework the repair a second time. Service providers should be proactive and ensure impacted fiber is addressed in a planned and methodical way.

Cleaning is not merely important; it is critical to the long-term reliability of any network. It is essential to clean correctly by remembering the three steps: inspect, clean and re-inspect. Inspecting both ends of a connector pair just before mating is important. If replacement is necessary, inspecting and cleaning new jumpers and patch cords is also important.

Technicians charged with recovering networks and getting them up and running after disasters must be well-versed in the processes and have the correct tools for the job.

SAFETY MEASURES

Accessing a fiber network for disaster recovery can be challenging, with potential hazards ranging from downed power lines to rising flood waters. First, make sure everything is safe by following OSHA safety standards for all procedures. Technicians should ensure the structure is safe and that electrical systems are powered off. They should be careful to avoid electrocution and toxic hazards or leaking fuels and to ensure there's a source of light to make the repairs to the fiber because usual power sources are likely to be unavailable. Checking air quality also is important. Outside plant cables are made of rubber and polyethylene, which are very toxic when burned, so good ventilation is essential. OSHA rules for confined spaces should always be followed.

INSPECT, CLEAN AND RE-INSPECT

Areas where repairs are needed will be messy with contamination everywhere.

Clean a work area first with surface wipes.

Cleaning sticks clean the entire end-face, including the alignment sleeve sides.

For this reason, technicians should start by cleaning with presaturated alcohol wipes to remove grime and debris from the surface areas where they work. These wipes have an added benefit of disinfecting surfaces. Nonflammable, high-pressure contact cleaner aerosols are another beneficial tool to rinse particulate from hard-to-reach electrical connectors and contacts. Nonflammable dusters also blow dust, dirt and debris away from the surviving hardware, workbenches, keyboards and racks.

Once the area is clean, work can begin on the fiber itself. Technicians should first inspect the fiber to visually identify problems. These include broken or cracked fiber cable, scratches, pitting or the presence of contamination that can interfere with or damage the surfaces of the optical termini. This procedure must be done on every fiber during a restoration process. Just because a cable is mated does not mean that the inside is clean. It should be inspected, cleaned and re-inspected every time.

In such extreme circumstances, mechanical "push to clean" tools are not the best method to ensure end-face cleanliness. They are perfect for cleaning lightly contaminated end-faces quickly, but conditions following extreme weather often call for cleaning sticks, which offer more thorough and rigorous cleaning. Using quality cleaning sticks will clean the entire end-face as well as the sides of the adapter/alignment sleeves. Technicians should select sticks specifically engineered for cleaning fiber because these products will be soft enough not to scratch the ceramic or composite ferrule end-face. They are also absorbent and remove the contamination from the surface of

Fast-drying fiber optic fluid doesn't leave moisture behind.

Optical-grade lint-free wipes are engineered specifically for cleaning fiber.

the end-face without generating lint. When using stick cleaners, rotate only in one direction. Four to eight rotations usually is sufficient. Important: Remember to use a stick on only one end-face to avoid cross-contamination.

Foam swabs should not be used because they can tear in the alignment sleeve and leave debris behind. They also may generate static electricity, which will attract further dust contamination to the end-face. Wet-dry cleaning is the most effective process for removing all forms of contamination and helps eliminate electrostatic charge, which can draw in impurities. Choose specially developed fiber cleaning fluid, which is fast-drying and nonflammable, has a low surface tension and dissipates static. The fast-drying feature is especially important when cleaning fiber before making a spliced repair. Also ensure fluid is not trapped in connector housings when termini are mated after cleaning. Slow-drying fluids, such as water or even the popular alcohol cleaners, are inadequate, will slow the repair, and run a high risk of being trapped in the housing.

Finally, when restoring a network damaged in a disaster, it is essential that technicians use high-quality, optical-grade lint-free wipes engineered specifically for cleaning fiber. These wipes are substantially stronger and cleaner than general-purpose wipes or towelettes. Also ensure wipes are left inside the packaging until ready to use. This protects them from exposure to the elements and guarantees a pristinely clean product at the point of use. Quality wipes can serve multiple tasks and be used to spot-clean cabinets, cables, racks, workbenches and other nearby surfaces before unmating connectors for inspection, speeding the restoration process. It also simplifies inventories.

PLAN AND PREPARE

Next-generation connectivity requires planned procedures to ensure guaranteed system performance. This can be difficult, but it becomes even more challenging when climate change triggers severe weather events that cause widespread damage to infrastructure.

Planning and preparation are key. Products from respected vendors that manufacture tools specifically engineered to clean all contaminants are essential. Operators should be proactive and equip and train technicians in advance so they have the skills, tools and knowledge to successfully repair fiber damaged by disaster. ❖

Jay Tourigny is senior vice president at MicroCare Corp., which offers Sticklers fiber cleaning solutions. For more information, visit www.sticklers.microcare.com.