

What causes a complete break in a telecommunications fiber optic cable



Overview

When an internet outage occurs, the source is often a physical interruption to this light path, known as a fiber break.

Key Takeaways

A complete break in a fiber optic cable is typically caused by physical damage from human activity, environmental events, or mechanical stress that severs the delicate glass core, halting data transmission.

Mechanical and Human-Induced Damage

The most common cause of fiber breaks is accidental physical damage, often from construction or excavation activities. Heavy machinery, trenching, or digging can sever buried cables, especially if their locations are not properly marked, a scenario known as a "dig-in". Improper handling during installation, such as exceeding the cable's minimum bend radius, can also stress or fracture the fiber, leading to a complete break.

Environmental and Natural Events

Fiber optic cables are vulnerable to natural disasters. Earthquakes, landslides, floods, hurricanes, and tornadoes can shift the ground or destroy protective conduits, snapping or crushing the fiber. Submarine cables face additional risks from ship anchors or fishing trawlers, which can physically cut the lines on the ocean floor.

Wildlife and Rodent Damage



Animals, particularly rodents like squirrels and gophers, can chew through the cable's protective jacket and the glass fibers inside, causing service outages . In some regions, larger wildlife may also damage above-ground or exposed cables.

Other Contributing Factors

Water ingress in outdoor or underground installations can corrode fibers over time, weakening the cable and potentially leading to a break . Extreme mechanical stress, such as repeated bending or crushing, can also cause microfractures that eventually result in a complete severing of the fiber .

Detection and Repair

When a fiber break occurs, the light signal is immediately interrupted, causing a total loss of connectivity. Technicians locate the break using an Optical Time Domain Reflectometer (OTDR), which measures reflected light to pinpoint the damaged section, often over long distances . Repairs involve splicing the fiber, either through fusion splicing for precise alignment or mechanical/plastic splicing for simpler, higher-tolerance connections . Understanding these causes is essential for designing protective measures, such as proper burial depth, conduits, warning signage, and wildlife deterrents, to minimize the risk of complete fiber optic cable breaks.

Article Content

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This guide explores the most common causes of fiber-optic cable damage, explains the technical impact of each risk,

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Fiber Break Locations Explained in Fiber Networks

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Let's see what are the reasons behind fiber optic cable damage and what you can do about it. Learn more on our blog.

How to Find and Repair Breaks in a Fiber Optic Cable

A fiber optic cable break occurs when the glass core or cladding of an optical fiber is physically severed or damaged,

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Learn the common causes of fiber optic cable damage and how experts repair them. This guide helps you prevent failures and keep

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Learn the basic steps and tips for fiber optic troubleshooting and repair, including how to use devices and methods to locate, isolate,

Caring for fibre optic cables — damaged is worse than broken

A fibre optic cable relies on complete internal reflection — and this scenario still supports that — but a substantial

Top 5 Causes of Fiber Optic Failure

Polarization Fiber optics often carry polarized signals, although not all fiber optic communication is polarized. When it is, the light in

How to Repair a Damaged Fiber Optic Cable?

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Troubleshooting fiber

So you've replaced your copper cables with fiber optics, but now you're having problems. Learn how to troubleshoot

Causes of Fiber Cut and the Recommendation to Solve the Problem

Although telecommunication companies have invested significantly in fiber optic infrastructure, there has been an

7 Common Issues Requiring Professional Fibre Optic Cable Repairs

Extreme temperatures cause cable materials to expand or contract, resulting in fiber fractures or breaks. Water

What Causes Fiber Optics to Fail? 5 Reasons

This causes a cable breakage, leading to an increase in attenuation. 3 - Rodent/fire damage. 4 - Improper sealing and moisture

Diagnose and Troubleshoot Damaged Fiber Optic Cables

What causes fiber optic cables to lose signal? Signal loss can result from bending, physical damage, connector contamination, poor

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