Technical Reference

Key Optical Fibre Cable Management Practices

Proper cable management practices make optical fibre networks less susceptible to accidental damage, quicker to install, less expensive to own and operate over the long term and easier to expand as needs grow.

Key cable management concepts include:

- ***Bend radius:*** At turns in optical fibre runs, maintain a 35mm bend radius. Tighter bends may cause micro-bending of individual fibres that allow light to escape the signal path, resulting in signal attenuation. More severe bends can break fibre strands completely, resulting in signal loss.
- ***Cable troughing:*** Used to route optical fibre cable, troughing systems provide a protected pathway for optical fibre to traverse spans between rooms and equipment racks. Good troughing systems will keep optical fibre separate from copper cable, protect it from out-of-tolerance bends and promote neat, easily accessible runs.
- ***Vertical cable protection:*** Allowing optical fibre to hang unprotected from the back of equipment can be a recipe for disaster. Exposed cables are easy to snag accidentally with a hand or foot, which can result in damage to the connector or optical fibre itself. Additionally, over time the weight of hanging optical fibre can cause bends outside the acceptable limit and consequently, damage to the fibre. Proper vertical cable management in panels or equipment bays provides adequate support, cable protection and a transition from the vertical run to the back of the equipment that does not damage the optical fibre.
- ***Cable pile-up:*** In horizontal optical fibre runs, it is unacceptable to allow a pile of optical fibre cable to exceed 50mm. Beyond that point, the weight of the bundle will surpass the crush tolerance limit of the optical fibre at the bottom of the stack, resulting in microscopic damage and signal attenuation.
- ***Cable segregation:*** Keep optical fibre runs separate from legacy copper cable. Copper cable is relatively heavy and can crush optical fibre cables. Additionally, segregating coax from optical fibre ensures that technicians repairing coax do not accidentally damage the fibre cable while working on the copper.
- ***Labelling:*** As you would in a copper environment, develop good labelling practices. Know where optical fibres originate and terminate. Doing so will reduce maintenance time and the likelihood that a maintenance technician will make hasty decisions on optical fibre routing that can lead to a rat's nest of cable and patch cords.
- ***Density:*** When selecting products for an optical fibre network, remember future maintenance. The more densely connectors are packed onto a panel, the more difficult it will be for even the most dexterous technicians to maintain. Remember, inevitably cables will be moved, so the ability to trace and re-route them is critical to working efficiently.
- ***Future proofing:*** When planning rack configurations with a given number of terminations to accommodate a relatively low number of optical fibres for today's requirements, don't forget the future. An optical fibre path that easily supports 12 optical fibres today may be inadequate to support the 200 optical fibres needed in a few years. Planning up front for the future can save the expense of ripping out outgrown capacity down the road.

Proper cable management is extremely important to the success of an evolving high-performance communications network. The fact that a single optical fibre may transmit mission-critical signals underlies the importance of taking the steps necessary to manage optical fibre's installation and use.

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