

Importance of Cable Management

White paper

Introduction

Nowadays, modern facilities take a structured approach to management solutions. It is important for cable installers and engineers to take a closer look at cable management to ensure valuable space is utilised, along with maintaining network performance.

The solutions to improve cable management will ensure you adopt best practice, meeting industry standards for installation purposes. It also ensures facilitate plans to maximise a data cabinet's density, providing essential cost savings when streamlining equipment inventory. With networking equipment getting more compact, engineers must review cable solutions ongoing, to maximise density and infrastructure.

Fibre optic cables are used frequently for today's telecommunication network because of their high bandwidth, high reliability and relatively low cost. To maximise the network performance, a good cable fibre management system must be in place.

This white paper explores some fundamental principles for a good fibre cable management system improving the performance of your network.

Why is Cable Management Essential?

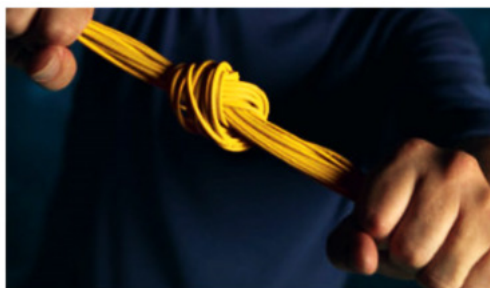
To master fibre optic cabling, users must first optimise their management strategies. In order to obtain a flexible and well organised patch cable management, the factors that affect the performance of the fibre optic patch cable should be introduced first. Below are the key elements that should be considered during patch cable management for improved network performance.



A. Bend Radius Reduction

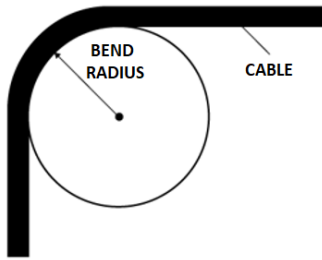
As we know, most of the fibre optic cable is made of glass. It is very amazing that the bundle of fibre can transmit a huge amount of signals and data. But, do you know that the cable can be pretty delicate

because of the material itself? Thus, we need to set a standard (e.g. EIA/TIA 568) to define the minimum bend radius in order to keep cables in good working order.



The "bend radius" of a fibre optic cable is the term for how sharply a cable can safely bend at any given point. All cabling has a bend radius, and the bend radius may be different according to different types or different make of cables.

Fibre bends beyond the specified minimum bending radius can cause signal loss or even break the fibre, causing service disruption. Today, industry standards for traditional singlemode jumpers typically specify a minimum bend radius of ten to fifteen times the outside diameter of the jacketed cable. This new breed of flexible singlemode optical fibre has the potential to significantly reduce these minimum bend radius requirements to values as low as 0.6" (15mm), depending on the cable configuration, without increasing attenuation.



A reduced bend radius fibre is able to withstand tighter bends within frames, panels and pathways. It also enhances the reliability of a network and reduces network down time.

B. Well Defined Cable Routing Paths

The major reason of optical fibre cable minimum bend radius violation is improper routing of fibres by fibre installation technicians. Routing paths should be clearly pre-defined and easy to follow. In fact, these paths should be designed so that the technician has no other option than to route the cables properly. If an option is given to technician, inconsistent human decision could cause improper routing, and causes bend radius violation. Well defined routing paths can standardise fibre optic installation process, and less training time is required for fibre technicians.

An improper path can increase the probability of bend loss, termination panel congestion, and long-term cable failures. Manage your cable path wisely, making access to individual patch cables simple and safe.

C. Easy Access to Installed Optical Fibres

Allowing easy access to installed fibre cable is essential for maintaining proper bend radius protection. The system should be designed to ensure that individual fibres can be installed or removed easily without negative effects on nearby fibre cable.

D. Physical protection of installed optical fibres

The management system must provide measures to physically protect fibre cables from accidental damage by technicians and equipment. Otherwise, the network reliability and performance will be adversely affected.

Few Guidelines to Consider During Cabling Installation

For many datacentres managing cables is an afterthought. Not having a plan or scheme in place prior to running cables, makes troubleshooting problems difficult. Companies should develop cable management plans and guidelines prior to any cable installation.

There are a number of low cost, easy to implement cable management solutions for small to medium sized datacentres. Keeping your cables organised according to predetermined scheme, routing in specified locations, and properly labelling them for easy identification are just a couple of simple, inexpensive cable management solutions.

Following is a list of some cable management parameters that will be helpful in the day-to-day facility management of a datacentre.

- **Proper Handling of Cables During Installation**

During cable installation, pulling issue can't be avoided. If the cables are pulled too hard, they can get damaged by stressing the core. Stressing the core will affect the signal performance. It will cause unwinding of the twists in the sheath in the extreme cases. Therefore, it is recommended to buy high quality patch cords from reliable vendors or manufacturers. Better quality patch cords have the ability to withstand stress. Because low quality cables have sub-standard sheathing and narrow diameter cores which can cause signal loss. A smaller core is also more fragile and weak, more likely to bend, leading to an increased rate of cable failure.

- **Using Colour for Cable Identification**

Colour provides quick visual identification. Colour coding simplifies management and can save a lot of time when you need to trace cables. With data cables, use colour to identify their role/function of the cables or the type of connection. With power cables, use different colours to identify and organise dual power feeds for redundant power sources.

- **Labelling Cables for Easier Installation**

Be it any cable, labelling cables can prove to be critical if a problem arises. Labelling cables allow for easier installation when on site and for quicker installation of cables if you need to shut the power down. Cable labels should be secured in a way that will make them accessible, yet difficult to remove. Thus, labelling should not be overlooked as it can help you identify cables in a short time and leave messages to other installers to easily decipher what goes back.

- **Removal of Unused Cables**

Unused and abandoned cables left under the raised floor can restrict airflow, represent a potential fire hazard and is a code violation. Be it any cable, if it isn't being used, it shouldn't be there and has to be pulled out.

- **Use of Cable Ties**

Use cable ties to hold groups of data cables together or to secure cables to components. Velcro based cable ties are versatile and can be reused or adjusted as cables are added or moved. If you use zip ties, make sure clipped ends of the ties are disposed of properly and don't end up a contaminant in the plenum cooling system.

- **Manage a Spreadsheet**

Keeping a spreadsheet identifying your cables, where they are coming from, where they are going, their colours, and specific configurations makes for an inexpensive user-friendly cable management system.

- **Cable Testing**

All cables should be pre-tested prior to installation. Once installed, it is much harder to test and identify problems. Purchasing third party certified or UL listed pre-tested cables is the easiest and most convenient. You'd hate to put the cable under load during a power cutover and have a receptacle fail unexpectedly, especially if you don't have a backup in place.

- **Correct Length Cables**

Always use the correct length of cables, allowing for some slack at the end for device movement and final fitting. Too much cable can create airflow problems both under a raised floor and behind a rack in a hot aisle. It is always advisable to measure the exact cable length you need. Custom cable is the best solution for you to get the right length.

- **Protecting Cables**

When cables are installed through raised floors use brushed grommet cable seals to physically protect the cables from the rough edges of the floor panel cutouts, seals against airflow bypass and maintain the under-floor plenum integrity by minimising contaminations.

- **Leaving Space for the Cables Trays**

Suppose long cables are left in the network system, you might consider them to put them in the cable trays. But, this isn't a good idea. Overloading cable trays is not advisable. Suspended cable trays are mounted to a rack or something. If it's too heavy, the cable trays might fall off and break the other expensive things. Having too many cables is not only a safety problem, but also leads to poor operational practices because it's too hard to fear of disturbing cables. The cables at the bottom of the cable tray might get crushed, further degrading the signal propagation.

- **Choose a Proper Cable Manager**

Economical and efficient solution to manage high density structured cabling in datacentres and telecom rooms can be achieved using a cable manager. A cable manager permits maximum number of cables to be organised in a minimum amount of space. You may select the best cable manager meeting your requirements. Simple or complex cable manager, vertical or horizontal, plastic or metal, one must meet your requirements for network cable management improvement.

- **Selecting Manufacturers/Vendors**

When choosing a vendor, find someone with a lot of experience supporting your size and type of business. You need to rely on their expertise to help you purchase the right product for your situation,

make the ordering process easy, and that they'll warranty their work.

- **Consider Cable Guides**

Vertical and horizontal cable guides allow neat and proper routing of data cables from equipment in racks and protects cables from damage.

- **Build or Buy**

Even through many datacentres have electricians on staff who can build cables, consider the time and expense of building verse buying before you start calling around looking for components. Having your datacentre staff focused on more important tasks, like preventative maintenance, is probably a better alternative than assembling cables.

Conclusion

To deliver and guarantee an optimal network performance, patch cable management is critical. In addition, well management of fibre patch cable can lower operation cost & time and increases the reliability and flexibility of network operation and maintenance. This white paper explored all the critical elements that should be noted during patch cable management, as well as tips for fibre patch cable management

Fibre cable management is a major factor in the success of your network, but poor cord quality can make all your efforts futile. No amount of management can fix cords that perform badly from the start. The best way to become an excellent fibre cord manager is to work with a leading cable provider.

A good cable management is not used for attraction but is a method to make our cabling more easier to manage. If cable management were easy, there would be no need for superior cabling solutions. A cable management solution is necessary as there will be number of cables utilised for datacentres.

Bend radius protection, reasonable patch cable path, easy accessibility of patch cable and physical protection should be provided by a robust and successful cable management which can increase the reliability and flexibility reducing the cost of network operation and maintenance. Therefore, meeting these aspects half of the success is achieved towards building a robust patch cable management

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