OCC-206-5

Installation – Cable Tray & Vertical Rise Guidelines Excerpt from Optical Cable Corporation's INSTALLATION GUIDE

Tray Installation

Cable trays or raceways often provide a convenient, safe and efficient method of fiber optic cable installation. Trays can be installed in ceilings, below floors and in riser shafts. When installing fiber optic cables in trays, National Electric Code (NEC) standards may apply. Please consult the NEC for fiber optic cables needed for a specific application.

TIA-569-B "Commercial Building Standard for Telecommunications Pathways and Spaces" provides guidelines on installing cable in cable trays.

Cable trays are typically designed to accommodate a maximum calculated fill ratio of 50% to a maximum of 6 inches (150 mm) inside depth. Cable tray fill ratio can be calculated per the following formulas:

$$\text{Area of One Cable} = \frac{(d)^2 \times \pi}{4}$$

$$\text{Area of Multiple Cables} = \left(\frac{d_1^2 + d_2^2 + \ldots + d_n^2}{4}\right) \times \pi$$

$$\text{Usable Area of Cable tray (50\% fill)} = \frac{\text{width} \times \text{depth}}{2}$$

Where:

d = outside diameter of cable
π = 3.14159265
width = width of cable tray
depth = depth of cable tray

The inside of the cable tray needs to be free of burrs, sharp edges, sharp turns, and projections that can damage the cables.

Vertical Rise

All Optical Cable Corporation tight buffer cables can be installed in vertical applications.

In vertical installations, the weight of the suspended cable creates a tensile load on itself and is the factor, from a cable perspective, that limits the height of vertical installation for a tight buffer cable. This tensile load should not exceed the cable's maximum long term tensile load for a permanently installed position. For example, an Optical Cable Corporation distribution style fiber optic cable weighing 36 lbs/1000 ft and having a long term tensile load of 220 lbs can be installed in vertical rise approximately 6100 feet (220/36 x 1000 = 6111).

Vertical Support

As demonstrated in the previous paragraph, Optical Cable Corporation's cable can be installed in vertical rises for great distances. However, due to the practical nature of installing cable, the weight of the cable at these distances could create problems with getting the cable off the reel and securing the cable attachment at the top of the vertical rise. Furthermore, wind or air blowing in the vertical installation/environment can create stress on the cable. Therefore, the cable should be secured at intermediate points along the length of the vertical rise. The distance between the intermediate points is largely based upon the installation and environmental conditions such as the number of fixed access points along the shaft, access to the fixed access points, the amount of cable weight between access points the installation crew can handle, severity of wind, etc.

Clamping a vertical cable to support it at intermediate points can reduce cable tensile loading. If clamping is not possible, a fiber optic mesh grip or fiber optic split mesh grip can be used at the top of the vertical rise and at intermediate locations along the vertical rise (if possible). Please see Figure 1. The mesh grip may have to be taped after the grip as been installed on the cable. The tape will insure that the grip does not "loosen" and allow the cable to "slip" through the grip. If the cable does "slip", another grip further up the shaft may be taking the entire load and thus creating a stress point on the cable.

Care must be taken to insure that the minimum bend radius of the cable is met at the top of the cable rise and that the grip is rated for the proper load of the cable in the vertical rise.

Another option is to use a very large smooth drum (3 to 4 feet in diameter) as an attachment at the top of the vertical rise and at intermediate locations along the vertical rise (if possible). Please see Figure 2. With the cable wrapping around the drum multiple times, the drum distributes the stress over a longer length of cable than a fiber optic mesh grip or fiber optic split mesh grip. Using this method, the cable can be moved from the bottom up to the next attachment with cable never receiving the full load of the entire vertical drop.

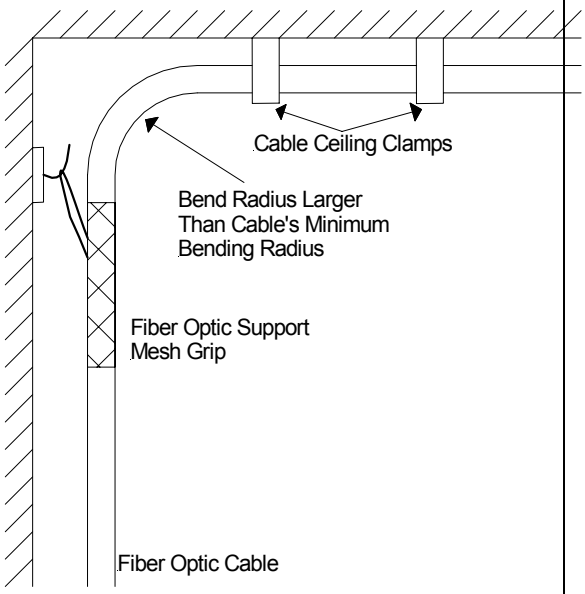

Figure 1: Vertical Cable Support Using Fiber Optic Split Mesh Grip

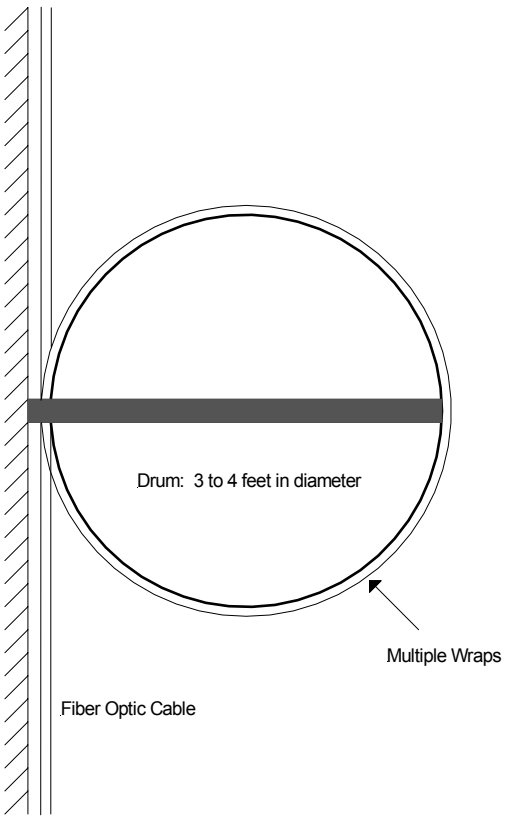

Figure 2: Vertical Cable Support Using Large Drum