



Separation Anxiety: Closing the Loop on Armored Cable

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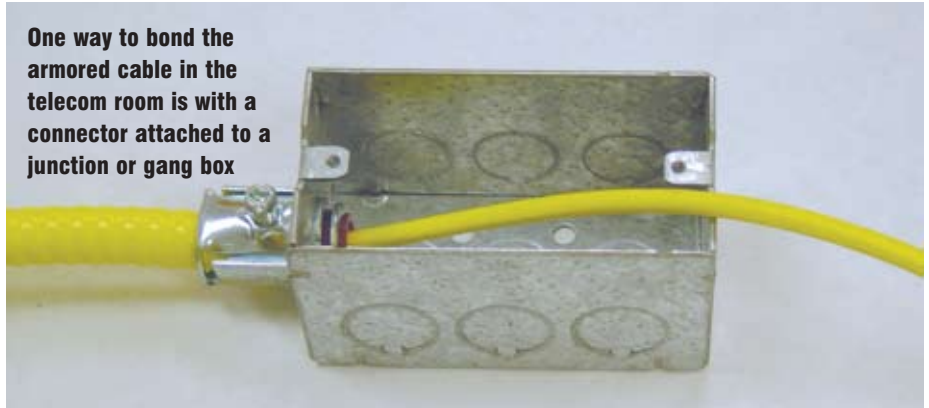
Q: Whenever possible in a LAN or data center environment, I specify armored fiber optic cable as the primary backbone because of its savings in space, and material and labor costs versus cable in conduit. But, I also know there is also a concern with extra steps needed for grounding and bonding, especially when separating the cable from the armored jacketing. Can you please provide further information?

A: Yes, armored cable has been gaining popularity because its construction combines ruggedness with space efficiency, resulting in lower cost of materials and installation, making it perfect for all premise environments – riser, plenum, indoor and outdoor, backbone and horizontal. Armored cable eliminates conduit, saving 25-50 percent in material costs. And when factoring the labor savings, as much as 80 percent can be saved over installing traditional fiber optic cables in conduit. However, there are unique methods for installing armored cables that must be followed.

As with all cable installations, following manufacturers' installation guidelines will assure maximum performance and preserve cable life. For an armored cable, it is important to bond the armor as the armor is conductive and may provide a path for additional and unwanted electrical voltages. This could result in injury of personnel, as well as damage to electronic equipment.

The fiber optic cable itself and the outside protective interlocked armor are actually separate; they are not coupled together.

One way to bond the armored cable in the telecom room is with a connector attached to a junction or gang box



er. The fiber optic cable “floats” within the armored sheath. Thus, both elements require connection to a pulling medium to prevent separation during installation.

Armored cable can be made easier to install and connect if it is manufactured as a trunk cable, with a pre-terminated ends and a factory installed pulling device. In any case, careful installation procedures must be followed using a properly installed pulling grip. Failure to do so may result in separation of the optical cable from the interlocking armor and elongation or unraveling of the interlocked armor. (Please refer to the “REEL TIME” in *CBM*'s June 2007 issue for information on pulling grips and procedures.)

Once the cable leaves the armored jacket to be terminated into the fiber distribution unit, also known as the fiber patch panel, the interlocking armor must be bonded to the grounding equipment for over current protection. Bonding is defined by NEC (Article 100 and NEC Section 250-90) as the permanent joining of metallic parts required to be electrically connected. Grounding is defined as a conducting connection between an electrical circuit or

equipment and the earth – or to some conductive body that serves in place of the earth. By directing current along a path to earth, bonding and grounding reduces (but does not totally eliminate) the danger of unwanted electrical current reaching the electronic equipment, which would cause shock and damage to both people and the equipment.

Proper procedures for grounding of all the termination equipment in the telecom room is referenced in ANSI/J-STD-607-A standard. All racks and cabinets should be bonded to their own grounding backbone system, known as the common bonding network. At minimum this includes bonding the cabinet or rack's ground rod to the telecommunications' grounding busbar. This serves as the main path to ground for all surges, as well as providing an area to dissipate electrostatic discharge (ESD). ESD is similar to the effect of creating a charge when you walk across a carpeted area and touch a non-grounded person (or thing).

The interlocking armor should be bonded to the closest grounding system or busbar next to the optical termination point. Doing so minimizes the exposure potential

Reel Time

to damage of the optical cable. So, make sure that the bonding procedure is done as close to the termination point as possible while allowing for enough exposed optical cable to enable termination within the patch panel.

At the separation point, the interlocking armor must be bolted, clamped, or crimped using any NEC-approved connector, clamp, lug or clip to the equipment bond. These connectors may fit a variety of knock-outs or gang boxes. These may also include an insulated bushing, which helps protect the fiber optic cable when it exits the armor as it is terminated into the fiber distribution unit or patch panel.

Remember that properly installed telecommunications cabling is almost never dangerous. But, all metallic components (including conductors, shields and equipment) must be bonded and grounded and free of fault potentials before turning over the installation to the customer. ■



Berk-Tek's ArmorTek, a cable cutter and a connector for bonding procedures

Berk-Tek's ArmorTek™ armored cable



"Reel Time" addresses cable topics including both copper and fiber constructions, applications, installation practices and standards updates. If you have a particular cable issue, please send an E-mail to: carol.oliver@nexans.com and we will feature the solution in an upcoming issue.