The Radius Limiter waterfall concept is based on safe bend radius protection for all cables when dropping out of the wire tray.

Build a Static Infrastructure for Constant Changes

By Ed Cronin, RCDD

Today's data center designers are now choosing cable tray and rack systems because of their cable control benefits, the adaptability to different cabinet/rack configurations and its EMC/continuous bonding capabilities.

Their questions are constant. Where is the first physical bottleneck most likely to happen? Is it the access floor space, the rack space, the plenum area or a combination?

If the racks and its cables are properly managed, there should be no issue. As the older equipment is removed and replaced, there should be minimal affect on the rack space. However if all the old cables are not removed, it is likely that the cable channel space will be the first casualty.

This common practice of abandoning cable in the tray is an unnecessary risk that is no longer worth taking. BICSI® recognizes this and is teaching the proper method in its RCDD® and ITS training classes. Earlier this year, BICSI decided to have its Tampa, FL, training center classrooms retrofitted with a wire tray system that addresses this cable management issue in a contemporary design. The products were manufactured and installed by Defem®, one of Europe's leading wire tray manufacturers for the data/telecom industry. David Cranmer, RCDD, executive director at BICSI, stated, "We strive to expose our students to a variety of products during their training in Tampa. This makes the addition of this system a valuable addition in our classrooms."

The classrooms were re-designed to accommodate two of the Defem Combi-Rack™ systems per training room. Each room consisted of an "instructor module" and a "student module." The instructor module was complete with almost every part needed to configure today's complex data center. It included standard components, such as cable tray, wall angle brackets, ceiling threaded rod, U-bars, patch panels, etc. However, the instructor module also included the Radius Limiter. This allows the cable to smoothly and properly transition from one tray level to the next. A bonding clamp is then used which allows bonding throughout the entire system without the need of ground wire.

The student module was similar to the instructor module; however it was not completely assembled. This instructional design concept allowed the BICSI RCDD and ITS students a true hands-on experience of installing the cable tray system

Mark Kazes, RCDD/OSP Specialist/SME and Master Instructor at the BICSI headquarters in Tampa, explains, "We need to constantly adjust the way we train our students. The proper method of managing cable and equipment racking has become an increasing dilemma. The key challenge is to design a static infrastructure that allows for constant changes. Allowing the old, non-functioning cable to remain dormant in the trays is no longer an option."

Many data center managers will agree. At a minimum, a well-designed data center should address the following issues:

1. CONGESTION:

- Flexibility for moves, adds and changes for cabling, equipment as well as different types and dimensions of racks/cabinets.
- Simple and flexible separation system of different types of cabling
- Simple cable lane marking and identification system

2. BONDING:

- A mechanical configuration that ensures equipotential/continuous bonding and a reduction of the ground loop area

3. CABLE BENDING LIMITS:

- Safe bending radius protection of fiber optics and other cabling

In the BICSI Tampa Training Center, the Defem concept was built as one mechanical structure to support the cable channeling and to serve as support for the open integrated racks. Complete flexibility to use either cabinets or open racks under the Multi-Level Cable Channel structure.

THE NEW "CABLE TRAY 101"

Kazes and the instructional team at BICSI Tampa wanted to impress on the RCDD and ITS students that the cable tray for the data center designer have become yet another critical component in the installation.

In discussing the evolution of the cable tray to its students, Kazes uses the story of how the legacy telecom rooms/central office areas in Europe were to be equipped with the new digital equipment generation in the mid 1990s, there was simply no available space for new cabling. The cable pathways above the cabinets were jammed with existing cabling.

A new cable management concept was developed by a team of engineers in Scandinavia from Swedish Telecom-Telia and Ericsson in cooperation with AB Wibe Defem, a manufacturer of cable support systems. The team knew that digging into the legacy cabling was not an option; even if the majority of cables were disconnected or abandoned, the "live" cables could not be at risk to be cut.

Their solution was to phase out the old equipment, row by row. Once a row was disconnected, the new seven-foot cabinets were installed. This gave a new free space of two feet between the tops of the cabinets and the old cable trays. In this space, the three-level cable channel structure was first realized.

Cable congestion is being recognized as a global issue. Whether the installation is in Geneva, NY, or Geneva, Switzerland, Paris, TX, or Paris, France, the situation is universal. The industry has recognized that cable congestion is a well-known problem that needs to be addressed from several fronts. There is new software available to assists with this issue. There are more efficient cabling and connector concepts that help reduce the need for frequent cable moves, adds and changes. However, the today's RCDD needs a strong awareness that the cable tray space is often still the "first casualty" when a data center starts to fill up.

This type of cable graveyard problem prompted the new cable try process.

A valuable lesson learned in designing data centers is to understand the key concept of visibility. Conny Bradalen, Defem's technical manager is a 30-year veteran of Scandinavian Telecom cabling techniques. Bradalen concludes that data center visibility is a key requirement. "The more you can see, touch and reach in a data center, the more the designer is in control," he states. "The choice of enclosed cabinets or open racks is a question of priorities for the specific site, but there remains a strong argument for open cabling," he concludes. Bradalen then asks a rhetorical question, "What is the advantage of hiding cables in a technical room like a data center or central office?"

BONDING TECHNIQUES

BICSI is a strong defender and watchdog of the TIA/EIA and NEC safety regulations. Its common teaching method is to connect all metal parts in the telecom room to the equipment potential/continuous conductor system. But still there are some common EMC, bonding and grounding traps that need to be addressed more carefully.

The metal cabinets, the metal racks and the metal cable trays are a part of the electrical system. The random currents occurring during external or internal disturbances must be diverted as smoothly as possible within the metal structure. It is critical to master the bonding and grounding techniques between equipment housing, cabinets, trays, raised floor structures, etc. In addition, the reduction of the ground loop area for common-mode disturbances also becomes a critical issue.[1]

CABLES DON'T LIKE TIGHT BENDS… BUT DO LIKE PROPER ID

To protect the cable and keep within its bending limits, the Radius Limiters were installed in the BICSI classrooms. Mounted from below, without interfering with existing cables in the tray it covers the entire width of the tray and enables cable bending radius protection in both directions. The product is designed with "wings" that protects cables from slipping off. The cable system is divided with the separation lane plates. The separation plates are mounted with bayonet type grips that make it simple to change future cable lane widths. These plates are designed with a return flange. These eight-foot plates are joined together to create one continuous separation wall. It is easily bendable and shaped to maintain the cable lane design. Preprinted cable identification tags snap onto the tray making it simple to identify the lanes (copper, fiber, coax, power, etc.).

In complicated mounting conditions, when cable has to be installed around obstacles, ascending or descending from one level to another, the system enables the installer to find the optimal solution. Multi-level cable organization makes it easy to change abandoned cables because they are laid on different levels thus providing easy access to any cable and the rack system in its entirety.

The BICSI RCDD and ITS students are now taught that the proper design solution for a well-managed data center consists of product hardware and excellent installation practices. This concept provides the product hardware, which makes it simpler to follow correct installation practices for the proper design solutions. The multi-level cable tray organization allows the organization of cable from the very beginning of the install. ■

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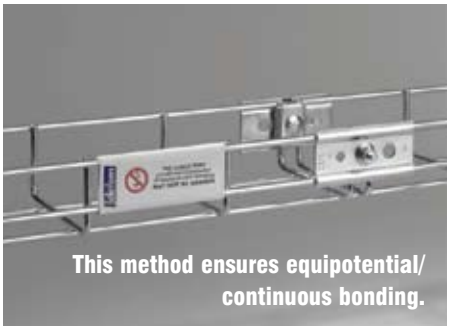

This method ensures equipotential/ continuous bonding.

[1]For more details, see a PowerPont presentation from the 2006 Las Vegas BICSI conference available at www.defem/applications/data-telecom.com.

CABLE AND FIBER OPTICS RECYCLING LINKS –

www.buildinggreen.com
www.redoma.com/Sidor/Cable.htm
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