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FEATURES

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Remote powering equals opportunity

PATRICK McLAUGHLIN
patrick@pennwell.com

This editorial is being written less than two weeks after the conclusion of BICSI's Fall Conference and Exhibition, which took place September 11-15. As an attendee of the event, I came away having heard one overriding theme throughout the week: remote powering technologies represent a significant opportunity to professionals in the structured cabling trade.

No fewer than five presentations made during the conference included remote powering as a significant focus, and in some cases it was the primary focus. I use the term "remote powering" here rather than Power over Ethernet or PoE, because I view remote powering as a superset of PoE. All PoE is remote powering, but not all remote powering is PoE. One of the most-discussed applications for remote powering nowadays is lighting. Some, but not all, lighting systems that can be powered via twisted-pair cabling use PoE as the powering technology. Whether they use PoE or another mechanism, these systems open up new opportunities for providers of twisted-pair cabling systems, particularly including the professionals who design and install these systems.

Another reason I use the term "remote powering" rather than "PoE" is that despite the term's widespread use in the industry and close association with the IEEE 802.3af and 802.3at specifications, as well as the forthcoming 802.3bt specifications, "Power over Ethernet" has not been trademarked by the IEEE. A device does not need to comply with the "af" or "at" specifications in order to carry the term. In August 2014, cablinginstall.com published an opinion from The Ethernet Alliance's Steven Carlson titled "Why the industry needs a PoE logo program." In it, he explained that the term PoE does not "belong" to the IEEE and told a cautious, true tale about the implications of that fact. "Unfortunately, the success of PoE led to products that took shortcuts with the standard, or simply ignored it ... Many cheap 'PoE injectors' appeared on the market. These units did not have any of the IEEE standardized features ... In many cases the voltage was not the correct IEEE standardized voltage, or the power supply could be switched to different output voltages." Carlson pointed out that an online search of "Power over Ethernet" yields "a frightening array of non-standards-based products."

Yet the term PoE proliferates just like the technology does. And that is why I believe remote powering, including 802.3af-, at-, and bt-compliant technologies, represent such an opportunity for you as cabling professionals.

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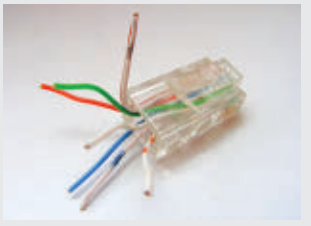

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Cabling Installation & Maintenance 2016 Innovators Awards

Innovative products, systems and applications honored

The 2016 Cabling Innovators Awards ceremony was held during the 2016 BICSI Fall Conference.

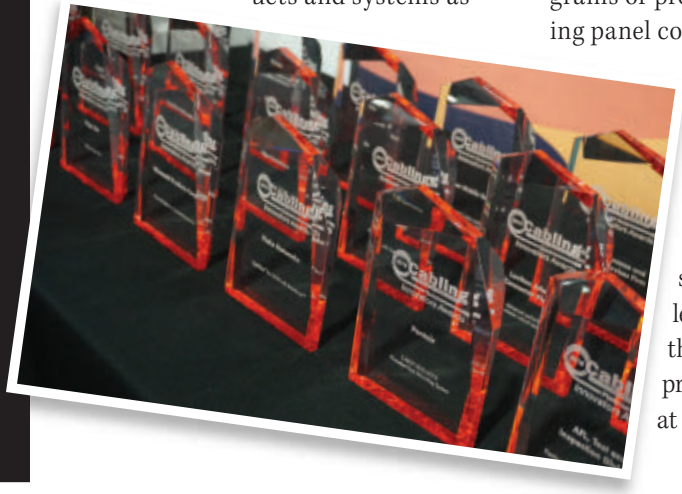
BY PATRICK MCLAUGHLIN

The second annual Cabling Innovators Awards presentation ceremony was held September 12 at the BICSI Fall Conference and Exhibition in San Antonio, TX. In total 18 Silver Level Awards, 8 Gold Level Awards, and 4 Platinum Level Awards were distributed.

The awards program was launched in 2015 to recognize innovative products and systems as well as their uses and applications. The Cabling Innovators Awards program is intended to recognize ingenuity and innovation where it is found in the value chain of cabling-system design, installation and administration.

Participants in the program were invited to self-nominate their products, systems, programs or projects. A judging panel comprising industry professionals screened the entries and determined their level of innovation.

Following is a description of each award level and a rundown of the products, systems, and projects that were honored at each level.



2016 Cabling Installation & Maintenance Silver Innovators Awards

Silver

Honorees recognized at the Silver level demonstrated that their innovation has resulted in marked improvement over previous methods, approaches, or product system and use.

CablExpress—H-Series 12U module patch panel and fiber breakout system that provides port replication for Brocade's DCX FC16-64 blades.

CenterPoint Energy—Deployed Panduit's converged infrastructure solution to unify information and communication technology physical infrastructure to ensure business continuity and a robust design capable of lasting 30 years or longer.

Chatsworth Products Inc.—eConnect power distribution units with Secure Array and Click Secure locking outlets, which result in significant energy savings.

Colvin Industries—UniPath is an assembly designed to eliminate the need for numerous individual installations of cable supports for open-air cabling.

CommScope—Supplied 250 miles of Category 6 cable and 100 miles of singlemode fiber-optic cable, as well as 12,500 terminations, to the Daytona Rising project, which redeveloped Daytona International Speedway.

Comtran Cable—Qualified a MIL-DTL-24643/59 network communications cable for Navy Sea Systems Command (NAVSEA). Comtran used resources from its sister companies including RSCC, RSCC A&D, Marmon I&T Group, Gendon Polymers and two NRTL Labs.

Comtrend—PG-9172PoE combines powerline networking and Power over Ethernet, allowing installers to connect a remote device such as a security camera or wireless access point to a power source and networking from the closest electrical outlet.

CyrusOne—Deployed the Active Control feature of Panduit's SynapSense SynapSoft Software to achieve a more-cost-effective, energy-efficient data center.

D-Tools—The System Integrator 2016 software package offers new functionality, features and enhancements that help streamline operations and increase profitability.

Hyperline Systems—Hyperline's new concept in product packaging includes a colored picture of the cable on the box's exterior. Having the color visible on the box minimizes the risk of unintentionally segregating the boxes, anywhere from the factory to the jobsite.

OFS—LaserWave Flex Wideband Multimode Fiber is a 50-micron laser-optimized fiber designed to help meet the demanding requirements of today's OM4 networks as well as next-generation, short-wavelength division multiplexing (SWDM) applications.

Siemon—ConvergeIT Cabling Solutions for the Digital Ceiling were deployed at the Mobile, AL public school system. The deployment resulted in significant capital and operational savings, better user experiences, improved productivity and overall better sustainability.

Tekcell.com—The Visual CableBuilder allows network professionals to create bespoke fiber cables, making custom cable procurement easy using online specification technology.

Transition Networks—Transition's networking integration solutions and configuration services for developing intelligent camera-based parking guidance systems have been deployed at facilities including those operated by New York City-based Park Assist.

Tripp Lite—The 3-Phase Rack ATS (Automatic Transfer Switch) combines the speed of solid-state switching with the efficiency of electromechanical relay switching. The solution delivers high reliability, high efficiency and cost savings in high-density, clustered server environments.

Trunktie—The Trunktie device allows

cabling-plant administrators as well as technicians to label unused patch ports. In doing so, professionals can leave notes for customers, vendors, or even oneself.

Viavi Solutions—The SmartClass Fiber OLTS-85 and 85P optical loss test sets combine industry-standard Tier-1 fiber certification with advanced endface inspection. The tools allow installers and technicians to meet the requirements of structured cabling standards without unnecessarily spending valuable time.

Wiremaid Products Corp.—Cable-Mgr Pro-10 Series cable tray enables one-tool installation and can dramatically reduce installation time in the field. This reduced-installation-time characteristic was critical for Power Design's installation project at its newly expanded corporate headquarters.

2016 Cabling Installation & Maintenance Gold Innovators Awards

Gold

Organizations were honored with Gold level awards by demonstrating an innovation that is considered excellent, and whose benefits are clear, making a substantial improvement over previous methods employed, approaches taken, or products and systems used.

Brother Mobile Solutions—The LabelLink Cable Labeling App, offered by Brother Mobile and Fluke Networks, manages the test and labeling processes, results and assets. The solution bridges the gap between the office, where the project originates, and the jobsite, where the project data are needed in the testers and labeling tools.

Fluke Networks—LinkWare Live with Asset Tracking helps contractors, installers and project managers track and manage their testers and maximize the return on this investment. LinkWare Live's asset tracking and management capability is based on Google WiFi location services; it tracks device locations as well as tracking and reporting software version, and calibration and status reports.

Fluke Networks—The introduction of SmartLoop Technology makes OptiFiber Pro the first OTDR that comes standard with the ability to test two separate fiber links in both directions from one end in a single test. SmartLoop provides instant bidirectional averaged results as required by TIA-568.3-D, reducing the time required for testing by 50 percent or more.

Global insurance and financial services firm—This Fortune 100 company turned to Panduit's small-gauge harnesses for space and speed. Large cable bundles in the company's intermediate crossconnect had become congested over time. Panduit's 28-AWG switch harnesses provided a solution; the customer used 6-foot lengths of these Category 6 patching harnesses, whose quick-connect feature connects six ports at a time.

Leviton Network Solutions—The Atlas-X1 Connector Platform is a U.S.-manufactured tool-less, icon-ready platform that accommodates shielded and unshielded cabling, covering performance levels from Category 5e to Category 8. Available in shuttered and non-shuttered versions, the platform has been deployed in several universities—including California State University, Monterey Bay—as well as data centers, medical centers and other mission-critical networks.

Pentair—The Caddy Rod Lock Threaded Rod Mounting System allows contractors to prefabricate complex assemblies at ground level or offsite, then easily lift and lock them into place by pushing the threaded rod supports into the Caddy Rod Lock device. The system's push-to-install design reduces the installation time of threaded rod support structures when compared to conventional fasteners.

Purdue University—The university undertook an ambitious project to provide 100-percent student coverage in residence halls and to move beyond 100-percent coverage in academic buildings. The project included installation of 1,300 access points, bringing the campus total to 8,600. The use of Panduit's 28-AWG patch cords allowed the university to use existing surface raceway in residence hall rooms; in academic buildings new Category 6A cabling was installed to access points.

Viavi Solutions—The FiberChek Probe Microscope delivers an all-in-one handheld solution for fiber technicians. The autonomous device includes live image viewing, auto-focus, auto-center, pass/fail analysis and the ability to store and recall results. The FiberChek Probe Microscope pairs with mobile devices, laptops and other Viavi instruments via WiFi, Bluetooth and USB.

2016 Cabling Installation & Maintenance Platinum Innovators Awards

Platinum

The four honorees receiving Platinum Level Awards demonstrated superb innovation that is characterized by a groundbreaking approach to meeting a need, or a groundbreaking level of performance, efficiency, or ease of use.

AFL Test and Inspection Division—FlexScan Complete Kits bundle the company's pocket-sized FlexScan OTDR with integrated Optical Light Source, Optical Power Meter and Visual Fault Locator, together with its FOCIS Flex autofocusing, self-contained connector inspection probe, OFI-BI Optical Fiber Identifier for bend-insensitive fiber and cleaning supplies in a soft carry case.

Belden Inc.—REVConnect, which stands for "Reliable, Easy-to-use, and Versatile," enables an installer to learn just one process, and use just one tool, to perform any connectorization from Category 5e to Category 6A shielded or unshielded jacks, as well as Category 6A field-mountable plugs. REVConnect has been shown to support 100W Power over Ethernet devices such as LCD monitors and pan/tilt/zoom security cameras.

EXFO Inc.—The TestFlow Process Automation and Analytics Solution digitizes and automates field construction and testing of fiber-optic networks, ensuring that work performed by technicians is labeled and tracked 100 percent of the time, without the need for post-processing bookkeeping, unnecessary processing, or manual collection of results. The technology also standardizes all tasks and tests to provide national workforce conformity to quality construction and testing processes. TestFlow also centralizes and analyzes all field and test results into a unified set of dashboards for convenient verification and tracking focused on job performance, status, efficiency and quality.

Superior Essex—PowerWise Category 5e+ 4PPoE cable was installed at Launch Fishers, a 52,000-square-foot building whose occupants use co-working office space. Specifically, 10,000 feet of the 22-AWG cable were used to connect from Cisco 3850 switches to LED lights. PowerWise Cat 5e+ delivers the 60W of power necessary to support LED lights with 98-percent power efficiency while also supporting 1-Gbit/sec speeds.

2016 Cabling Installation & Maintenance Gold Innovators Awards

Purdue Delivers Wireless Access with Innovation

For today's students, wireless access is a must-have. Purdue University delivered wireless access to students living in residence halls with an innovative solution using Panduit 28-AWG cabling, surface raceway, and faceplate-sized access points. Congratulations, Purdue on your "Boilermaker" Gold award!

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2016 Cabling Installation & Maintenance Gold Innovators Awards

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2016 Cabling Installation & Maintenance Silver Innovators Awards

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The many problems of using IPA for cleaning fiber optics

Isopropyl alcohol is an inappropriate cleaning agent for fiber optics. Here's why, and which options are better.

BY EDWARD J. FORREST JR., RMS

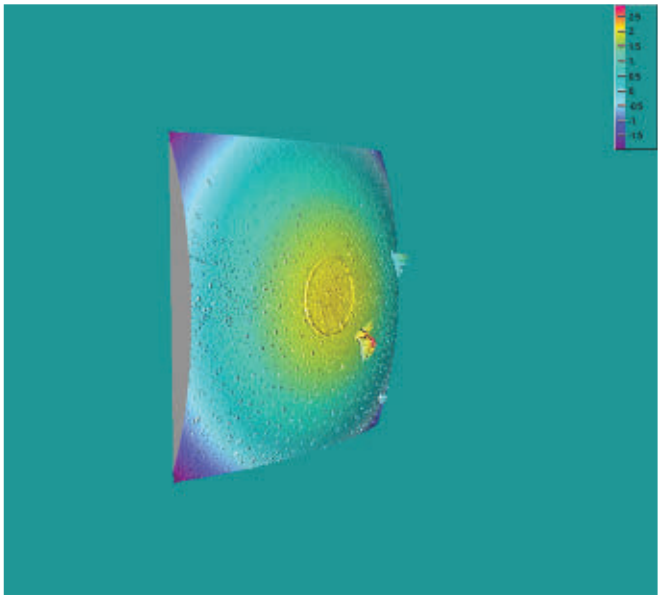
In the world of fiber optics, there only are two truly critical precision cleaning operations. The first is "prep" before a fusion splice. The other is endface cleaning. Both are essential to deployment of reliable, high-capacity networks. But as new and advanced as modern fiber networks might be, most technicians still are cleaning them with the same fluid used in the 1960s: isopropyl alcohol, also called IPA.

So here's the headline: To get the most from their investments in advanced fiber equipment, companies must update their cleaning processes and stop using IPA. Over the past 20 years, the precision cleaning industry has developed high-performance products that cost less, are safer to use and perform better than traditional alcohol cleaners. Let's take a look.

Why clean?

The basic reason to clean is as simple as the stain on your shirt. In fiber optics, this is not merely a cosmetic issue. Stains and debris on an optical surface will degrade the transmission of the signal. "Clean" directly equates to more-reliable transmissions and mechanically stronger splices. Optical fiber must be pristine to transmit reliably and to splice properly.

The existing standard for endface cleaning is confusing. IEC 61300-3-35 clearly states that IPA is no longer acceptable for endface cleaning. But IPA commonly is packaged and promoted for fusion-splice prep. Far too often splicers and endface cleaners forget to send each other "the memo": Do not use this chemical for every fiber cleaning application.

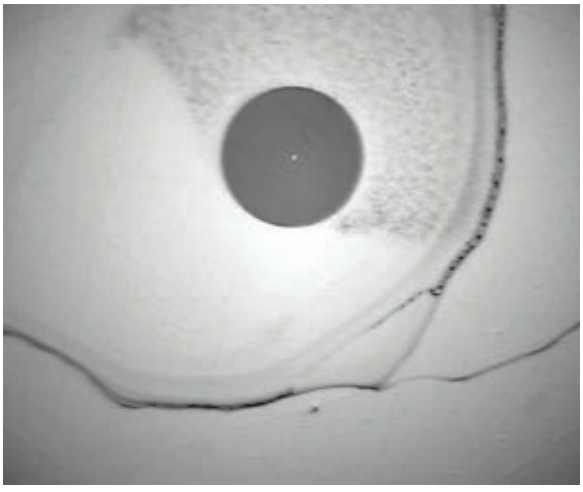


This image taken by an interferometer shows alcohol residues on a fiber-optic endface.

Throughout the 1990s numerous new solvent choices evolved to replace ozone-depleting chemicals, and some of these experiments migrated into the fiber-optic industry. Some companies used alcohol in different mixtures. Precision hydrocarbons were tried and "tweaked" to minimize environmental issues. New chemicals such as hydrofluoroethers (HFE) and hydrofluorocarbons (HFC) entered the market. I even have seen companies using unconventional cleaning fluids, such as dishwashing detergent and SimpleGreen. It was a crazy time.

Most of the exotic (and ineffective) practices died out due to economic, environmental, performance or worker-safety concerns. Today the list has been abbreviated to just a few, proven choices. Amazingly, more as a nod to tradition than effectiveness, IPA remains on the list. There is another reason: IPA is inexpensive and often purchased from a drug store.

I recall training a fiber-optic distributor and gently suggesting to the owner that IPA was not the best choice for cleaning fiber. Coolly, he advised me



Isopropyl alcohol, IPA, leaves residue on a fiber endface, as documented by this microphotograph.

that he and his mom had started their massive international business transferring IPA from 55-gallon drums into small bottles. Their highly successful enterprise exists to this day and, "We're not going to change," he informed me.

But one has to ask, why not? Why have perceptions of IPA remained unchanged while everything else in the industry has evolved at a furious rate?

What don't we understand?

Isopropyl alcohol has many names. On safety data sheets it may be called isopropanol, rubbing alcohol, propan-2-ol, 2-propanol, dimethyl carbinol or just IPA. It is an organic compound with the chemical formula C_3H_7OH. No matter what the name, the safety data sheet will carry the official "CAS number" of 67-63-0. It is a colorless, flammable compound with a strong odor. It has a wide variety of medical, industrial and household uses but it has many flaws as well.

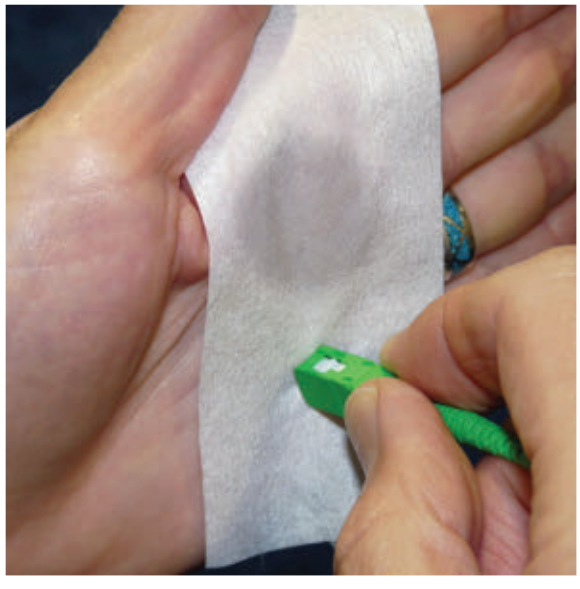
For a start, IPA is neither a very effective nor very versatile cleaner. IPA's cleaning ability is limited to human body oil and iconic salts but not much more. IPA is not effective on mineral oils and most hand lotions. IPA does not clean oils and greases very well. Because fiber optics have now expanded into mining, oil fields, as well as telecom networks and data centers, selecting "the right stuff" becomes an essential best practice.

Drying speed is another issue with IPA. Slow-drying IPA can be trapped inside a fiber-optic connector. This once-pure liquid may leach out inconveniently and contaminate an endface. A familiar characteristic of any liquid is its boiling point; the lower the boiling point, the faster a liquid will evaporate. Water boils at 100 degrees Celsius and dries slowly; alcohol boils at 78 degrees Celsius so it dries slowly as well. Many companies have introduced new cleaning choices that boil near room temperature. These cleaners will "flash dry" and will not leave contamination or moisture trapped on the fiber.

IPA has another unexpected characteristic; it is hygroscopic, which means it attracts moisture to itself. Studies of 99.9-percent IPA reveal that a bottle of IPA in an open container will lose 7 percent of its strength in as little as 15 minutes. IPA continues to absorb moisture until it reaches equilibrium at about 65 percent. This is why the "rubbing alcohol" purchased at a local store is about 30-percent water. The manner in which the cleaner is packaged is critical to its performance.

Water doesn't just dilute IPA's already-feeble cleaning power. It also will add residues carried in the air. These contaminants from the air—and others from those cheap plastic bottles—will be left behind when the IPA dries. This is the source of the "haze" that IPA leaves after cleaning. The haze may interfere with transmission of light (increased insertion loss) and also may affect the transmission of one wavelength versus another wavelength, which can be very troubling in wavelength-division-multiplexing systems.

No matter how pure the IPA may be when purchased, it will become contaminated when it is poured into a pump bottle, dispenser or an uncovered container. Guaranteed. Each time a drop of IPA is squeezed out of a traditional pump-bottle, air enters. This is reality—not just sometime, not just maybe—but each time it is dispensed. IPA out, water and contamination in. For optimal results, the packaging should be hermetically sealed.



A best practice is to conduct wet-dry cleaning, using ultra-pure, fast-evaporating nonflammable cleaners and hydrogenated non-woven polyester/cellulose cloth.

There is another concern: the "headroom" in the drum or pail of IPA will have air that

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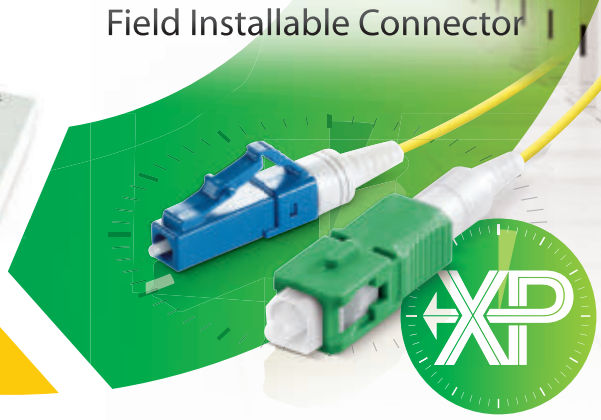

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contains moisture. This exposure continues hygroscopic deterioration. There is no practical way a technician can estimate the purity of IPA that has been opened or improperly stored. The best practice is not to use the IPA at all.

Can companies buy pure IPA and solve the haze problem? Many try, but I believe that the purchase of 99.9-percent "reagent grade IPA" is a waste of money and effort. Here's the little secret about reagent grade IPA: Because it is the most pure it is the most hygroscopic; 99.9-percent reagent-grade IPA will reduce itself to drug-store purity long before the container is emptied. Unless the techs are buying reagent-grade IPA in a hermetically sealed container and using it under very controlled conditions (such as protecting it with a nitrogen blanket to control moisture absorption), your company is just wasting money.

Storage and packaging are problems rarely discussed, but are crucial in this environment. IPA is a hazardous liquid because it is flammable. All flammables should receive special storage and handling. These characteristics also make it difficult and expensive to ship IPA, and IPA certainly cannot be carried onto airplanes because of numerous TSA, DOT, FAA and IATA (International Air Transport Association) regulations. As a result, it often is difficult for techs in remote locations to have the proper cleaning fluid on hand. A better choice would be to select a nonflammable, nonaerosol, nonhazardous liquid, which are easy to ship anywhere.

Environmentally, IPA is a volatile organic compound (VOC). This means it contributes to local smog. Now, tiny bottles of IPA aren't going to do much damage. But many locales—including California and New Jersey—have implemented clean-air legislation that make it very difficult to legally use VOCs in such containers. Emerging nations such as China have also considered the VOC problem to become a better global neighbor. So while a technician may be able to get IPA it may not be legal to use it. Single-use penalties can be as high as five figures and include incarceration. Yes, we live in a new legislative environment, and one of "best practice" performance.

Pictured here is a technician wetting a wipe with an appropriate cleaning fluid.

For fusion splice prep there is one last concern: The residual moisture in the IPA will corrode the electrodes on expensive fusion splicing equipment. As the high-intensity arc fuses the fibers, the heat not only evaporates remaining IPA, but also the moisture embedded in the IPA. Yes, you can replace the electrodes, but would it not be better practice to select a chemical that does not hasten their demise? This is the reason many major fusion-splice producers have gravitated away from IPA for splice prepping and now market application-specific products in unique packages.

Fluid for automated endface cleaning

At the European Conference on Optical Communication (ECOC), held in late September in Dusseldorf, Germany, MicroCare Europe featured CleanBlast as part of its Sticklers fiber-cleaning portfolio. Specifically, Sticklers announced that CleanBlast-compatible HFE-based fiber cleaning fluid from Viavi Solutions is now packaged by Sticklers.

"The CleanBlast chemistry is engineered for the automated, high-speed cleaning of fiber endfaces using the CleanBlast systems manufactured by Viavi Solutions," Sticklers explained. "These systems are widely used around the world by OEMs making transceivers, patch cords and other quality fiber-optic devices. Thousands of systems are in use in Europe, the USA, Mexico and across Asia and every one of these systems needs a supply of the CleanBlast HFE-based cleaning fluid."

Though not for use in the field by technicians to keep fiber endfaces clean, CleanBlast is an important piece of the fiber-connectivity ecosystem in that it ensures that endfaces are clean when they leave the factory. As of the conclusion of ECOC on September 21, Viavi Solutions no longer offers the cleaning fluid; it now refers customers needing CleanBlast fluids to Sticklers.**—Ed.**

What's the answer?

The point is simple. There have been many important advances in the science of cleaning over the past three decades. The essential reality is IPA has been surpassed and replaced by safer and more-effective chemicals.

Fiber optics need fast, consistent and reliable contamination removal, as well as a dry surface. The selection of a fluid for cleaning fiber optics is a complex tradeoff of many attributes—cost, storage, handling, purity, actual cleaning ability, drying time and worker safety to name a few. Modern, nonflammable fluids, along with the appropriate non-cellulose wipers (no paper, cosmetic-like nose tissues!), are the best choice to ensure a clean surface that is optimized for ultra-high speed and ultra-capacity for fiber optics. The best choices are ultra-pure, fast-evaporating, nonflammable cleaners in non-refillable, hermetically sealed containers. When choosing a wiper, I prefer hydrogenated non-woven polyester/cellulose cloth, not cheap paper wipes. These are readily available. Just ask.

Look for better products. They are on the same catalog page as IPA. Remember, by the time that expensive reagent-grade IPA is used it will have lost almost all its cleaning ability, wasting time and money, and compromising the performance of your network. ◆

Edward J. Forrest's career in fiber optics has included the issuance of several patents, development of products in production, and pending patents. He is recognized as an expert on the three-dimensional nature of connectors, contamination, cleaning and the implications for network design and performance. Forrest wrote this article on behalf of Sticklers (www.sticklerscleaners.com). He can be reached via email at edforrest@fiberopticprecisioncleaning.com. The images in this article were supplied by MicroCare's Sticklers Products.

Air containment and seismic readiness can coexist in the data center

Seismic isolation and preapproved hardware are possible paths to achieving both, at least according to one oft-quoted airflow expert.

BY PATRICK MCLAUGHLIN

Managers of data centers or other computing centers who must factor seismic protection into their everyday planning face specific and sometimes daunting considerations. As we reported a little more than a year ago ("Seismic-activity preparation requires care in product selection," September 2015), the International Building Code (IBC) incorporates ASCE 7 Minimum Design Loads for Buildings and Other Structures, which was developed by the American Society of Civil Engineers (ASCE). ASCE 7 includes guidelines and calculations intended to prevent nonstructural components from sliding or overturning in an earthquake.

The IBC separately categorizes facilities and components/nonstructural elements, based on the earthquake-related risks associated with them. Data centers rank highly, as in high-risk, among facilities. Equipment like network cabinets and racks are rated as components/nonstructural elements.

Of note, the state of California has its own set of codes—the California Building Code—that incorporates much of the IBC's content but also includes specifications particular to state laws.

Regardless of its location, a data center that has to be prepared for potential seismic activity also faces many of the same challenges that data centers everywhere face—including thermal management.

In a post to Upsite Technology's blog earlier this year, critical facilities consultant Ian Seaton weighed in, with heavy detail, on the practicality of achieving both seismic preparedness and thermal management. Seaton began the blog post, titled "Achieving data center containment through seismic requirements," by stating bluntly, "Conventional wisdom is pretty clear that when it comes to a choice between saving a buck and saving your butt, anatomy takes precedence." For that reason, he says, when a data center is located in a seismically active area, "prudence, and sometimes relevant building codes, typically guide us to focus our energy on designing and building a data center that will stay put on shaky ground and lose sight of the airflow containment strategies that help our operating dollars stay put as well."

It doesn't necessarily have to be that way, he asserts, to the tune of about 1500 words. This article will paraphrase and excerpt some of Ian Seaton's teachings on the coexistence of containment and seismic readiness.

"Not only are seismic considerations no reason to compromise on airflow containment best practices; there are situations in which such compromises are not even allowed," he explains. "In California there are very stringent requirements for the seismic sturdiness of data centers in hospitals and other life-safety-critical applications. These requirements are defined and enforced by the Office of Statewide Health Planning and Development (OSHPD)."

He adds that, "California Administrative Code, Chapter 6, Table 11-1 defines that all communications systems in an NPC-2 building must be braced or anchored in compliance with Part 2 of California Title 24 ... Part 6 of Title 24 dictates that there must be a physical barrier between the supply air mass and return air mass in all data centers with an IT load in excess of 175kW such that the heat load removal path inside the IT equipment

is the only path between those two air masses. Data center seismic robustness and energy-efficient airflow containment are therefore required by the same umbrella government regulation."

Seaton acknowledges that, of course, data centers are built outside of California, and therefore not subject to the regulations that make both seismic readiness and airflow containment a matter of law. In those places, the aforementioned IBC and ASCE documents prescribe. Then, Seaton says, "Once a seismic requirement has been established, the next question addresses how to both meet the seismic requirement and derive the airflow containment benefits.

"Seismic isolation might be the easiest path," he continues. "If a building were supported on columns equipped with friction pendulums, the entire building could effectively float above the earthquake movement. This isolation would essentially allow the data center located within such a building to look like any other data center with standard server cabinets and any of the traditional hot-aisle containment, cold-aisle containment, or chimney cabinet airflow separation topologies."

He adds that partial isolation—isolating individual or groups of server cabinets—may also be a possibility, albeit with complications including "the potential instability of the large return hot aisle duct" precluding hot-aisle containment.

Seaton also offers up the use of preapproved seismic hardware as an option. When taking this approach, he advises, one should "begin with as many preapproved seismically ruggedized pieces of hardware as can be specified that meet the rest of the application performance requirements. One possible starting point would be GR-63 CORE-compliant server cabinets. Such cabinets have been tested on a shaker table under extreme motion conditions and not only have survived, but have performed under a tight deflection threshold that assures the survivability of components mounted within and accessories attached externally.

"Another source of hardware that will offer a little more flexibility and variety will be the OSHPD Pre-Approval of Manufacturers' Certifications (OPM) list," according to Seaton. The list is available on the oshpd.ca.gov website. "This list will not only include server cabinets from multiple vendors, but it will include associated pathways and other ancillary accessories, with bills of material and instructions for anchoring and bracing."

He pointed out that at the time of his post in January, the OPM lists did not contain containment products "primarily because they are so typically application-specific, so this is where a structural engineer gets involved with the project to use IBC methodology to certify design-specific elements." He later emphasized that the key "is to start with GR-63 CORE or OPM components that have been seismic certified and then have the containment additions certified on-site, which will likely require additional anchoring and bracing tactics, which should also be a part of that engineer's expertise."

In conclusion, Seaton notes, "The available options for incorporating airflow containment within a data center that meets some level of seismic withstanding compliance means that there really is no good reason for compromising on airflow management." ◆

Patrick McLaughlin *is our chief editor.*

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Copper vs. fiber considerations for industrial networks

An industrial environment's harsh conditions will require certain physical characteristics, regardless of which media type you choose.

BY BRIAN SHUMAN, BELDEN INC.

Engineers strive for maximum productivity with minimal downtime, but this goal is only attainable with the right network infrastructure. No matter the industry, if a team doesn't have the right cabling system in place, network reliability and performance can be compromised, leading to very costly production downtime.

This is why investing in high-quality, rugged cabling is crucial; it can reduce both the direct and indirect costs of network failure and give you peace of mind that the system is working properly. There are a variety of cabling options out there, so how do teams know they have the right one to support their specific infrastructure and network requirements? Deciphering whether you need fiber or copper cabling is a great place to start.

Whether twisted-pair copper or optical-fiber cable is the choice for industrial-network cabling, the medium's physical characteristics have to stand up to the network's environmental conditions.

Copper: The classic cabling mix

Copper cabling is the traditional option in industrial installations and is best suited for the majority of industrial data transmission needs. Copper cables come in a variety of forms, including Category 5e, Category 6 and Category 6A twisted-pair cables using any number of conductor types, insulations, shielding and jackets. Armoring is also available for extremely harsh environments.

Category 5e cables are the most widely used copper cables today, but new installations favor the use of Category 6 cables to meet required Gigabit speeds and increased headroom. Category 6A cables are also an option for extreme futureproofing, minimizing the lack of bandwidth and headroom.

Teams must be careful when using copper cabling as it can stimulate potential failure points due to ingress from electrical noise, also known as electromagnetic interference (EMI) or radio-frequency interference (RFI). In light of this risk, these cables can also limit bandwidth capacity and signal transmission at extended distances.

Fiber: The ultimate for futureproofing

Fiber-optic cabling is ideal for industrial environments in which high-speed, high-bandwidth data solutions are needed. Because fiber-optic cables are typically superior in bandwidth, low attenuation and complete electrical noise immunity, more information can be carried across the network without interruption. They are also smaller and lighter than copper cables, extremely durable and intrinsically safe, with no risk of spark hazards.

Fiber-optic Ethernet cables are available for both indoor and outdoor

use, including situations where cables need to be buried underground. For example, fiber-optic cabling is great for campus and in-building data backbones because they can anchor to an operator's Ethernet, and also for point-to-point digital signal transmission.

Other important considerations for fiber-optic cables include the following.

- Typical designs for fiber-optic cables consist of multimode fibers in a loose-tube configuration, commonly available in 2 to 72 fiber constructions.
- To handle Gigabit Ethernet light sources and any expanded bandwidth requirements, some cables use a laser-optimized fiber.
- A basic commercial off-the-shelf (COTS) fiber-optic cable will likely not withstand industrial conditions given it is intended for enterprise applications. A fiber-optic cable that is designed with ruggedized features to operate in industrial settings is needed.
- In particularly harsh environments, a chlorinated polyethylene (CPE) outer jacket will provide additional protection against chemicals or abrasion. An armor tape or aluminum/steel interlocked armoring may also be appropriate for extreme environments.
- For moisture protection, a water-blocking agent should be included in the cable construction.
- Look for fiber-optic cabling with key industry ratings, including IEEE 1202-2006 for flame test and Underwriters Laboratories (UL) ratings for optical fiber, non-conductive riser (OFNR).

Four questions for copper cables

Once teams understand whether they need copper or fiber cabling, it's important to consider several physical components and surroundings of the cabling system. Here are four questions engineers need to ask when faced with a purchasing decision.

1. *Should my cable be shielded or unshielded?* Unshielded products can be used in most environments, while shielded products are recommended for environments with high noise. A foil is typically used to protect the integrity of the signal and screen out any undesirable interference or noise. To provide extra durability and protection against noise, a foil/braid combination should be used.
2. *Should my conductors be solid or stranded?* Solid conductors are appropriate for most installations,

while stranded conductors provide extra flexibility for handling smaller spaces, such as robotic or continuous flex operations.

3. *Should I go with bonded or non-bonded cables?* Bonded-pair cables provide resistance to the rigors of installation by using a manufacturing technique that affixes the insulation of the cable pairs along their longitudinal axes so that no gaps can develop between the conductor pairs. A non-bonded-pair cable construction can be susceptible to pair-gapping during installation, which results in impedance mismatches.
4. *What insulation material should my cable employ?* It depends on the application scenario. Most industrial-grade Ethernet cables use a polyolefin insulation. For extreme temperatures, a fluorinated ethylene propylene (FEP) insulation and jacket are recommended for extended operating temperatures of -70 to +150 degrees Celsius.
    - For oil- and sunlight-resistant cables, polyvinyl chloride (PVC) jackets are typically used. If the cables are exposed to moisture, a water-blocking agent should be part of the cable's construction, as well as inner and outer polyethylene (PE) jackets if the cable is buried.
    - Gas resistance cables call for FEP jackets, while low-smoke zero-halogen (LSZH) jackets are available for environments in which acidic smoke and flames are a key risk. This helps avoid smoke toxicity.
    - For continuous flexing or robotic applications, cables with thermoplastic elastomer (TPE) inner and outer jackets are recommended due to the risks and complications involved with caterpillar track (c-track) installation.

Knowing whether you need copper or fiber-optic cables and understanding the physical cabling components critical to the success of your application are the first steps in ensuring optimal performance in the face of demanding environments.

During the product selection process, it is very important to take the time to evaluate the marketplace and select top-quality, end-to-end cabling that can withstand tough environmental conditions and also fit with your specific application needs.

Taking this kind of total system approach will result in a more-integrated system with all products seamlessly matched to deliver tremendous interoperability and consistently reliable performance every day. ◆

Brian Shuman *is a senior product development engineering project manager at the Belden Engineer Center in Richmond, IN (www.belden.com).*

Data/comm cables and the 2017 National Electrical Code

Recently made available from the NFPA, the 2017 NEC includes changes of interest to professionals in the data/comm cabling field.

BY STANLEY KAUFMAN, PHD, CABLESAFE INC.

The *National Electrical Code (NEC)* is published by the National Fire Protection Association (NFPA; www.nfpa.org) with revisions on a three-year schedule. The 2017 *NEC*, which replaces the 2014 *NEC*, was released by the NFPA in August 2016.

This article, sponsored by SPI: The Plastics Industry Association (formerly known as The Society of the Plastics Industry), is intended to provide the reader with a guide to the key changes in the 2017 *National Electrical Code* that are of interest to manufacturers, installers, distributors and users of data/comm cables.

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Data/comm cables

Although widely used in the industry, the term data/comm cable does not appear in the *NEC*. The term data/comm cable, as used in this article, encompasses six families of cable types in the *NEC*, described in the table.

TABLE 1.

Cable Family	Cable Type	Applicable NEC Article
Optical fiber	OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, OFC	770
Communications	CMP, CMR, CMG, CM	800
Class 2	CL2P, CL2R, CL2	725
Class 3	CL3P, CL3R, CL3	725
Coaxial	CATVP, CATVR, CATV	820
Power-limited fire alarm	FPLP, FPLR, FPL	760

Note that cable types CMX, CL2X, CL3X and CATVX are not included in the table of data/comm cables because of the very limited applications of these cables.

Temperature limits of data/comm cables

The concept of temperature limits on electrical conductors is a fundamental safety requirement in the *National Electrical Code*. Section 310.15(A)(3) in Article 310, Conductors for General Wiring, in the 2014 and 2017 editions of the *NEC* requires that electrical conductors be installed and operated so they do not exceed their temperature limits. This long-standing requirement is in Section 310-9 in the 1978 *NEC*, which happens to be the oldest code book in this author's library.

This fundamental requirement in the 2014 *NEC* applies to cables used for Class 2, Class 3 and power-limited fire alarm circuits; including, of course Class 2, Class 3 and power-limited fire alarm cables. This requirement also includes communications cables that are used as substitutes for Class 2, Class 3 and power-limited fire alarm cables.

Section 90.3, Code Arrangement, states that "Chapter 8 is not subject to the requirements of Chapter 1 through 7 except where the requirements are specifically referenced in Chapter 8." Since there are no references to Section 310.15(A)(3) in Chapter 8 in the 2014 *NEC*, there are no requirements in the 2014 *NEC* that communications cables and CATV coaxial cables should be operated so as not to exceed their temperature ratings.

In the 2014 *NEC*, the applicability of Section 310.15(A)(3) to Class 2, Class 3 and power-limited fire alarm cables is tenuous because there are no temperature limitations in the listing requirements for Class 2, Class 3 and power-limited fire alarm cables in Sections 725.179 and 760.179; the temperature

limits are in the listing documents, UL 13, Standard for Power-Limited Circuit Cables, and UL 1424, Standard for Cables for Power-Limited Fire-Alarm Circuits. Since the listing documents require that the temperature limit be marked on a cable only if it exceed 60 degrees Celsius (140 degrees Fahrenheit), an electrical inspector would have difficulty determining the temperature limit of an unmarked cable.

The applicability of Section 310.15(A)(3) to optical fiber cables is also tenuous, since this section applies to current-carrying conductors and there are no current-carrying conductors in optical fiber cables. Recall that Section 770.3(C) requires that cables containing optical fibers and electrical conductors (composite cables) be classified according to the type of electrical conductor.

The 2017 *NEC* addressed these ambiguities in the applicability of temperature limitation requirements by requiring that all data/comm cables have a temperature rating of at least 60 degrees C (140 degrees F) and have the temperature rating marked on the cable if it exceeds 60 degrees C. New Section 800.3(H) requires that cables used in communications circuit installations comply with Section 310.15(A)(3). The only cables permitted to be used for communications circuits are communications cables, i.e. Types CMP, CMR, CMG, CM and CMX.

Powering over data/comm cables

While data/comm cables are widely used for simultaneously powering and communicating/signaling with equipment, the 2014 *NEC* does not explicitly address the issue that cables that were designed for transmission of data are now carrying sufficient power that the cables may overheat, i.e. exceed their temperature ratings. The 2017 *NEC* addresses this issue; it has a new section, 725.144 Transmission of Power and Data, in Article 725, Class 1, Class 2, and Class 3 Remote-Control, Signaling, and Power-Limited Circuits.

Anyone familiar with the *NEC* knows that the code deals with conductor heating issues through the use of ampacity tables. Ampacity is the maximum current that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. While power conductors have "conductor" temperature ratings, in the case of data/comm cables, the "cables" have the temperature ratings. The temperature ratings of the data/comm cables apply to the conductors in the data/comm cables.

While the *National Electrical Code* has many ampacity tables, virtually all deal with the large conductors used in power wiring. The smallest conductor in the ampacity tables in Article 310 is 18 AWG. An ampacity table for 4-pair, 22, 23,

Table 2. Ampacities of Each Conductor (Amperes) in 4-Pair 75°C (167°F) Rated LAN Cables at an Ambient Temperature of 30°C (86° F)

AWG	Number Of 4-Pair LAN Cables in a Bundle						
	1	2-7	8-19	20-37	38-61	62-91	92-192
26	1.0	1.0	0.8	0.6	0.5	0.5	NA
24	2.0	1.4	1.0	0.7	0.6	0.5	0.4
23	2.5	1.5	1.1	0.8	0.7	0.7	0.5
22	3.0	1.8	1.2	0.9	0.8	0.8	0.6

24 and 26 AWG cables was introduced in the 2017 *NEC* based on an extensive fact-finding investigation conducted by Underwriters Laboratories (UL). As indicated in the title, Fact Finding Report on Power over Local Area Network Type Cables (4-Pair Data/Communications Cables), the study was carried out on LAN cables. The ampacity table includes cables rated for 60, 75 and 90 degrees Celsius, and accounts for cable bundling, up to a bundle size of 192 cables. For bundle sizes over 192 cables and conductor sizes smaller than 26 AWG, ampacities are permitted to be determined by qualified personnel under engineering supervision.

The listing requirements for Class 2 and Class 3 cables are in Section 725.179. This section provides the listing requirements for Types CL3P, CL2P, CL3R, CL2R, CL3 and CL2 cables. The 2014 *NEC* includes an additional classification, circuit integrity cables. Circuit integrity cables are marked CL3P-CI, CL2P-CI, CL3R-CI, CL2R-CI, CL3-CI and CL2-CI. The 2017 *NEC* introduces another additional classification, limited power (LP) cables, which are listed as suitable for carrying power and data circuits up to a specified current limit for each conductor without exceeding the temperature rating of the cable.

Limited power cables are marked with the suffix "-LP" and their ampere limit, for example, Type CL2P-LP (0.6A), 22 AWG.

Section 725.144 permits "-LP" cables to be installed in bundles, raceways, cable trays, and cable routing assemblies without any limit on the amount of cables. Since the "-LP" listing is an add-on to the basic cable listing, "-LP" cables are permitted to be used in any application the base cable is permitted to be used. For example, a 75-degree C rated Type CL2P-LP (0.6A), 22 AWG cable is permitted to be used anywhere a 75-degree C rated Type CL2P, 22 AWG cable is permitted to be used. While a 75-degree C rated Type CL2P-LP (0.6A), 22 AWG cable is permitted to carry up to 0.6 ampere per conductor when the cable is installed in a cable tray with hundreds of cables, the simplified ampacity table (which only includes 75-degree C rated cables) shows that a 75-degree C rated Type CL2P, 22 AWG cable is permitted to carry up to 1.2 amperes in a 19-cable bundle.

The *NEC Style Manual* notes that the term "ampacity" refers to the current-carrying capacity of conductors only. It does not include, for example, the current limit of connectors used with LAN cables. New Section 725.144 has a requirement that the current in a power circuit not exceed the current limitation of the connectors. The 8P8C (8-position 8-contact) connector, which is often referred to as the RJ45 connector, is typically rated for 1.3 amperes per contact. Consequently, the maximum current permitted to be carried by each conductor in a LAN cable will often be determined by the current limits of the connector rather than the ampacity of the conductor.

New Section 725.144 provides three compliance options for installing a typical 4-pair LAN cable with 22, 23, 24 or 26 AWG conductors.

- *Option one*: Comply with the current and bundle size limits of the ampacity table (Table 725.144) for the gauge (AWG size) and temperature rating of the cable. The largest bundle size in Table 725.144 is 192 cables.
- *Option two*: If the bundles or groupings of cables are large, more than 192 cables, use "-LP" cables and comply with the current limits of the "-LP" cables. Note that this current limit of a "-LP" cable will often be less than the ampacity permitted by the ampacity table (Table 725.144) for small bundle sizes of the same cable.
- *Option three*: If the bundles or groupings of cables are large, over 192 cables, or conductor sizes are smaller than 26 AWG, a qualified person under engineering supervision is permitted to determine the ampacity.

The scope of Article 840, Premises-Powered Broadband Communications Systems, has been broadened. In the 2014 *NEC*, the scope only included services provided through an optical fiber cable. In the 2017 *NEC*, that limitation has been removed to permit any input, thereby recognizing systems based on ubiquitous multipair communications cables and CATV type coaxial cables. Article 840 has a new Part VI, Premises Powering of Communications Equipment over Communications Cables. New Section 840.160, Powering Circuits deals with the issues of powering communications equipment over communications cables. Section 840.160 requires compliance with Section 725.144 when the power supplied to a communications circuit over a communications cable is over 60 watts, except that Section 840.160 requires communications cables to be used rather than Class 2 or Class 3 cables permitted in Section 725.144.

Requiring use of a communications cable rather than a Class 2 or Class 3 cable is not a significant restriction because communications cables are widely used for communications as well as Class 2 and Class 3 applications. Typically, LAN cables are listed as communications cables because communications cables are permitted to substitute for Class 2, Class 3 and non-power-limited fire alarm cables. Listed communications cables, because of the permitted substitutions, are effectively universal cables for all data/comm applications.

Painting of cables

In the construction of office buildings, cables are often installed before construction is completed. Consequently, communications cables may be inadvertently spray-painted or coated with foreign substances. Painting the cables can change the cable performance properties in unknown ways. This is especially true of plenum cables, which are designed to have excellent fire resistance properties. Painting of plenum cables will likely compromise their excellent fire-safety properties.

In order to alert users to this issue, Informational Notes have been added to Article 770, Optical Fiber Cables, Article 800, Communications Circuits, and Article 820, Community Antenna Television and Radio Distribution Systems. The notes warn that paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants may result in an undetermined alteration of the cable properties.

Plenum-grade cable routing assemblies

The 2017 *NEC* has new listing requirements for plenum-grade cable routing assemblies. The new requirements correlate with those that are specified in the 2015 edition of NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*. In the 2014 *NEC*, plenum-grade cable routing assemblies were listed to a less-rigorous test and they were not permitted to be installed in plenums. In the 2017 *NEC*, plenum-grade cable routing assemblies are permitted to be installed in plenums. Only listed plenum cables, Types CL2P, CL3P, FPLP, CMP, CATVP and BLP are permitted to be installed in plenum cable routing assemblies that are installed in plenums. ◆

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DALE WILLIS, a 20-year industry veteran, is vice president for Milliken Infrastructure Solutions LLC (infrastructure.milliken.com).

Futureproofing for FTTx: How to address the growing challenges of congested conduit

Segmented conduit can help operators to execute the "dig once" philosophy.

BY DALE WILLIS, Milliken Infrastructure Solutions LLC

Earlier this year, Verizon surprised many by announcing its plans to extend its fiber network into Boston, a move that caught many off guard. On the surface, the move seems to contradict the communications company's recent strategy to limit the expansion of its FiOS fiber-to-the-x (FTTx) services. But by upgrading existing copper networks to fiber, the company is actively working to create a single fiber-optic network that will support both wireless and wireline technologies.

In making its announcement, Verizon also suggested that it is in discussions with other cities about similar projects. Some would speculate that most of those cities would be in the northeastern U.S., where Verizon has a significantly larger footprint. However, it is worth noting that last year Verizon deployed fiber throughout San Francisco in preparation for the Super Bowl, so its plans for FTTx could extend elsewhere.

What made the San Francisco deployment possible was Verizon's ability to utilize available space in the utility company's conduit—a luxury that might not be available as the company tries to upgrade lines in the likes of Boston. Boston might be the birthplace of Benjamin Franklin, one of America's great visionaries, but when it comes to infrastructure, it's like many other larger metros wrought with issues that could have been addressed with long-term cable management planning.

Boston is a historic city with nearly 700,000 residents, so any project that requires dealing with the metro's infrastructure will face a number of challenges. In addition to dealing with restrictions dictated by historical regulations, existing above-ground utility lines and a range of mixed-use buildings, one of the biggest obstacles any operator would face would be how to deal with areas where there is simply no more room to add new conduit.

In many cases, especially in large, developed metros, companies don't have the benefit of utilizing existing conduit for new fiber runs similar to those Verizon handled in San Francisco. This may not be a possibility in places like Boston because existing conduits are already incredibly crowded, packed full of various cables from a range of different vendors, some of which aren't even in operation any longer. In New York, for example, existing conduits are so congested that telecom companies are forced to route new runs via much longer—and much more expensive and time-consuming—detours.

While deploying FTTx within large, older cities has a myriad of challenges, some of that potential headache could be avoided by those cities looking to "futureproof" against similar problems. By avoiding the trap of trying to cut corners now to save time, FTTx owners and operators can look at emerging practices and deployment methods to ensure they're set up for success—operationally and financially—in the long run.

There are several examples of public-private partnerships that help to address and possibly eliminate these issues. In some scenarios, a public entity (e.g. the state, county or city)

takes ownership of the network infrastructure, working to deploy materials that can be easily upgraded as technologies change. The public organization then contracts out various vendors to operate the network systems and/or provide network maintenance as needed. This model ensures that the network is deployed in a way that enables local leaders to better plan for and finance FTTx, limiting the challenges of having multiple vendors fighting over the same infrastructure real estate. At the same time, telecom and other utility providers have assurance that they'll have an available, organized infrastructure in place to meet their evolving needs.

In an ideal scenario, these deployments would focus on a "dig-once" mentality, installing minimal conduit, perhaps just one, limiting the amount of space needed. With the availability of segmented conduit, once a conduit is in place, multiple fiber cables could be run within a single conduit at the same location, thus increasing the limits of conduit capacity.

It's worth noting that it is desirable from both a cost and time standpoint to make use of the dead space within an existing conduit, rather than laying a new length of conduit. However, it is difficult to insert fiber into a conduit that already contains cables or other wiring, which would be the case in most cities looking to deploy FTTx. When a new cable is blown or rodded into a conduit with an incumbent cable, the first cable often impedes placement. The rope can become tangled with, or twisted around, the first cable, causing damage to the cables' protective outer sheaths. Industry standards dictate that only one fiber or cable run should be placed within a dedicated pathway. However, the size of fiber only occupies a very small percentage of the available space within the conduit, warranting the readdress of the use of existing conduit space.

With segmented conduit, a single conduit with multiple cells, network owners have spare pathways available to add capacity or bandwidth without requiring new construction—hence "digging once." Additional bandwidth can be added without expensive and time-consuming engineering or permitting, avoiding the traffic disruption that occurs during construction activity.

The benefit of segmented conduit is perhaps greatest in applications in which the cost of conduit deployment is highest, which is often these areas where there is limited or no space in existing infrastructure. Its cost of the deployment is dependent on the size of the bore required, plus the location and terrain of the job—which if in a city like Boston, would make it even more difficult. The size of the bore is dependent on the number of conduits to be placed so if operators can limit the number of conduits, they obviously can reduce the size of the bore needed for the install.

Additionally, in major cities like Boston there are a multitude of existing utilities to avoid during the boring process. A smaller bore reduces the chance of hitting these existing utilities, such as water mains, natural gas distribution networks or telecom networks. Smaller bores equate to greater overall efficiency and cost savings. In addition, fewer conduits mean lower labor cost associated with handling, storage and installation.

If operators and owners want to get serious about FTTx, they have to take into consideration how future technologies could impact existing infrastructure. And a great way to plan against that is to ensure that the products being deployed now allow for future growth and expansion. ◆

PRODUCT FOCUS

IP CAMERAS

Low-light cameras

Honeywell of Northford, CT offers a new line of IP cameras featuring low-light capabilities, allowing them to work nearly anywhere, the company says. "With the new equIP and HDZ PTZ cameras, you can receive accurate, high-quality color surveillance in any low-light conditions, allowing you to reduce potential risk and make informed decisions," Honeywell adds. "WDR [wide dynamic range] ensures you have continuous high-resolution video in contrasting levels of light, which allows you to accurately identify people and objects."

The HDZ PTZ cameras are ONVIF S-compliant, and the equIP cameras are ONVIF S- and G-compliant allowing these cameras to integrate with most network video recorder (NVR) systems, including Honeywell's MaxPro NVR. Honeywell's video portfolio also includes the Performance Series, embedded NVRs, MaxPro Cloud, and Xtralis analytics.

Honeywell, *www.security.honeywell.com*

Video intelligence analytics

Tyco Security Products recently introduced video intelligence analytics at the edge for Illustra IP cameras. Users of Illustra IP cameras now have access to "powerful video intelligence analytics to automatically analyze captured video and alert users of specific motion-detected activities," the company says. "The new intelligence analytics alert operators of key events that need immediate attention for perimeter detection in airports and critical infrastructure and give additional insight to daily operations, such as crowd monitoring for retail applications."

Illustra video intelligence analytics are available on the Illustra Pro 2, 3 and 5 megapixel minidome IP cameras. Tyco Security Products adds that the analytics are easily integrated with American Dynamics VideoEdge network video recorders and victor video management system. The analytics offer the following new video analytic rule options: object removed, linger, abandoned object, enter/exit, crowd formation, and dwell analysis.

Tyco Security Products, *www.illustracameras.com*

EDITOR'S PICKS

News, products and trends for the communications systems industry

- POE HEAT GETS FOILED
- EMERSON SELLS NETWORK POWER DIVISION
- CABLE DRESSING AND BUNDLING TOOL

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WIRELESS

3M's conceal film masks cell site wireless infrastructure

As wireless infrastructure can be a visual nuisance to its host communities, 3M's new Conceal Film eliminates visual pollution by adhering to antennas and blending cell site equipment into its surrounding environment, with no impact to radio frequency performance and no signal degradation, claims the company. By combining several of the company's core technologies and with its expertise in films and adhesives, the 3M Conceal Film is designed to offer an effective yet unobtrusive solution for visual pollution.

The product is a new generation of 3M's high-performance, nonmetallic reflective film technology. The company says the Conceal Film, reflective over the full visible spectrum and capable of radio frequency transmission into the microwave range, is specially formulated with an adhesive backing that provides long life in outdoor environments and excellent ultraviolet irradiance stability. Other key attributes of the product, according to the company, include: radio frequency properties (metal-free, the film's alternating polymeric layers reflect visible light while enabling an unobstructed transmission of radio frequency signals); and adhesion (the 3M Controltac Graphic Film with 3M Comply Adhesive system provides a simple, initially repositionable, bubble-free application using a "dry" application method).

The company maintains that "at present, many cell site expansion projects stall during negotiations involving project planners and city government. Debates over land use and visual aesthetics are common, and can cost developers and carriers valuable time and resources during the expansion process." 3M says its Conceal Film makes it easier for carriers to place needed infrastructure and helps municipalities provide residents with best-in-class connectivity without compromising their community's visual appeal. "The wireless industry is once again going through a new revolution where ubiquitous communications, vast infrastructure, massive connectivity, reduced latency and sustainability are the new norm," comments Omar Flores, 3M's global business manager. "At 3M, we have developed a unique film that allows the industry to conceal infrastructure, which enables mobile operators to deploy and blend networks for reduced visual pollution with no radio frequency interference."

The development of the 3M Conceal Film comes on the heels of a growing demand for cell site infrastructure to keep pace with increased mobile use worldwide. According to the 2016 Ericsson Mobility Report, global mobile subscriptions are growing 3 percent year-on-year, totaling 7.4 billion in the first quarter of 2016. But that's only one part of the industry's growth. The same study reports mobile broadband subscriptions growing some 20 percent year-on-year, for a total of 140 million subscriptions in the first quarter of 2016. The bottom line is, mobile carriers are continually increasing capacity and coverage — building new cell sites — to stay competitive. Carriers can potentially achieve faster site acquisition by reducing the visual impact of cell sites — a major benefit of the 3M Conceal Film, claims the company.

The 3M Conceal Film was on display during the 2016 CTIA Super Mobility conference (Sep. 7-9) in Las Vegas.

PHYSICAL SECURITY

Video surveillance specialist IDIS expands U.S. sales team

Video surveillance and security technology specialist IDIS announced its hiring of Brian White as the newest IDIS America regional sales manager, and the appointment of Robert Miville to the IDIS America inside sales team. White and Miville are the latest hires in the global surveillance expert's continued expansion of its sales capacity in the Americas, "indicative of its sustained growth since its debut in the American video surveillance market in 2015," as noted by a company press release.

A veteran of the video surveillance industry, White has over 16 years of experience in enterprise sales, business development, and forming global strategic partnerships in the information technology and physical security markets. He brings with him a background of project management across multiple installations and key accounts, with a proven track record of exceeding revenue objectives and invaluable leadership experience. White will represent and manage all IDIS accounts in the U.S. Midwest region and will be based out of Columbus, Ohio.

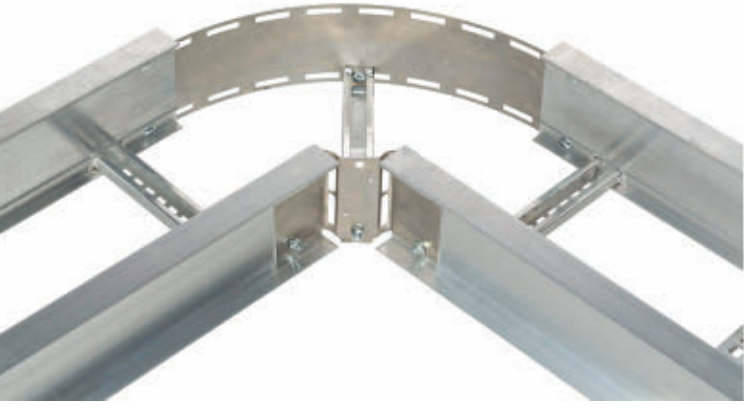
The latest addition to the IDIS America inside sales team, Miville has a multi-faceted background with experience in sales, marketing, network technology, and strategic planning. Miville will provide direct support to the IDIS America sales team at large, developing and maintaining relationships with integrators, VARs, and end users through demonstrations of the IDIS total solution and its products, performing lead follow-ups, and tailoring solutions to best meet the needs of IDIS clients.

Both White and Miville join a team led by IDIS America senior director Keith Drummond, who commented, "It has been an exciting year of growth since the launch of IDIS America in April 2015 and a large part of our early success is thanks to our world-class sales team in the Americas. We are very excited to welcome Brian and Robert to IDIS and their experience and enthusiasm will be a welcome addition to our already outstanding group of industry leaders."

CABLE MANAGEMENT

Cable tray flexible coupler kit eliminates need for bonding jumper

New from Thomas & Betts (T&B), the T&B Cable Tray flexible coupler kit features a bendable plate that allows for electrical continuity, which eliminates the need for a bonding jumper. According to the company, the flexible coupler kit also provides maximum horizontal installation flexibility and easy installation that eliminates the need for cutting cable tray side rails.



Other features of the new cable tray include an exterior strap that provides an accurate radius for any cable tray design requirements, formed ribs for greater cable protections, and no sharp edges. The product meets the electrical continuity requirements of NEMA VE1 and CSA C22.2 No. 126.1.

"We designed the T&B Cable Tray flexible coupler kit to be quickly and easily installed, and it provides excellent cable protection that ensures electrical conductivity without bonding devices. It is a flexible and economical alternative to the more common AU/AH fitting," Ralph Donati, product marketing director at T&B, said.

For more information, visit www.tnb.com and select T&B on the "Brands" tab, or call (800) 238-5000.

WIRELESS

Anritsu, TRX Systems partner to simplify in-building wireless mapping

Recently, Anritsu integrated its RF test-and-measurement equipment with the location-tracking solution from TRX Systems to create the MA8100A TRX NEON Signal Mapper, which is designed to make indoor-coverage mapping of RF signal strength easier.

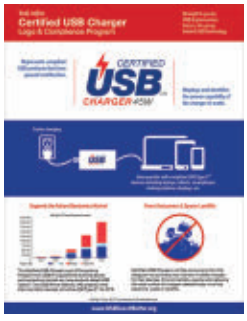
Where GPS is unavailable, the Anritsu MA8100A Series solution delivers real-time 3D location information for indoor test and measurement applications. Available with 1, 3 and 5 year licenses, the MA8100A Series consists of a TRX Systems' NEON Tracking Unit, NEON Signal Mapper Software for Android devices, NEON Command Software, and TRX Cloud Service. The MA8100A is billed by the companies as "a 3D in-building coverage mapping solution for use with all Anritsu handheld instruments with spectrum analyzer mode using channel power measurements." Instruments supported include Anritsu's LMR Master, Spectrum Master, Site Master, BTS/Cell Master and VNA Master units.

"The NEON Tracking Unit supports collection and processing of sensor data that delivers 3D location information," continues the product's data sheet. "The NEON Signal Mapper Application provides an intuitive Android user interface enabling lightly trained users to map signal and sensor information within buildings; users can initialize their location, start/stop mapping and upload/download mapping data to/from the cloud. The NEON Command Software enables creation and visualization of 3D building maps and provides centralized access to the NEON Cloud Service to access stored maps and measurement data."

"As people become increasingly dependent on mobile devices, the importance of providing indoor wireless coverage continues to grow," notes Anritsu product manager, Wayne Wong, in a newly available FAQ document regarding the MA8100A Series.

STANDARDS WATCH

USB-IF announces Certified USB Charger logo and compliance program



The USB Implementers Forum (USB-IF), the support organization for the advancement and adoption of USB technology, has announced its Certified USB Charger Compliance and Logo Program to establish USB chargers for compliant USB Type-C devices including laptops, tablets, smartphones, docking stations, displays and other products.

The Certified USB Charger Program from USB-IF supports the evolving device and computing markets as more products adopt USB Type-C and USB Power Delivery capabilities. Certified USB Chargers, based upon the USB Type-C and USB Power Delivery specifications, will free consumers from the obligation to purchase and maintain multiple chargers. Reusing chargers and reducing the total number of chargers needed will help minimize electronic waste in landfills. Additionally, Certified USB Chargers will be convenient and easy to use for consumers, states the forum.

"USB-IF understands consumers want to carry less equipment without sacrificing battery life or flexibility," says Jeff Ravencraft, USB-IF president and COO. "Guided by the USB brand promise of 'it just works,' the Certified USB Charger Program will make it easier to share device chargers across the compliant USB Type-C landscape, whether consumers are at home, in the office or anywhere in between."

Certified USB Chargers will resemble a traditional power brick or wall wart, provide faster charging and be interoperable with compliant USB Type-C products. Consumers are reminded to purchase compliant USB products from trusted sources that display USB-IF certified logos on packaging, in product briefs or on the cable or device itself.

"The future of consumer tech is mobility and letting technology disappear into the background," adds Rahman Ismail, USB-IF CTO. "Certified USB Chargers will give users an interoperable power source and a seamless experience. From displays, to smartphones and docking stations, the industry is aligning behind USB Type-C and USB Power Delivery as the last wire you'll ever need for faster charging."

Non-compliant chargers, whether USB or otherwise, pose a risk to the functionality and interoperability of electronics, claims the forum. USB-IF compliance "means that products have met the highest standards in the industry, were certified to be compliant to the specification and have been tested for interoperability with other USB products," said an official press release.

Learn more about the Certified USB Charger Compliance and Logo Program at www.usb.org.

REMOTE POWERING

R&M: Foil that reduces ANEXT also keeps cable cool in PoE applications

R&M recently stated that, after in-depth testing and investigation, it confirmed that its Category 6A WARP—WAve Reduction Patterns—unshielded twisted-pair cable dissipates heat more effectively than conventional unshielded cables in Power over Ethernet (PoE) applications.

The jacket of a WARP cable, which is characterized as unshielded twisted-pair, contains a foil that reduces alien crosstalk. "These short metal foil segments suppress alien NEXT, but do not have to be grounded, which saves on installation costs," the company explained. Originally developed to fight ANEXT in 10GBase-T applications, WARP has now also proven its ability to keep cable temperatures down in high-power PoE deployments, R&M asserts.

"WARP cables stay cool and behave just as well as shielded cables," said Matthias Gerber, market manager for LAN cabling at R&M. "That is an advantage when you are planning a local data network intended to include PoE." The company added that in large installations with "massive cable bundles and PoE operation," a WARP cable becomes less-hot than conventional unshielded (U/UTP) cables, thereby allowing a longer-distance link.

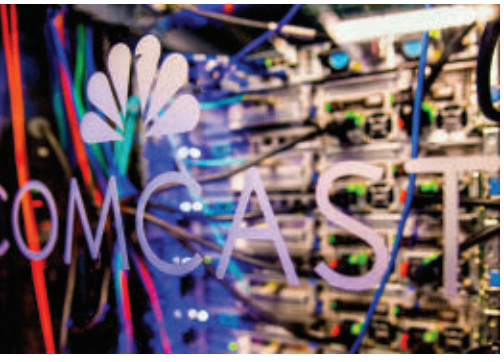
Thermal measurements on R&M's test setups showed that the Category 6A WARP cables behaved the same as shielded (F/UTP) cables. "Whereas a normal U/UTP cable of the same diameter can be expected to heat up by a factor of around 5, the R&M WARP cable can be assumed to heat up by a factor of 3—similar to a shielded cable," the company said.

"With small cable bundles, the difference between the cable types has only a minimal effect. In large installations involving massive cable bundles, a WARP cable can become as much as 14 degrees Celsius less-hot," R&M stated. "The link is allowed to be as much as 11 percent longer."

Gerber added, "With an R&M WARP cable, you have not only the ideal solution for alien NEXT but also decisive advantages for the use of PoE. Under certain circumstances, the temperature difference and the longer link can decide whether a specific installation functions or not."

FIBER-OPTIC NETWORKS

Comcast Business mounts 100G fiber-optic network expansion in Tallahassee, FL



Comcast Business announced that it has expanded its fiber network in Tallahassee, Florida to offer local businesses Ethernet services with speeds up to 100 Gigabits-per-second (Gbits/sec) and a variety of other services, including internet, voice and TV services and cloud-based computing capabilities. The expanded service offerings will support Tallahassee's developing business climate, which landed it among the top 200 U.S. cities on the Forbes Magazine List for "Best Places for Businesses and Careers."

"In today's increasingly digital world, internet access and speed are critical to operations for businesses of all sizes and across all industries," said Tallahassee Mayor Andrew Gillum. "The expansion of Comcast's high-speed network will serve as a strong contributor to the continued business and job growth we are seeing in our City, and overall the development of Tallahassee's new economy."

Comcast says its advanced network "is geared for businesses that need bandwidth to move large amounts of data for operations like video conferencing, streaming, multiple users on a WiFi network, file sharing and backup, and cloud-based applications. In addition, the network is capable of connecting multiple locations of one company to provide the same level of service across its network. Comcast's services can also be used by businesses that need a redundant or second network for business continuity and to provide file access, backup and recovery in the event of a disaster." This can be particularly critical to Florida businesses during hurricane season when severe weather can cause power outages or make office buildings inaccessible.

Comcast has been delivering multi-gig (up to 10 Gbits/sec) Ethernet service to businesses in Florida since 2011, and last year began offering Gigabit Pro, a residential multi-gigabit broadband service for consumers in the Miami, Fort Lauderdale, West Palm Beach and Jacksonville areas. In April, Comcast announced that it will offer DOCSIS 3.1-powered gigabit internet service in Florida using connections that are already in customers' homes.

"Our network not only delivers the highest speed and capacity to Tallahassee businesses, it's also built to easily accommodate future growth," said Reggie Scales, vice president, business services for the Comcast Florida region. "Multi-gigabit speeds and reliability are critical for business today, and those needs are growing exponentially."

NETWORK CABLE

Black Box expands Category 6A cable line

Black Box announced that it is expanding its line of Category 6A bulk and patch cables by offering additional colors and lengths.

The company's GigaTrue 3 Lockable CAT6A 650-MHz patch cable (F/UTP) is now being offered in red, green, and yellow, in addition to the current offering of blue, gray, black, and white. This cable provides optional lockability when a locking pin is inserted into the company's patented LockPORT boot.

Also, the company's GigaTrue CAT6A 650-MHz UTP bulk cable (riser and plenum) is now available in green, red, and yellow 1000-foot spools, in addition to the existing blue, black, white, and gray cable. Both cable lines are ETL-verified for component-level performance as part of Black Box's CAT6A channel.

Finally, the company's CAT6A 500-MHz F/UTP bulk cable (PVC and plenum) is now available in seven colors. In addition to the original blue, it comes in black, white, gray, green, red, and yellow 1000-foot spools. The cable's foil shield virtually eliminates all ANEXT worries, contends the company. All cables are guaranteed for life, covered by Black Box's Double Diamond warranty.

"This cable expansion is in response to increased Cat 6A development rates," says Ryan Hopkins, cable product manager at Black Box. "Color-coding network applications for easier identification is becoming standard practice with IT professionals."

DATA CENTER

Emerson sells Network Power division to private equity for $4 billion

In August, Emerson announced an agreement to sell its Network Power business unit to Platinum Equity and a group of co-investors. The transaction is valued at $4 billion and Emerson will retain a subordinated interest in Network Power.

The sale of Network Power is expected to close by December 31, 2016, subject to customary regulatory approvals. "This agreement marks a major milestone in the strategic portfolio repositioning we announced last June," said David N. Farr, chairman and chief executive officer of Emerson.

Farr added, "By selling Network Power to Platinum Equity, we have achieved a successful result for our shareholders as part of our plan to streamline Emerson to create a more focused company with significant opportunities for growth and profitability in our core served markets. We believe Network Power has a bright future ahead and Platinum Equity is well-positioned to help the company continue to thrive and realize its full potential."

With revenue of approximately $4.4 billion in fiscal 2015, Network Power, based in Columbus, Ohio, is a leading provider of thermal management, A/C and D/C power, transfer switches, services and information management systems for the data center and telecommunications industries.

"I'm very proud of the relationship and mutual trust that the Emerson and Platinum Equity teams have built with one another," said Platinum Equity chairman and CEO Tom Gores. "Emerson is a world-class company that we know shares our commitment to creating value, and this is an important investment in a business that will be a cornerstone in our portfolio. It plays to our core strengths. In addition to our capital resources, we will deploy our global operations skills to build on the foundation Emerson created and take this business to another level."

The proposed sale marks Emerson's second divestiture to Platinum Equity in the last three years. In November 2013 Emerson sold a 51 percent controlling stake in its embedded computing and power business, which Platinum Equity rebranded Artesyn Embedded Technologies.

"Emerson has been a great long-term partner and we are pleased to collaborate again," said Platinum Equity Partner Jacob Kotzubei. "We have worked extensively with Emerson to customize a divestiture solution for Network Power that is beneficial for all sides and aligns with the long-term strategic goals of the business. Network Power is recognized as a global leader in infrastructure technologies and we are confident that working together with management we can further extend that position as a standalone company."

Network Power will continue to be led by Scott Barbour, who has been executive vice president of Emerson and business leader for Network Power.

Barbour added, "We firmly believe Platinum Equity is an ideal partner as we continue to drive efficiency in our operations and invest to bring innovative products and services to our customers. The work we've done at Network Power in recent years ensures we are well prepared for an ownership transition and have the right foundation in place to be successful."

Transactionally, J.P. Morgan Securities LLC and Centerview Partners LLC served as financial advisors to Emerson and Davis Polk & Wardwell LLP served as legal advisor to the company.

As noted on Aug. 8 at the stock investors' portal *SeekingAlpha*, Emerson "during its most recent earnings report lowered fiscal 2016 revenue and earnings estimates, as it continues to face adverse business conditions. The company, however, has been focusing on driving revenue and earnings growth by exiting low-margin businesses and focusing on higher-margin businesses. The company is in the midst of multiple business divestitures raising billions in acquisition funds that will finance a substantial acquisition of a higher-margin business in a growth market."

INTERNET OF THINGS

Global Internet of Things testbed created in Taiwan

SIGFOX, one of the world's foremost providers of dedicated communications services for the Internet of Things (IoT) in France, and UnaBiz, an IoT network operator in Asia, have joined French and Taiwanese officials in announcing the creation of a global Internet of Things testbed in Taiwan. With the SIGFOX IoT network as its centerpiece, the testbed will provide global IoT connectivity to Taiwan's huge electronics manufacturing industry and demonstrate multiple applications and use cases.

The Aug. 1 announcement came at a launch event in Taipei with C.K. Lee, Taiwan's minister of economy; Benoit Guidée, director of the French Office in Taipei; SIGFOX CEO Ludovic Le Moan; UnaBiz CEO Henri Bong and a panel of industry and government experts, including Chaney Ho, Advantech president; Wei-Bin Lee, CIO of Taipei City, and Ming-Whei Feng, dean of the Smart Network System Institute of the Institute for Information Industry.

In addition to supporting Taiwan's goal of becoming the "Silicon Valley of Asia," where new and disruptive technologies thrive, the nationwide network and testbed will also provide to SIGFOX the benefits of Taiwanese design and manufacturing expertise as it scales globally, Guidée said. Taiwan's large high-technology manufacturing sector has extensive experience in developing high-quality products at competitive prices.

"SIGFOX is not only one of the best ambassadors of La French Tech spirit, it is also a large contributor to the entrepreneurship ecosystem in France through its European IoT Innovation Hub–the IoT Valley," Guidée said. "By bridging the IoT Valley with Taiwan design and manufacturing capabilities, I am convinced that France and Taiwan have a great opportunity to shape together the future of the IoT in the world. France is thus inviting Taiwan to use SIGFOX as a gateway into a global market and, by doing so, simplifying the integration and accelerating the go-to-market strategy."

UnaBiz, which announced only three weeks prior to the test bed's announcement a strategic partnership with ENGIE and SIGFOX to deploy the network in Singapore, will lead the network deployment in Taiwan, which is expected to have nationwide coverage in early 2018. "This extension to Taiwan is key in our regional development strategy, because Taiwan has the largest ecosystem of devices and solutions to accelerate the adoption of IoT use cases globally," said Henri Bong, CEO of UnaBiz.

With this rollout, Taiwan will be the 23rd country globally, the second in Asia and the fourth country in the Asia Pacific region to have SIGFOX's two-way IoT coverage, which provides low-cost, energy-efficient connectivity for countless devices that will make up the Internet of Things. Taiwan's six largest cities or districts, containing half the country's population of 23.5 million, will have coverage by mid-2017, the test bed companies expect. The rapid rollout in all countries is facilitated by the fact that SIGFOX's infrastructure is far lighter than traditional wireless network infrastructure, according to a press release.

"This collaboration between Taiwanese electronics companies, which are among the most competitive and efficient in the world, and SIGFOX will strengthen the SIGFOX ecosystem as it speeds learning and the implementation of IoT design and use cases," Le Moan added. "It also will provide demonstrations of how SIGFOX's seamless IoT network can foster unprecedented industrial manufacturing efficiencies that could benefit companies everywhere."

"We will go to work immediately to create strong partnerships with key players in the local ecosystem along the whole IoT value chain, from silicon vendors to design houses and device manufacturers," concluded Bong. "This dynamic process will spark entrepreneurial and creative responses for making the IoT come alive. As part of that process, UnaBiz will leverage on the Taiwanese ecosystem to complement SIGFOX's global ecosystem of partners in order to offer the largest catalogue of IoT devices worldwide."

WIRELESS

Westell shutters ClearLink DAS brand in cost-cutting measure

Westell Technologies, a provider of in-building wireless, intelligent site management, cell site optimization and outside plant solutions, announced a comprehensive expense reduction plan and a preliminary revenue estimate for its fiscal 2017 first quarter ended June 30. The company plans to implement a program designed to reduce annual expenses by approximately $11 million, including discontinuing development of the ClearLink Distributed Antenna System, consolidating facilities in Manchester, NH and Aurora, IL, and taking additional actions to reduce SG&A expenses.

"To accelerate our path to profitable growth and positive cash flow, we are taking actions to significantly lower our cost structure including, based on our latest analysis of the market and expected return, ceasing development of ClearLink DAS. Westell will continue as a leading supplier of repeaters, DAS conditioners, antennas, and system components to the IBW market," said Tom Gruenwald, chairman, CEO, and president of Westell Technologies.

"We believe these actions are necessary to preserve the company's strong balance sheet and position Westell to create shareholder value. At the same time, we intend to continue to advance our turnaround by staying focused on operational discipline and execution on new products and solutions that meet the challenges of a dynamic market," Gruenwald added.

Westell estimates preliminary consolidated revenue for 1Q17 of $14.8 million, compared to $21.6 million in the year-ago quarter and $20.9 million in the prior quarter. Cash and short-term investments were $25.3 million at June 30, 2016, compared to $29.7 million at March 31, 2016.

The ClearLink in-building distributed antenna system was launched in mid-2015. The company said the system was particularly adept at addressing the near-far performance issue.

"First quarter revenue weakness reflected a confluence of factors across our businesses, including a general slowdown in carrier spending and the adverse impact of a strike-related work stoppage at a major customer. We believe our strong customer relationships, recently announced new IBW and power distribution offerings, and opportunities in the intelligent site management (ISM) and integrated cabinet markets can provide profitable growth," Gruenwald said.

Expense reduction actions are anticipated to be substantially completed by March 31, 2017, including workforce reductions and the consolidation of facilities in Manchester, NH and Aurora, IL.

DESIGN & INSTALLATION

Fujitsu acquires US-based network infrastructure engineering contractor TrueNet Communications

Fujitsu Limited announced that Fujitsu Network Communications Inc. has acquired TrueNet Communications, Inc., a prominent US-based communications infrastructure engineering contractor, for undisclosed terms. TrueNet, headquartered in Jacksonville, Florida, will retain its distinct brand identity through the transition into a wholly owned subsidiary of Fujitsu Network Communications.

The acquisition greatly expands Fujitsu Network Communications' potential range of offerings as a prime contractor, and enhances the company's ability to deliver complete, end-to-end solutions for designing, building, operating, and maintaining fiber and wireless communications infrastructure.

The companies contend that the combination of Fujitsu Network Communications' inside plant (ISP) and TrueNet's outside plant (OSP) expertise creates an industry leader that can deliver the design and management services necessary to support every stage of a broadband network's lifecycle. The companies say their combined offering "reduces operational, organizational and communication silos, creating cohesive services to any organization considering investment in hybrid broadband infrastructure."

"TrueNet's OSP capabilities are an ideal complement to Fujitsu's portfolio, creating a total broadband solution provider," comments Greg Manganello, senior vice president and head of services at Fujitsu Network Communications, Inc.

Manganello continues, "With this ISP/OSP design control and single point of responsibility, Fujitsu can ensure a seamless, integrated broadband network and minimize project risk. As a result of this acquisition, whether customers select individual services or an end-to-end solution, we can now help them realize their visions faster. We believe that broadband turns towns into communities, states into job creators, and enterprises into powerhouses.

"Now we can help our customers harness the transformative power of broadband even faster."

CABLING INSTALLATION

Cable dressing/bundling tool mounts to hand cart, cable reel, work platform

Developed and manufactured by Tantus Enterprises, LLC, the Bundlizer is a cable dressing/bundling solution that allows the cable to be bundled while it is being pulled and eliminates the dressing step of the cabling installation process.

Fashioned from a rugged and lightweight engineered polymer, the Bundlizer handles up to 24 cables and mounts to a hand cart, cable reel, or work platform. Easily broken down for storage and transport, the company says the tool can enable higher margin projects, faster installations, and greater cable density in racks and cabinets, with less strain on technicians and faster troubleshooting and cable replacement.

"For the past 10 years we've conducted complex network cabling installations for mission critical environments in top tier data centers. This technology has been patented and is now available so you can benefit from all the Bundlizer's features," states the company on the product's website.

The product's writeup continues, "Data center cabling contractors must address requests for increasing network cable density. Bundling cables greatly increases the number that can be brought into racks and cabinets. However, manual dressing of Cat 6 cable is time-intensive and painful. We developed the Bundlizer to improve efficiency and eliminate the pain associated with manually dressing network cabling. "

The Bundlizer is currently available through Anixter and Graybar "and pays for itself within the first week of use" by providing "picture-perfect installations—fit and finish is unsurpassed," claims the manufacturer. For more information, visit http://bundlizer.com/. ◆

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INFRASTRUCTURE INSIGHTS

Textbook cabling "What not to do"

We have a standing joke at the *Cabling Installation & Maintenance* editorial desk about the internet meme-like notion of "What not to do" as a recurrent pet phraseology for defining a range of maladroit behaviors—but especially within the cabling trade. Check out CablingInstall.com's homepage "Must-See Photos" gallery to thumb through voluminous examples of the phrase, pictorialized. A good many of these photos have been sent in by readers. On this page is another.

Robert R., an IT project manager with a large California school district, found this unpleasant surprise. His commentary: "This is an ongoing problem. We are constantly having to correct these issues. Every time we fix one, another one pops up."

This mess was left by techs either ignorant or ambivalent to the concept of "the plenum"—what it means, what it implies, what it defines for a specific space in the building. From Wikipedia.com: "Space between the structural ceiling and the dropped ceiling or under a raised floor is typically considered plenum." This shot was apparently taken within an extremely aged drop ceiling space. To paraphrase a line from a famous movie, if this ain't plenum, it'll do till the plenum gets here.

A big question: Is any of the structured cabling abandoned, or is it just poorly looped and bundled, installed on the well-known premise of, "Always put in too much" … and forget about cable management? And what about those power lines snaking by and through? Ever hear of the standard warning against placing data cables against sources of electrical interference?

Conscientious techs know that cables, especially those with PoE, can overheat in large bundles, and need to be kept cool, because changes in cables' thermal properties can affect the electrical performance and impact signal propagation.

But back on the note of abandoned cabling, again from Wikipedia: "The cavity/plenum space is typically used to house the communication cables for the building's computer and telephone network; however, it has been proposed that the growing abandonment of cable in plenum spaces may pose a serious hazard in the event of a fire, as once the fire reaches the plenum space, the airflow present in the space supplies fresh oxygen to the flame and makes it grow much stronger than it would have otherwise been."

This isn't rocket science. Whatever the explanation, the case can be made that what we're really looking at here is no more or less than a robust potential fire hazard and connectivity slough. How ironic that it's from a school: a textbook, not to say classic, example of structured cabling "What not to do ..." ◆

Matt Vincent, Senior Editor
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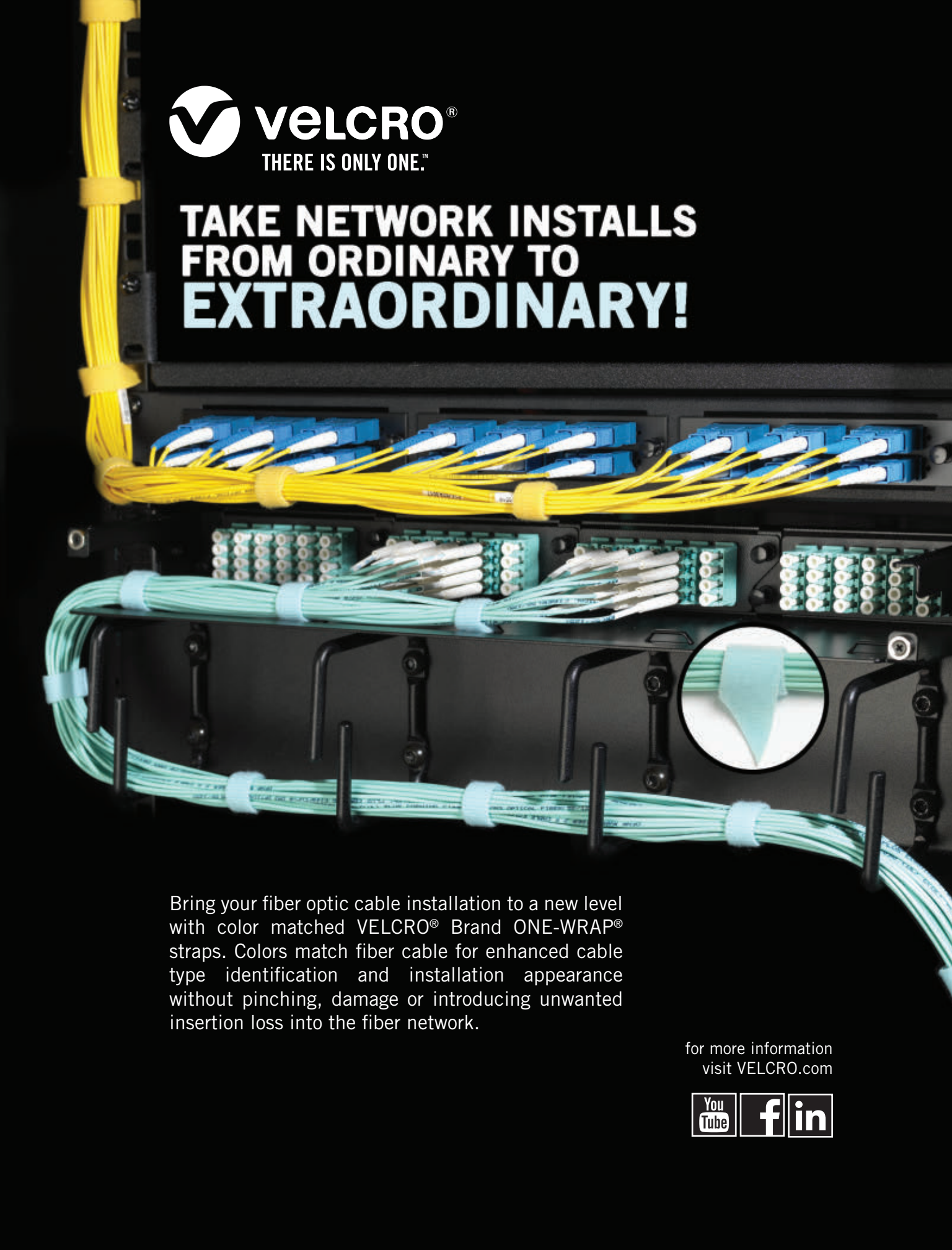
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