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# **Automatic Coax & Cable**

Fred Noer

Generation: This year is their 25th anniversary of founding, owning and operating their business, Automatic Coax & Cable (ACC) in Sanford, Fla. The milestone is a significant achievement in a challenging industry and an unsettling U.S. economy.

Why have the Martinets, each 63 years old, been able to mark this special occasion? One word – passion. They have it in abundance.

Passion enabled the Martinets to take an initial \$1,400 investment in equipment (including a Eubanks cut-and-strip machine they still have) and build a company expected to hit \$2.5 million in sales this year. The 2014 forecast is \$3 million plus.

Another major business element -

## Inside TE Connectivity's Aluminum Crimp

Joe Tito Wiring Harness News

t the EWPT Expo in Milwaukee this past May, I was once again afforded the opportunity to attend a presentation from USCAR on aluminum wiring for automotive. Quite honestly, I almost skipped the presentation this year. Not that the USCAR folks haven't been great presenters. Quite the contrary. It just seemed like it might be a rehashing of previous information. But I'm so glad I resisted the urge to grab that extra danish, and attended Don Price's presentation. In it, he revealed a glimpse of TE Connectivity's approach to some of the major issues surrounding crimping aluminum wire. It seems the industry is finally getting some traction with high volume, reliable aluminum crimp crimping.

advised that designing new aluminum terminals would defeat any cost savings. He further stated that whoever could come up with the most innovative solution for sealing these junctions, without a secondary process like epoxy shields or heat shrink, would have a competitive advantage. The answer had to come in the crimp itself. It seems TE has come a long way towards that goal. Eager to see if I could dig even deeper into the new TE technology, I scheduled an interview with Dave Fleak, Automotive Product Manager for TE Transportation Solutions, in Winston-Salem, NC.

TE Connectivity has been in the aluminum crimping market in some fashion for some 30 years, according to Fleak. "Even today, we're heavily in the appliance, and military/aerospace industries," for which, surprisingly, TE actually makes aluminum wire, he noted. "Now the dynamics of crimping wires for an aircraft, versus the economies of crimping for 15 to 20 million vehicles, are quite different," he said,



Gary (left) and Glenda Martinet (right) with the Automatic Coax & Cable (ACC) team.

people – led Gary Martinet to buy the equipment in the first place. While working as a rep selling screw-machine parts and custom molded plastics, he learned that a customer needed cable assemblies. When Martinet came across the equipment stashed in the back of the garage of a woman holding a rummage sale, he made a connection. Despite the equipment purchase depleting the Martinets' personal savings account to only \$100 and Gary having no background in cable assembly, Glenda embraced what he had done. "He's always been an entrepreneur," she said.

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# **Crimp Force Monitoring "The Recipe for Success"**

By Gustavo Garcia-Cota, Crimping Product Manager, Schleuniger, Inc.

n my line of work, I have the privilege of visiting many wiring har-Leness shops that produce wiring harnesses for many different industries. One of the common issues I've noticed when visiting shops that use crimp force monitors (CFMs) is that the CFMs are usually turned off, regardless of the brand, because engineers and operators are not using them properly. While I hope this does not apply to your specific situation, it may be worth paying an unexpected visit to your crimping work areas to look for indications of whether the CFMs are being used regularly. Chances are they are not. Unless of course it's audit time, then you can be sure all the CFMs will be on! Why, with all of their benefits, are CFMs not being used regularly by employees? One of the biggest problems is the lack of understanding of the variables affecting the CFM's ability to detect variations. Crimp quality detection is similar to baking a cake. There are a lot of ingredients and if one ingredient is missing or of bad quality, you likely are

not going to achieve your desired result. This article will go back through the basics of a crimp quality detection system and discuss what ingredients or variables you need to consider before switching off that CFM.

#### What can CFMs actually detect?

One very basic and important concept that needs to be understood in order to achieve successful crimp force monitoring is "what a CFM can actually detect." There is a general assumption within the industry that crimp force monitoring will provide reliable detection of all general crimping errors during processing, including:

I wrote an article for *Wiring Harness News* back in 2012, on the pressures from auto manufacturers to replace copper with aluminum wherever possible. At that time, Randy Sumner of Delphi

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- Wrong strip length
- Missing strands
- Wrong wire cross section
- Wrong terminal
- Inconsistent terminal material
- Insulation in wire crimp
- Wrong insertion depth
- Wrong crimp height

Is this assumption correct? It depends! While this is not a very scientific answer, it is the correct one. What many people fail to realize is that simply plugging in a CFM will not solve all their

Continued on page 22

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### **Automatic Coax &** Cable

Glenda and Gary Martinet celebrate their 25th anniversary of founding, owning and operating their business.

### Inside TE **Connectivity's Aluminum Crimp**

A glimpse of TE Connectivity's approach to some of the major issues surrounding crimping aluminum wire.

### **Crimp Force Monitoring - The Recipe for Success**

Gustavo Garcia-Cota of Schleuniger, Inc., gives readers the "Recipe for Success" for Crimp Force Monitoring.



Read about the latest products on the market and points of interest about companies and people in the industry.



Is is more effective for a harness maker to rely on manufacturers' reps or to hire and train a sales staff?



Control panel demand is on the rise among the wire processing industry.



Anixter's Wire Wisdom discusses the "Hype about discontinuing Hypalon".

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## **NEWS PLUGS**

#### **FDR25S Power Cable Helps Provide Optimal Solution for** Tight Spaces in Aerospace and **Military Applications**

TE Connectivity (TE) announces the new FDR25S wire. This flexible diesel-resistant power cable is designed for commercial and military aerospace, military ground systems, and military marine industries. The highly flexible wire helps allow the cable to be bent and routed in extremely tight areas while helping to prevent wrinkling

and cracking of the insulation. This results in the ability to run shorter distances, reducing the stress on the contact and reducing the mating and demating forces normally associated with various connectors. Its ability to route in tight spaces may allow for a larger American Wire Gauge (AWG) size and eliminate the need to split power.

"FDR25S is among the most flexible power feeder we have seen in the market. It has excellent insulation properties," said Carl Treadwell, product manager, TE Connectivity, Global Aerospace, Defense & Marine. "The combination of the flexibility and durable radiation cross-linked insulation gives it an ideal balance of properties, allowing it to be what we think is a perfect candidate for

installation in tight spaces in and around less forgivable objects in ground vehicles, engines and aircraft."



**FDR25S Power Cable** 

Able to help withstand highamperage and high-voltage conditions, the FDR25S wire is fluid and arc resistant, which includes resistance to diesel fluids, hydraulic fluids, lubricating oils, cleaning fluids and deicing fluids. The wire is made with a polyester-based material and has tin-plated conductors that help prevent the oxidation of copper. These high qual-

ity electrical and mechanical properties meet highvoltage and high-amperage requirements in a number of applications. The FDR25S wire's thermal temperature operates between minus 55 degrees Celsius and 125 degrees Celsius. The wire offers stability for up to 168 hours at 150 degrees Celsius, and bends for four hours at minus 55 degrees Celsius.

For more information on TE's FDR25S wire, visit www.te.com/adm or contact the Product Information Center at 1-800-522-6752.

#### **PC North American PCB** Market **Report Shows Mil/Aero Sales Growth Still Out-Paces Other** Vertical Markets

Printed circuit board (PCB) sales growth to the military/aerospace market continues to outpace sales to other vertical markets in North America, according to IPC's July 2013 issue of North American PCB Market Report.

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lative rigid PCB sales to the military market from January through May this year were up 3.4 percent compared to the same period in 2012, while rigid PCB sales to other markets were down 9.1 percent year-to-date. In the flexible circuit segment, year-to-date growth rates of sales to the military and other markets were both positive, but military sales growth was higher.

"We estimate that the military/aerospace market accounts for about 27 percent of the total PCB market in North America," said Sharon Starr, IPC director of Continued on page 13



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# **Reps or Direct Salespersons? Which Approach Yields Better Results?**

#### Loren M. Smith, CEO **Blue Valley Capital**

'm frequently asked a classic sales question: Is it more effective for a harness maker to rely on manufacturers' representatives (reps) or to hire and train a sales staff? I've been around long enough to see each method succeed and each fail, so let's review what's at play.

The rep advantage: Two obvious pluses for the rep route are the variable expense (you pay only for results) and the relationships a rep might have that you don't. Reps sure look like a winning approach when they open doors you might otherwise never enter.

The sales staff advantage: The key word here is "control." You wield great influence over the content and frequency of contact with your customers, and you control the depth of product training your sales team receives.

Now for the flip side: the potential disadvantages. How do they figure into your decision-making? Frankly, I don't see many downsides to the direct sales



Loren M. Smith, CEO **Blue Valley Capital** 

approach--other than the ongoing expense, of course, which is a major consideration. On the other hand, the rep approach needs to be handled carefully.

Rep caveats: When a rep scores some new business for you and sustains it, you may eventually want to service the account with your own people to avoid paying eternal commissions or simply because you know you can service the account more effectively, but how do you engineer that conversion? It may be impossible--unless you addressed this possibility up front. If two commission

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structures might be necessary down the road, be sure to negotiate this at the start of your relationship with the rep.

Another potential weakness in the rep arrangement is the rep's long-term availability. A rep might behave as if you are the only harness maker in the hemisphere at the outset, but that rosy picture can change markedly for any number of reasons--chief among them, a responsibility to other lines. Optimal long-term coverage then gets compromised.

A wire harness manufacturer I know well recently encountered this scenario.

A rep had been able to a major new open account, but it soon became clear that "harvesting" the account was going to require a weekly purchasing and engineering call schedule--a level of involvement the rep could not meet. As a result, a company direct sales engineer was assigned to the account. By giving the account weekly service for 18 months, the new business potential was realized, but it's important to note that the happy ending depended on the upfront agreement with the rep. That maneuverability created the opportunity for the pivotal change.

My answer to a classic sales question: I think by now I've tipped my hand. Although I concede some key advantages to entrusting reps with your sales contacts, I believe the rep approach demands careful handling. For that reason, and because the harness manufacturer presumably has so much know-how within its various staff members, I am a proponent of the team approach. If individuals representing various functions and levels within the company--including the owner or CEO--interact with major accounts, cus tomers receive optimal coverage.

reps can parallel.

Whether you rely on reps, direct sales employees, or both, the crucial factor is achieving solid market coverage. Active, informed coverage insulates you against the one call from a key customer you never want to get: "You've been a good supplier, but...."

Loren Smith can be reached at lms@blvcapital.com or www.bluevalley-capital.com





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The team approach does not eliminate the need for one salesperson shoulder account to responsibility, but engineering, quality, and manufacturing personnel should complement his or her interaction with the customer. The team approach maximizes the linkage between the wire harness manufacturer and customers through a high level of coordination and product knowledge that few multi-product-line

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# **Refrigerator Art**

### By Paul Hogendoorn

y fridge is filled top to bottom with refrigerator art - drawings made by my granddaughter, depicting life as she sees it. The pictures usually include all the people important in her life - her parents, her siblings, my wife and I, and often the family cat, or the dog she hopes to one day have. Sometimes there's a car in the picture, or a boat; sometimes trees and blue skies and a bright yellow sun.

Its not Picasso or "Group of Seven" quality, but each piece still requires a knowing eye to see the magic - to see what the artist saw and was trying to portray. My granddaughter's art is as true an expression of her thoughts and emotions as any famous or accomplished artist's is. She was using her talents and gifts to the best of her ability, for someone else's appreciation (mine), and she was doing it with a great sense of pleasure. Every time every one of these pieces made it to the fridge, it filled her with a great sense of pride.

These were the thoughts on my mind as I waited to board a flight to Mexico, where I was going to make a series of presentations to try to gain business traction for a company I was helping launch. I miss my family when I travel now, far more than I did when I was younger. My life's priorities have changed, and I sometimes find myself asking the questions "do I still want to work?"', "how hard do I want to work?", and "what work do I want to do?"



#### Paul Hogendoorn

On the plane, with the headsets on, I reflected on it further, and I realized it comes down to a singular question that almost everybody asks: "what work could I do that has 'meaning'?" People ask this question as they seek out their first career, and then throughout that career, but for most of their working life, ultraistic aspirations have to take second place to the primary objective of economic survival. And so it was with me, until recently.

I checked into the hotel, reviewed my notes and tweaked my power point presentation. My enthusiasm for what I was doing - launching this new business - was rising.





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When I thought of things this way, I realized that I am using my talents and gifts to the best of my ability, for the appreciation and benefit of others, and that it gives me both a sense of pleasure and pride doing it. This new little business venture, with all the tasks that need to get done and objectives that need to be accomplished - this is nothing less than my refrigerator art. Right now it may seem like stick drawings, and perhaps it needs to be viewed by a knowing eye in order to be recognized, but it is an expression of my values, thoughts and emotions, and it is a reflection of my hopes and dreams.

The presentation was well received and I spent the rest of the day discussing various applications with several talented and imaginative people. I left their office with a sense of accomplishment and satisfaction, and this additional thought: whether an engineer, entrepreneur, sales person, administrative assistant, or production worker - whatever your vocation is, we are all creating refrigerator art - something that uses our talents, pleases our teachers and mentors (or perhaps our Creator), and is done for the benefit of others.

Paul Hogendoorn is a self-described "incurable entrepreneur". Along with his partners, he recently launched FreePoint Technologies (www.freepointtech.co). He was a founding member of the London Region Manufacturing Council, and enjoys writing and speaking on the topics of leadership, entrepreneurism and motivation. He can be reached at paul@tpi-3.com. For more information on these topics, check out www.tpi-3.com



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See Page 10 for more information

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# **Grow Your Control Panel Manufacturing Business**



s our economy rebounds, control panel demand is on the rise among the wire processing industry. In order to meet the growing infrastructure in industries such as telecommunications, industrial, commercial, and housing, control panels are required to control electricity. The control panel industry which provides strong financial growth opportunities is typically approached with caution as many contract manufactures are unfamiliar with the production processes. Komax Wire, a leader in wire processing equipment and solutions, is partnering with control panel software designer, EPLAN, and CNC machining manufacturer, Kiesling, by offering free educational seminars and hands on workshops for customers to learn

and grow their control panel business.

Today, the manufacturing of control panels is labor-intensive and suppliers provide few automation options to manufacturers. On-site customer visits led Komax Wire and its partners to host the first of its kind event for any manufacturer interested in learning more about control panel manufacturing. "The company mission of Komax Wire is to provide its customers with optimal solutions through product and after-sale service. While meeting with several customers on a market research trip, I noticed many are beginning to manufacture control panels or have had requests. The issue is that control panel manufacturing involves many auto-

Continued on page 12



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# **Grow Your Control Panel Manufacturing Business**

Continued from page 10 \_\_\_\_

mated processes to maximize production efficiency in which manufacturers may not be aware of, if it is not their expertise. By offering solutions to our customers, we can hold true to our mission statement and provide current and prospective customers with future business opportunities," states Zachary Kozak, Marketing and Communications Analyst at Komax Wire.

Control panel manufacturing is typically a three-step automation process which includes planning, production, and assembly. Planning and production are two key factors for manufacturers to improve their internal processes to maximize efficiency and reduce costs. Komax Wire's extensive product range allows manufacturers to review their specific production needs and what is the most optimal solution for their budget. One of the featured machines at the upcoming Komax Wire In-House Show will be the Zeta 633, the only fully automatic crimping machine in the market that is capable of processing up to 36 wires without any changeover. The Zeta 633 is extremely flexible and best suited for high mix, low volume production that is common in the manufacturing of control panels. Modules can be custom configured along the entire length of the machine, and if needed, the machine can be expanded for up to thirteen processing stations. Other equipment solutions include Komax Wire's measure, cut and strip product line of the Kappa brand and its fully automatic crimp by crimp product line of the Gamma brand.

Komax Wire also leverages its technology innovations to automate the work flow. If electronic data is available for all wire processing applications which would include cable length, marking and cable-end processing; the production data can be directly imported over a network, from a database or ECAD system such as EPLAN. If the data is not available in an electronic form, it can be programmed quite conveniently with standard machine software. The manufacturer can also archive relevant quality processing data and ensure traceability at all times.

The Komax Wire In-House Show will take place on the dates of Tuesday, October 29th and Wednesday, October 30th from 9 AM – 5 PM each day. Additional participants include Rockwell Automation, Rittal, Panduit, TE Connectivity, and Z+F USA, Inc. Refreshments and lunch will be provided free of charge. Register online at http://info.eplanusa.com/register-control-panel-automation-expo or contact the Komax Wire marketing department at 224-676-5765, e-mail: news.buf@komaxgroup.com.



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## **NEWS PLUGS** continued

#### Continued from page 4\_

market research. "Based on new data, IPC is updating its market size estimates for rigid PCBs, flexible circuits, the mil/aero and medical vertical markets, and the prototype market. These will be reported in next month's North American PCB Market Report."

The 113-page July 2013 report provides a timely update on market trends in the North American PCB industry. Much of the information presented is based on data from IPC's monthly North American PCB Statistical Program.

A one-year subscription to the monthly report is available for \$1200, with a discounted annual price of

\$600 for IPC members. All subscriptions offer a moneyback guarantee in the first month. Subscriptions may be purchased at www.ipc. org/subscription-order.

#### New PolySwitch<sup>™</sup> Circuit **Protection Devices Out**last MINI Fuses & Circuit Breakers

Waytek, Inc. introduces PolySwitch circuit protection devices as a resettable overcurrent protection solution in vehicle, heavy truck and equipment wire harnesses.

Waytek's new Poly-Switch™ circuit protection devices provide resettable over-current protection in a 2.8mm footprint and solid state design. They are an easy drop-in replacement for mini fuses and type II circuit breakers in 12V vehicle systems

Unlike Type II bimetal circuit breakers, which typically cycle several times before latching, the PolySwitch BD280 devices features a solid state design with no moving parts or contacts to arc, erode or weld together. This makes resettable Poly-Switches a longer lasting and more reliable circuit protection device than circuit breakers or fuses. The Poly-Switches operate with a resistance switching action that latches immediately following an overcurrent tripping condition. Such latching occurs at a lower battery voltage and lower environmental temperature than circuit breakers and fuses. The PolySwitch™ devices provide virtually constant power consumption across a voltage range of 4V to 14V. They have less thermal cross talk between devices than Type II bimetal circuit breakers due to their low power

dissipation and flatter thermal derating. Rated for temperatures between - 40°F and +257°F, the PolySwitch™ BD280 devices pass more current at higher temperatures than bimetal circuit breakers and are suitable for harsh underhood applications.

Bright color-coded housings and rated current values printed on the top of the devices make replacement of automotive fuses and bimet-



**New PolySwitch Circuit Protection Devices** 

al breakers easy, and help prevent installation errors. PolySwitches also have exposed probe points to facilitate inspection and faultfinding, helping lower labor time and costs.

Waytek, Inc. carries more than 10,000 electrical supplies, including wire and cable, terminals and connectors, circuit protection parts, switches and more, for OEM and MRO mobile equipment markets. Founded in 1970, the company has seen continued expansion in the electrical supplies industry. Waytek carries large quantities of stock items and is able to ship most stock items the same day, allowing customers to carry smaller inventory, yet still have products when they need them. Browse our electrical solutions at www.waytekwire.com, or call 800-328-2724.





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## Cycle Speeds Increased Up to 18 percent on Cr.11/Cr.22 Series Automatic Crimping Wire Processor

he Cr.11/Cr.22 series automatic crimping wire processor from Artos Engineering Company now boasts an increase in maximum cycle speeds of up to 18%, depending on wire length and application.

Through advancements in servo drive software algorithms, each movement of the Cr.11/Cr.22 series has been further optimized for faster and smoother operation, resulting in greater production and capacity. For existing machines, Artos Engineering offers the easy software upgrade for customer installation or installation by Artos Engineering technicians on site.

"We continue to refine our wire processors as technology advances to give our customers the fastest, most affordable machines on the market today," says John Olsen II, Artos Engineering Company president.

Manufactured in the U.S., the Cr.11/Cr.22 Series represents a breakthrough in affordable automatic crimping and is ideal to handle high and low volume runs and a wide range of wire types. The digital, programmable servodrive termination units minimize crimping cycle times, while the quick-change cart system accommodates both side and end feed terminals allowing for fast pre-loading of terminal feeds to maximize machine uptime.

Founded in 1911 and based in Brookfield, Wis., Artos Engineering Corporation is an independently-owned manufacturer of wire processing equipment serving the aerospace, automotive and manufacturing industries.

For more information, visit www.artosengineering.com



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## **NEWS PLUGS** continued

#### WAGO LEVER-NUTS® 10-Year Anniversary

WAGO Corporation's 222 Series LEVER-NUTS® lever-actuated splices celebrate 10 years of reducing wiring time by up to 50%. A versatile, laborsaving alternative to twist-style splices, LEVER-NUTS® orange lever eliminates twisting, taping and crimping. Simply lift the lever, insert a stripped conductor and lower it. This also provides reusability, giving LEVER-NUTS® a unique, cost-effective edge over traditional splices.

UL Listed, touch-proof LEVER-NUTS® carry ratings up to 600 V, 20 A max current capacity and 105°C insulating material temperature. CAGE CLAMP® Compact Spring Pressure ensures maintenance-free, vibrationresistant connections. Every model, from 2–5 conductors, accommodates solid and stranded conductors AWG 12–28 (one conductor/pole) in one unit. Soon, a prominent WAGO logo will join the molded-in ratings on LEVER-NUTS® housings, symbolizing safety, usability and long-term contact quality.

Worldwide approvals and intuitive, tool-free operation have made LEVER-NUTS® a staple among electricians, OEMs and DIYers. Unique applications include:

• Controls — PLC wiring for reverse osmosis water purification system.

• Vehicular — Interconnect lighting/communication devices aboard military vehicles.

• Machinery — Fan motor power

leads with capacitor to limit electrical "noise."

• Appliances — Internal wiring, e.g., commercial laundry, food service and HVAC.

Facts:

• 5,000 miles. If all LEVER-NUTS® sold were lined front-to-back, they'd stretch from Brookings, Ore. (Westernmost contiguous US city), to Eastport, Maine (Easternmost contiguous US city), and return to WAGO's Germantown, Wis. HQ.

• 480 A and 5 G. LEVER-NUTS® withstands 480 A Short-Circuit Currents (for one second), and vibration from 5Hz–2,000Hz, 5G.

• 5–2,500 pieces. LEVER-NUTS® packs for all projects from clamshells (select DIY stores), to JUGO-NUTS jars and bulk cartons (electrical distributors and OEMs).

For additional information, visit www.wago.us. Contact WAGO at 1-800-DIN-RAIL or info.us@wago.com

#### Nelco Products, Inc. Expands Offering Of Heat Shrinkable Tubing

Nelco Products, Inc. (http://www.nelcoproducts.com/), a manufacturer and distributor of cable ties, wire ties, heat shrink tubing, wire connectors, cable tie mounts, HVAC supply products and related wiring accessories worldwide, has announced that the company has expanded its selection of heat shrinkable tubing with the launch of food grade heat shrinkable tubing. Specifically engineered to be used in applications involving contact with food, water, beverages and nontoxic materials, this unique form of shrinkable tubing is specifically for those building beer-brewing or sousvide projects using Nelco Products' waterproof DS18B20+ digital temperature sensors.

This heat shrinkable tubing is FDA compliant for contact with food and is flexible, non-toxic and resistant to ultraviolet light moisture, fungus and a wide variety of chemicals and oils. Food grade heat shrinkable tubing is extremely environmentally friendly, as it breaks down to carbon dioxide and water when properly incinerated. Additionally, this tubing meets USP Class IV requirements. For more information and to view Nelco Products' food grade heat shrinkable tubing, visit http://bit.ly/ 12GkX7P, or call toll-free at (800) 505-6352. Additionally, to view Nelco Products new product video, visit http://www.youtube.com/ watch?v =TOV\_luveU7Q.

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#### New additions to Push-In **Terminal Block Line**

Phoenix Contact has expanded its line of push-in technology (PT) terminal blocks to include a smaller version of the popular STIO 2.5 series. The PTIO 1.5/S series is only 3.5 mm wide with a new top-level location for the power wiring. The blocks offer the market's highest density power distribution for field sensors and actuators.

The compact double-level terminals are available in three-wire and four-wire versions. The upper level is for signal feed-

through and is available with or without an LED. Continuous bridge shafts allow a quick and simple potential distribution of power using push-in bridges.

The PT terminal blocks allow easy and fast termination of ferruled wire by simply pushing the wire for a complete termination. Stranded wire is terminated by pushing the orange actuator, opening the spring for the insertion of the wire. All new versions are compatible with the Clipline Complete system of bridging, marking and test accessories.

The PT 1.5/S series features up to 50 percent reduction push-in force compared to other push-in type terminal blocks and allows for up to 35 percent faster termination than standard spring cage due to the short push button activation stroke. It is five times the IEC require-



**PTIO 1.5/S Terminal Bocks** 

ment for retention force and is the most compact solution available.

Phoenix Contact develops and manufactures industrial electrical and electronic technology products that power, protect, connect and automate systems and



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#### **BURNDY®** Announces New Auger Bits for Treated Wood, Composite/ Fiberglass Hollow or Solid Core Poles

BURNDY, a leading manufacturer and provider of connector solutions to the industrial, energy, construction, telecommunication, petrochemical, data center, and transportation industries, introduces several new auger bit designs for the Utili-

> ty and Construction industries. These new drilling bits complement the existing product portfolio by providing customers more drilling options.

> The new "RAZOR" auger bit is made from hardened



Razor

steel and designed to cut fast, clean and straight into a variety of treated utility poles. The unique cutting head incorporates a single spur and cutting edge design which scores and shapes the hole. The lead screw design pulls the bit through the wood effortlessly while the flute design evacuates debris quickly leaving a perfectly concentric hole.

The new "HOLLOW CORE" and "SOLID CORE"





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#### Cicoil Introduces New High Temperature FireWire Cable and Assemblies

Cicoil, a leading manufacturer of High Performance Flexx-Sil™ Flat Cables and Assemblies, is pleased to announce the introduction of its ultra-flexible FireWire Cable. Unlike typical FireWire cables, the Cicoil cable has been designed for high flexibility, mechanical stress, temperature extremes (-65 °C to +165 °C) and harsh environments. And the flat cable construction guarantees clear, high speed data transmission, even in the toughest of environments.

Cicoil's patented extrusion process allows 2 individually shielded 28 AWG 100 Ohm pairs and 2 shielded 22 AWG power wires to be placed in a flat profile, precisely controlling the spacing of each component, insulation thickness and the overall cable shape. The compact, Flexx-Sil™ encased cable solution is engineered to provide weight & space savings, consistent electrical characteristics, premium current carrying capacity, reduced skewing effects and EMI/RFI suppression.

Cicoil's tear resistant Flexx-Sil<sup>™</sup> jacket is self-healing from small punctures and will not wear, crack or deform due to long term exposure to vibration, water, ice, weld spark, steam, humidity, ozone, UV light, autoclave and many chemicals. The halogen-free & flame retardant flat design is an excellent alternative to bulky round cables in tight routing, continuous motion and mission critical applications. Standard "off the shelf" FireWire cables are available for immediate delivery and cable assemblies, complete with connectors are offered in 3 foot, 6 foot and 12 foot lengths. Custom designs are also available with minimum lead times. In addition, Cicoil offers antifriction coatings, impact resistant Super Tuff™ jacketing and custom shape designs by request.

Cicoil has been a leader in designing and manufacturing high performance cable assemblies for over fifty years. The company's Patented Flexx-Sil™ Flat Cable Technology provides high flexibility, extremely long life, and they can withstand temperature extremes from -65 degrees to +260 degrees Celsius. Cicoil's flat cables are used in thousands of demanding applications; including aircraft fuel

control cells, semiconductor automation, and the Space Shuttle. Cicoil designs and manufactures its Flexx-Sil™ jacketed cables and cable assemblies in an automated facility in Valencia, California. Cicoil's quality assurance system is certified to the ISO 9001 (AS9100) standard. Visit www.cicoil.com for more information, or call 661-295-1295 to speak to an application engineer.

## komax wire IN-HOUSE SHOW October 29th and October 30th

Register online at http://info.eplanusa.com/register-control-panel-automation-expo or contact the Komax Wire marketing department at 224-676-5765, e-mail: news.buf@komaxgroup.com.

See Page 10 for more information

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Surfaces tilt and adjust up and down Holds boards from 24" x 24" up to 48" x 96". Two models to choose from — Electric or Manual adjust Adjustable front lip holds boards from .250" to .750".



## **NEWS PLUGS** continued

#### WAGO SPEEDWAY IP67 **Incremental Encoder**

WAGO Corporation adds an HTL Incremental Encoder/Counter Module to its SPEEDWAY IP67 I/O-SYS-TEM. The machine-mountable 767-5202 evaluates incremental encoders and SSI absolute encoders at 24 V signal levels in harsh environments. It also provides a counting function for binary signals up to 250 kHZ. This makes it ideal for counting motor revolutions in applications such as topdrives, line shafts or motion-intensive machinery found in food processing and packaging.

The SPEEDWAY 767-5202 pro-

vides two 8-pole M12 encoder ports. Channel configuration options include: type of evaluation and sensor, output format, filters, inversion, latch, gate, preset, cam, simulation and limits. 767-5202 also has two 5pole M12 ports with four configurable digital inputs/outputs for sensors and actuators. Two of these channels can serve as pulse-widthmodulated outputs, with the 100 Hz–10 kHz clock frequency having a pulse-width repetition rate of 0-100%. Users may set previously defined outputs directly as a function of counter readings.

The 767-5202 is configurable via fieldbus-independent FDT/DTM, or via fieldbus-dependent device descriptions (e.g., GSD or GSDML). It is programmable via USB interface integrated into the fieldbus coupler, or directly via fieldbus (not applica-



WAGO SPEEDWAY IP67 **Incremental Encoder** 

ble to Ethernet-based couplers).

The machine-mountable SPEED-WAY 767 I/O-SYSTEM processes 1000 instructions within 150 microseconds. It features IP67 fieldbus-independent Ethernet controllers (IEC 61131-3 programmable)

> and couplers, as well as DI, DO and DIO modules. The system accommodates up to 64 modules per node with a 1,650 foot node extension.

> WAGO is a leader in spring pressure connection technology that eliminates loose wires resulting from vibration and temperature cycling, while providing highly reliable, corrosionresistant and maintenancefree connections. Products: DIN-rail, PCB and chassis mount terminal blocks; sigconditioners; the nal WAGO-I/O-SYSTEM and more.

> For additional information, visit www.wago.us. Contact WAGO at 1-800-DIN-RAIL.

#### **Pelican Products Introduces Off-Road Case Models**

Pelican Products, the global leader in the design and manufacture of highperformance protective solutions case and advanced portable lighting systems, has introduced a multi-terrain mobility configuration for four of its most popular case models with



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1510M Case with foam -MSRP: \$441.95

Continued on page 36

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Mini style applicators with mechanical feed mechanisms are supplied in a variety of feed configurations. Adaptable to most crimping presses.





Model 1700

Model 2000

Pneumatic feed mini-style applicators can accommodate terminals with center to center distances up to 2 inches.



Model 1500

Model 2100

DSA applicators are designed for large terminals manufactured from heavy gage material with center to center distances up to 3 inches and widths to 3.5 inches. Available in left to right, right to left and rear feed configurations.

DSA Series

Applitek has a solution for all your termination requirements. That's why many major wire harnessing companies and Original Equipment Manufacturers use and specify Applitek applicators. Our base applicator frame designs have proven themselves over the years with their reliability and have been able to accommodate over 3000 different types of terminals.

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# **Crimp Force Monitoring**

Continued from page 1

crimp quality issues. The main function of a CFM is to be a process monitor and to detect variations along the crimp force signature curve that are outside of the programmed tolerances. The CFM considers any variation outside of the programmed tolerance a "bad" crimp.

An operator must teach the CFM what to identify as a good or bad crimp through the "teach-in" process. This consists of running several crimps and manually verifying that the data associated with that crimp (crimp force, crimp height, etc.) is correct. The CFM then compares all future crimps to this data. Therefore, in CFM terms, "bad" really means: the actual crimp curve is outside of the tolerance range that was defined from the known good crimps during the "teach-in" process. But, since this does not fit in the CFM's display screen, it is simply called a "bad" crimp. Different applications require different CFM parameters and operators need to learn to interpret the feedback from the CFM to determine where the variation occurred and if that variation really constitutes a "bad" crimp.

#### What Causes Variation

Once an operator truly understands what is meant when a CFM detects a "bad" crimp, the variables that affect the crimp curve can be taken into account. There are many factors that can affect an application and how much each variable affects the CFM's ability to detect crimping problems varies.

Application feasibility is the most critical factor in the crimping process. Application feasibility is determined by the "headroom." Headroom is the difference in the peak force required to crimp a terminal with wire versus the peak force required to crimp a terminal without wire. The headroom determines how "hard" the terminal is in comparison with the wire. Usually, companies determine the best headroom to be from 30% to 40% (See figure 1 page 24). When these conditions are met, problems such as missing strands, strands over insulation, positioning problems, etc. can be easily detected.

Material type and hardness of the terminal is another big factor in determining the application headroom. The harder the terminal, the smaller the headroom and the more difficult it will be to detect other crimping problems. The finish of the material also plays an important role since some materials "slide better" on the crimping tooling than others. Some materials, such as gold, tend to build up on the tooling if not lubricated properly thus having an impact on the crimp curve. The tolerance of the stock thickness of the terminal is very important as well because the CFM will detect a difference in thickness if it varies from the teach-in samples.

\_Continued on page 24

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Our extensive inventory of the popular 5015 style 97 A & B series includes; standard, RoHS compliant, & reverse bayonet configurations designed to meet your power, signal & control requirements.

The 97 series features a wide variety of insert patterns, contact sizes, with crimp/solder terminations & PCB or thermocouple contacts. They are available in a wide variety of shell finishes including; **RoHS** compliant cadmium free black zinc & electroless nickel, as well as O.D. & clear cadmium.



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All our products use modern design and materials, and have an innovative control system. With speeds of up to 600 picks per minute, the ability to accept larger yarn and wire packages and the "jog forward and back" COBRA ensures higher productivity, reduced reworking and lower downtime.

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Figure 1

# **Crimp Force Monitoring**

Continued from page 22

The proper combination of wire, terminal and seal is also critical to the crimping process. If the wire is too small or too large for the terminal and seal being used, the CFM will have a difficult time detecting a good versus bad crimp.

Type and quality of the wire also need to be taken into account. It is very important that the wire has a good quality and consistency in its mass.Wire quality is one of the critical conditions since 30 to 40% of the crimping force is required to form the strands into a gastight honeycomb geometry. If the copper mass varies too much throughout the wire, this will have a significant impact on the crimping force detection. Also, strand count is very significant because monitors are typically only able to detect around 10% or more missing strands. Therefore, if the wire has 7 strands, the CFM can detect 1 missing strand, whereas in a 19 strand wire, 2 or more strands would need to be missing in order for the CFM to detect an error. Insulation also plays a role in crimping force, although to a lesser degree. A cleanly stripped insulation allows for better force detection.

The applicator is also a critical factor in the crimping process. It is important that a well lubricated and reliable applicator is used. A reliable applicator is a quality made applicator with a good feeding mechanism and quality made tooling.

A press with good consistency that is statistically capable (i.e. Cmk > 2.33) and well maintained means repeatable force will be applied to the wire/terminal combination. Presses also have to be designed so that they can consistently flex enough for frame sensors to be able to detect the deflection and therefore the force applied. For ram or base installed sensors, this is also important although to a lesser degree. Cmk is the key here.

\_\_\_\_Continued on page 26





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# **Crimp Force Monitoring**

Continued from page 24

Wire preparation also plays a part in the crimping process. A well prepared wire is required with consistent cut and strip dimensions and without damaged strands. Manually stripped wires have a greater chance for inconsistency and damage to the wire and therefore will have a bigger impact on variability. To achieve the best results it is recommended that a quality automatic cut and strip machine is used to cut and strip wire.

Presentation is another variable to consider. For manually fed crimping presses, the operator must present a properly stripped and straightened wire consistently to the wire stop position before initiating a crimp cycle. One factor that often goes unnoticed is temperature. Extreme temperatures or variations in the factory temperature throughout the day can have an effect on the CFM's ability to detect variation.

The CFM itself will also have an effect on the data. It is important that the user know about the type of CFM and force sensor that is being used and is familiar with the positioning of the sensor.

Crimp force monitors are very effective tools when the conditions previously mentioned are fully understood, considered carefully, their optimum conditions met and the influence of the different variables taken into account. Paying close attention to these factors is the only way to achieve meaningful detection of crimping problems.



Figure 2

#### Properly Interpreting the Data

Most importantly to the process, operators need to learn to read the data they are given by CFMs and understand what it means. As mentioned earlier in the article, an operator must teach the CFM what to identify as a good or bad crimp. In order to do this properly, first



time crimping studies must be performed to determine the detection feasibility, taking into account all of discussed the factors above. Because the teams in manufacturing usually have little say in determining what combination of wire and terminal to use, one of the best ways to effectively determine the capability of the application is through a thorough analysis done before releasing the tools and materials to the production floor. The most important output from these analyses includes:

- Conductor Crimp Height CPK
- Pull Out Force CPK
- Micrograph Analysis

## Micrograph analysis of crimped wire

Performing these analyses before beginning production will provide valuable information about the proper combination of wire, terminal and crimp specs.

Once the quality of the equipment, materials, and headroom is determined, the crimp zones need to be established. The easiest way to do this is by looking at the curve graph through a computer or the software in the equipment. Some applications introduce unwanted equipment and terminal noise at the beginning and the end of the crimping process, known as feeding noise (See figure 2 above). This is not critical to the crimping process and needs to be filtered out from the equation. The crimp zones should focus only on the actual crimp curve and need to be set on the CFM.

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Once unwanted noise is filtered out, then the averages of correctly crimped



Micrograph analysis of crimped wire

wires can be taken to determine the signature curve. Accomplishing this requires trial and error to determine how many missing wire strands a certain range will be able to determine as bad. Strands can be taken out of the crimp one at a time to determine the effect of the missing strands to the deviation from the signature curve. Once completed, this will determine the CFM's ability to detect the percentage of missing strands. After gathering all this data, the percentage tolerance from the mean curve of the known good crimps is determined.

#### **Documenting Results**

Finally, documentation is very important to determine process values for the correct terminal/wire/tool/CFM combination. Having these process values readily available and posted next to the crimping press or downloaded automatically into the machine's software will ensure proper adherence to the process charts at all times and give valuable reference data for troubleshooting purposes.

#### Conclusion

There are several variables that need to be evaluated and understood for successful use of a CFM. Of course, all CFMs come with base parameters that will work for many applications. However, in order to do a professional job and create products with the highest quality and reliability, we, like chefs in the kitchen, need to ensure each ingredient in the process is properly prepared before sending out to the production floor. That is the recipe for success!

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## **Inside TE Connectivity's Aluminum Crimp**

Continued from page 1

adding that TE does not profess to be in the automotive wire business. Fleak's main point in this regard is that TE has plenty of experience crimping aluminum.

I've covered the advantages and disadvantages of using aluminum wire for electrical circuits in previous articles, but a quick review is probably a good idea.

#### Why Aluminum?

Aluminum has one third the density of copper. It also has only two thirds the conductivity of copper, so a larger size wire is required to carry the same current. Even taking this into consideration, an aluminum conductor with the same resistance is still about 50% lighter than its copper equivalent. Reduced weight means adherence to CAFE standards, increased fuel efficiency, lower emissions, etc.

For the OEMs, however, it's really about cost savings. From a commodity standpoint, aluminum is three to five times cheaper than copper in the open market. Also, copper is a speculation metal, where aluminum is available in plentiful supply. Replacing copper allows the OEMs to forecast costs years in advance, and gives them the beloved sustainability they are looking to build into their supply chain models.

#### The Challenges

Along with its benefits, aluminum does have a number of properties that make its use in wiring systems a challenge. Here are the big ones:

• <u>Galvanic Corrosion</u> – Whenever two dissimilar metals are in contact, moisture and other contaminants can lead to corrosion of the metal with the lower electrochemical potential. The potential difference between copper and aluminum is significant and the aluminum will preferentially corrode in this situation. Measures must be taken to prevent contaminants from reaching the point where the aluminum and copper meet. In this case, where the aluminum wire is crimped to the copper terminal.

• <u>Oxide Layer</u> – Aluminum readily develops a hard oxide layer which acts as a strong insulator. In order to form a crimp with good electrical characteristics, this layer must be disrupted during the crimping process.

• <u>Creep</u> – Metals have varying tendencies to flow, or relax, in response to applied stress over time; like in a clamp. Creep will occur in aluminum at temperatures over 80 degrees C, and only to a comparable extent in copper at temperatures above 230 degrees C.

• <u>Strength</u> – Aluminum is ductile and therefore much softer than copper, with only about one third of copper's strength characteristics.

#### The TE Approach

The TE approach to all of these problems lies predominantly within the crimp. "Our secrete sauce is in the back of the terminal," said Fleak. He noted that TE's value proposition from day one was to make the system seamless to the harness manufacturer., adding, "it's very similar to crimping a terminal to a copper wire the way it's done today." TE's goal in developing the new terminal was to keep the harness producer's infrastructure the same.

Fleak went on to explain exactly what is going on inside the terminal, and how it alleviates the challenges of crimping aluminum wire to copper terminals. He reviewed a typical copper crimp where there is an exposed transition area between the wire crimp and the insulation crimp (*Fig. 1. page 30*).

\_\_\_\_Continued on page 30







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# **Inside TE Connectivity's** Aluminum Crimp



(photo courtesy of TE Connectivity)

In the aluminum crimp, Fleak instructed, TE has designed a structure that is solid and tapered from the wire crimp back to the insulation crimp, with no exposed wire in the transition area (Fig. 2). "The crimp terminal metal closes off the wires within the transition area to impede environmental ingress," he



TE Solid, Tapered, Aluminum Crimp (photo courtesy of TE Connectivity)

Describing more about the "secret sauce" of the TE system, Fleak revealed that TE adds a precise amount of a protective substance at the front of the crimp where there are larger wings that roll over onto themselves producing a ram horning effect that acts to impede environmental exposure of the aluminum wires. The protective substance also is placed at the insulation end of the crimp to further impede environmental exposure in the crimp. The protective substance is already on the terminals packaged on the reel. Fleak was careful not to use the term "sealed" with respect to how the new crimp provides an environmental barrier, referring to the system instead as a "self- protecting crimp."

In grappling the oxide issue on the Al wire, TE has designed unique shark finlike shaped serrations into the crimp

Continued on page 34



Serrations within TE Terminal. (photo courtesy of TE Connectivity)



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# Inside TE Connectivity's Aluminum Crimp



Fig. 4 - Shark Fin-like serrations.

Continued from page 30 \_\_\_\_

(photo courtesy of TE Connectivity)

barrel (Fig. 3, Fig. 4) These serrations, Fleak stated, are specially designed to break through the hard aluminum oxide layer to establish partial cold weld bonds between the wires and the copper terminal (Fig. 5).



Fig. 5 - TE Cross Section of Aluminum Crimp

(photo courtesy of TE Connectivity)

So, with galvanic corrosion and the hard oxide issues addressed, the next hurdles in any aluminum wire crimp design deal with creep and mechanical strength characteristics. The TE approach takes advantage of aluminum's ductile nature to solve these problems. "We crimp aluminum wire much tighter than we would a copper wire," Fleak stated. As a result, the high level of aluminum extrusion in this TE approach does not result in significant residual stresses, and therefore creep is not a concern. Instead, this high level of extrusion enhances the cold weld bonding process throughout the crimp. This fact in conjunction with the optimized wing lock and shark fin-like shaped serrations is used to achieve good electrical performance.

#### Other Challenges

Having clearly mastered the crimp part of the equation, Fleak admits there are other challenges in the periphery.As far as the crimp goes, Fleak asserted, "we are going into vehicles with a long history of crimp reliability testing experience, but there's still a lot of continuing development on the aluminum wire itself." Although he confirmed things like strand count and circular mil area are already called out in specifications, "the methodology used to extrude the wire and apply the insulation, if not done correctly, can actually degrade the process of breaking through any nonconductive films on the wires to establish stable electrical contact." Some wire manufacturers, he indicated, use techniques that create additional challenges to crimping. These variations in wire

\_Continued on page 38

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## Inside TE Connectivity's Aluminum Crimp

Continued from page 34 \_\_

#### **Aluminum Wire for Automotive - A Regional View**

The use of aluminum wire for automotive has developed regionally at differing paces. Dave Fleak, Automotive Product Manager for TE Transportation Solutions spoke recently with WHN about some of the reasons. "I would say that today, Asia Pacific leads the world in this space," he said, noting aluminum is currently in certain Toyota vehicles in production today. The first aluminum wires are expected to be in European production for the 2014 model year, Fleak noted.

With the big three in Detroit, Fleak admits it might be a couple more years for full production. There are some interesting reasons for the staggered global development. Where other regions sought weight reduction through aluminum, Detroit began by downsizing existing copper circuitry in vehicles. "Over the years, there was such a high safety factor built into the wiring used in (U.S.) cars and light trucks, they were able to just go down a size or two in copper to get the weight savings." That dynamic is quickly coming to an end, however. "The downsizing is done, and now aluminum is the next step," leaving Detroit two to three years behind, he outlined.

The gage size of wires being targeted also varies by region. Fleak became involved with the aluminum crimp movement about 18 months ago. He indicated at that point "in the U.S. and Europe...everything being targeted was in the 2.5 to 6 sq. range." He noted that battery cables had gone aluminum years ago, as did 8, 10, and even 12 sq. wire for some bigger commercial vehicles. Asia was a completely different story. Asia concentrated on .75 to 1.5 sq. wire, and in some cases even down to .5 sq., he said "It wasn't because those were big wires, but they made up 60 to 70 percent of the circuit count on the vehicle," he revealed.

What is clear to Fleak is that for all regions, when the gage size is below 1.5 sq., aluminum wire is much too mailable to be practical. This will require the use of alloys to give the wire the strength characteristics necessary, he advised.



(right to left) direction

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#### INDUSTRIAL INFO-TAINMENT

manufacture methods present the biggest limitations to full blown production right now. He noted that the current approach is to clearly call out the wire manufacturer, the size, strand count, insulation material and thickness on the TE application specification, 114-94204 (available on the TE web site). TE is working to increase the number of approved sources, and will work with the industry to promote conformity.

There are also different procedures for pulling and cutting aluminum wire in harness production. Just the inertia of pulling a softer wire with a higher propensity to deform presents setup variances, he cited. The relative softness of aluminum also creates smearing of the metal onto the cutting blades. TE is working with Komax and other manufacturers to smooth out these speed bumps. "We literally meet weekly with the wire producers, and [equipment] manufacturers," said Fleak. "They are

working their way through these issues, and as with any new disruptive technology, it's going to take some work to get everything clean."

#### Serviceability

Although it's not part of the TE production solution, Fleak wanted to touch on the subject of serviceability of aluminum harnesses in the auto dealer service bay. Typically, he described, OEM's provide a kit to their dealers with pigtailed crimped terminals, a crimp tool, a small heat gun, and lengths of shrink wrap. Technicians need only pick the proper crimped pigtail lead, butt splice it to the old harness, and heat shrink a length of tubing for a good seal. TE sees the heat shrink as providing a viable barrier to moisture intrusion for the aluminum harness repair, Fleak mentioned. The only variance is, in order to compensate for lower conductivity, larger aluminum conductors will likely be used to replace current copper circuits in the wire harness. In other words, the aluminum wire size will likely be a gage larger than the copper pigtail lead in the dealer kits. TE will have a special hand tool to crimp the butt splice that will account for this, he said, and the heat shrink operation will remain the same. The challenge, he noted, will be getting the technician to recognize these situations in the service bay, and choose the correct splice/tool combination.

proposition is to make the transition to the harness manufacturer as seamless as possible, with capital investment limited to little more than a new TE crimp applicator and depending upon current leadmaker solutions, possibly a new leadmaker or modifications to existing units.

The second point Fleak wished to stress is that crimping aluminum is really a system involving the wire, terminal, touch tooling and lead maker. TE is actively involved in development of the latter three of those, and is working with the industry to move forward.

The third and strongest point Fleak made is the TE system is tried, tested, and ready to be put into the harness supply chain right now.

In addition to Dave Fleak, Automotive Product Manager, I would like to thank Paul Mason, Director of Communications, TE Connectivity, Transportation Solutions, in helping me compile this article.



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Solderless ring terminals meet UL requirements only when crimped using Molex recommended tooling; however terminals may be crimped with a variety of industry-standard tooling.

#### Ready to Roll

To capstone things, Fleak stressed three major themes regarding the TE Connectivity aluminum crimp. First, the TE value

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#### **NEWS PLUGS** continued

#### Allied Wire & Cable Raises Money for Make-A-Wish With a Spin on its Charity Week Tradition

Allied Wire & Cable, specialty manufacturer and distributor of wire and cable, put a summertime spin on one of its favorite holiday traditions with a Christmas in July Charity Week. The event was held as part of Allied's 25th anniversary celebrations and, with the help of customers, raised \$9,148.06 for the Make-A-Wish Foundation.

Charity Week has become a muchloved tradition for the Allied Wire & Cable

family. Each December, one week is designated as Charity Week, during which a percentage of all sales is donated to nonprofits chosen by Allied employees and customers. The event is usually reserved for the holiday season, but because Allied is in the middle of its full year of 25th anniversary celebrations, the company decided that "Christmas in July" was a perfect time to incorporate an additional Charity Week event.

From July 15 – 19, a portion of all new orders set to ship by September 1, 2013 went to a donation to the Make-A-Wish Foundation, a charity which grants the wishes of children with life-threatening illnesses.

As a family owned and operated company that prides itself on a motto of "com-



Pictured – Allied Management & Make-A-Wish Philadelphia & Susquehanna Valley Representatives (L to R): Amy Moyer, Dan Flynn, Tim, Flynn, Karen Traten, Gene Evans, Dennis Heron, Tony Spina, and Natalie Beers

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mon sense, not dollars and cents," Allied makes giving back to the community a priority. Allied Wire & Cable has a long history with the Make-A-Wish Foundation and thanks to charitable events over the years, has been able to help fund wishes for trips to Disney World, a trip to baseball camp, a trip to Florida to meet the Philadelphia Phillies at Spring Training, a wish to have a new computer, and a wish to have a therapy pool installed, among others.

With the help of its customers, Allied Wire & Cable raised \$9,148.06 for Make-A-Wish during its Christmas in July Charity Week. On July 31, representatives from Make-A-Wish Philadelphia & Susquehanna Valley, Dennis Heron, President & CEO, and Karen Traten, Director of Partnerships & Communications, visited Allied Wire & Cable headquarters in Collegeville, PA for an official check presentation. During the presentation, Tim Flynn, co-owner of

Allied said, "We are so proud to give back to such a worthy cause and we're honored to be a part of the work that the Make-A-Wish Foundation does for children and their families."

Allied looks forward to continuing its Charity Week tradition with its 8th Annual Charity Week in December.

Allied Wire & Cable is a family owned and operated specialty manufacturer and distributor of wire and cable, celebrating its 25th year of business in 2013. Allied serves all major global markets, including government and military, as well as the aerospace, automotive, and telecommunications industries. AWC is dedicated to personalized service, and assigns an individual sales rep to each and every customer. Customization services such as cut and strip, custom print, dyeing, striping, twisting, and more are available, in addition to a full range of custom cable design and manufacturing services. Allied is headquartered in Collegeville, PA, with stocking locations in Florida, Wisconsin, and Nevada. Additional sales offices are located in New Hampshire and throughout the Southeastern United States. Allied is proud to serve customers worldwide. For more information, visit www.awcwire.com.

a single- gang box, or combined with other Carlon<sup>®</sup> Non-Metallic Single- or Multi-Gang Box Extenders for multi-gang applications.

"Encountering electrical boxes that are installed too deeply in the wall is a common problem for remodelers, complicating a flush finished installation," said Chad Smith, vice president, product manage

ment, at Thomas & Betts. "The Carlon® Non-Metallic Single- or Multi-Gang Box Extender is designed to correct this problem, as well as address multi-gang extensions, which is a problem that previously called for expensive and hard-to-find multi-gang extenders. Now, installers in the field will always have the right size extender at hand."

The Carlon<sup>®</sup> Non-Metallic Single- or Multi-Gang Box Extender features an adjustable mounting depth with a maximum extension of one inch for flexibility in installation, and works with most singleand multi-gang boxes and devices. By providing a single solution for single- and multi-gang extensions, it eliminates the need to stock multiple SKUs.

Other features include an innovation that simplifies installation by eliminating the need for trimming. It is UL listed and compliant with NEC Article 370-20. The Carlon® Non-Metallic Single- or Multi-Gang Box Extender includes two 6-32 by 1 ½inch screws for each extender.

Thomas & Betts Corporation, a member

of the ABB Group, is a global leader in the design, manufacture and marketing of essential components used to manage the connection, distribution, transmission and reliability of electrical power in utility, industrial, commercial, and residential applications with a portfolio of more than 200,000 products marketed under more than 45 premium brand names. Thomas & Betts' headquarters are in Memphis, Tenn. For more information, please visit www.tnb.com.

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See Page 10 for more information



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average energy expended by the bulbs to be delivered to the target zone. What you will see is an amazing difference in shrink time!

The Focus-Lite<sup>\*\*</sup> is equipped with an adjustable timer for repeatable shrinking, time after time. It also has a dimmer switch that controls the power for sensitive components. Visit our website at **www.judco.net** and see our full line of Focus-Lite<sup>\*\*</sup> products.

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In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

#### HYPE ABOUT DISCONTINUING HYPALON®

Hypalon<sup>®</sup> is the DuPont<sup>®</sup> trademark for chlorosulfonated polyethylene (CSPE) synthetic rubber. It was a common high-performance material used for the insulation of wire and the jacketing of cable. Its thermal, mechanical and electrical characteristics offered many benefits for specialized and unique applications.

#### HISTORY OF HYPALON

Hypalon was born when polymer chemistry efforts to produce a material superior to natural (polyisoprene) and butyl rubber resulted in the very useful CSPE synthetic rubber. In 1951, DuPont began to market CSPE under the Hypalon name, referring to the group of sulfur and peroxide cured elastomers created from chlorinated polyethylene (CPE) and CSPE.[1] These polymers are manufactured to produce an elastomer with a completely saturated backbone and side groups suitable for different methods of vulcanization. Figure 1



Figure 1–Structure of base Polyethylene chain

shows the basic structure of the polyethylene chain that the chlorine and sulfur atoms modify to form cross-linked CSPE molecules.

#### PROPERTIES

CSPE has many advantages over commonly used polymers such as polyvinyl chloride (PVC) and polyethylene (PE). One of the primary differences is that it's manufactured as a thermoset material capable of surviving thermally stressful and high-temperature environments that many common polymers would fail in. This makes it an excellent material in applications where overloaded circuits might otherwise damage plastic insulation or jacketing materials. Another inherent strength of Hypalon is its UV stability. When properly manufactured, it can withstand extended exposure to direct sunlight with limited degradation of its electrical and mechanical properties. In fact, it was very popular as a single-layer covering to protect flat roofs from the elements.

In addition to its unique UV stability, Hypalon is known for its ruggedness. Although many thermoplastic materials can be made to be very rugged, properly formulated CSPE combines the flexibility of rubber with extreme ruggedness. This makes it an ideal material for severe environments such as extra heavy-duty cord





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and even mining applications. Some formulations of Hypalon were so tough that they were used for gaskets and seals that experience extreme pressures during their service life.

Finally CSPE-based materials are more chemically inert than many other materials used in wire and cable. Because of this, they can be expected to survive in applications where caustic chemical exposure is probable, while many other common materials would fail in a matter of years, days or even minutes.

#### DISCONTINUATION

Hypalon had specific formulation requirements that are now either legally restricted or avoided as a part of good design practice. Even though thermoset CSPE materials won't melt in high-temperature environments, they will eventually ignite and burn. The gases produced during combustion of CSPE have varying levels of toxicity. Such toxic gases have been the subject of scrutiny in some segments of the industry. In addition, Hypalon often contains additives made from lead or lead compounds, a material well known for its dangers and restrictions.

The environmental pressures, high manufacturing costs, hazardous nature of manufacturing the product, as well as commercial pressures all probably contributed to DuPont's decision to discontinue the production of their Hypalon products. With much consideration, they announced the discontinuation of Hypalon production at the end of June 2009.[2]

#### SO WHAT ARE THE ALTERNATIVES?

If you're concerned about your products being obsolete, you need to continue reading. Even though DuPont discontinued Hypalon, CSPE is still available from several reputable sources. It's also important to point out that there are compounds that perform similarly to CSPE without some of the drawbacks, and many large users have already transitioned without skipping a beat. Over the last several decades, there have been innovations in other materials that can now provide performance on par with CSPE. In fact, users that specify Hypalon in their products will realize very little impact aside from updating their specifications. Manufacturers have taken one of two paths to resolution: 1) they are switching to other suppliers of CSPE materials that don't use the trade name Hypalon; or 2) they are switching to other materials such as thermoset CPE, which offers performance characteristics very similar to those offered by CSPE. Most manufacturers have worked out their transition plans in a way that users of CSPE products will generally not be able to identify any difference in terms of performance, feel or product ratings regardless of the resolution path chosen by the manufacturers.

For more information contact your local Anixter sales representative at 1.800.ANIXTER[1] DuPont Hypalon<sup>®</sup> 40S Data Sheet, Rev. 3, Nov. 2002 [2] Dupontelastomers.com Press Release, May 7, 2009



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The Focus-Lite<sup>™</sup> is equipped with an adjustable timer for repeatable shrinking, time after time. It also has a dimmer switch that controls the power for sensitive components. Visit our website at www.judco.net and see our full line of Focus-Lite<sup>™</sup> products.

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## NEWS PLUGS continued

#### New Heavy Duty Medium Voltage Couplers from Amphenol Ideal for Hazardous Environments

Amphenol Industrial Global Operations, a global leader in interconnect systems, introduces a new line of heavy duty medium voltage couplers (MVC) for use in hazardous environments. Amphenol's MVC series is ideal for applications in the mining, utility, tunneling and shore power industries for safe and reliable transfer of electricity throughout a job site. These new couplers vary in voltage from 600 V to 15 kV with amperages up to 600 A.

The MVC series features Amphenol's patented RADSOK technology that offers higher current ratings (up to 25% higher than standard contacts) with lower mating forces as well as high reliability, low contact resistance, high mating cycles and a self-cleaning design.

This new series features Amphenol's Rapid-Couple technology, an interlock

method that makes for quick and easy mating and unmating in the field -- no tools or closing mechanisms are needed.

The MVC couplers also incorporate secure fitting covers that repel water and soil while keeping the contacts uncontaminated when used in hazardous conditions. In addition, the couplers incorporate a combined strain relief and cable seal system that provides superior sealing against moisture.

The couplers are constructed with a standard aluminum housing, alternate materials are available, and feature elongated ground planes, fully shielded phase conductors, solder and compression ter-



Amphenol's Heavy Duty Medium Voltage Couplers (MVC)

minated contacts as well as fire retardant insulators. They are offered in various powder coat colors. All parts are replaceable and can be serviced easily in the field, saving time and money.

For further information visit www. amphenol-industrial.com.

#### Molded Nylon Special Standard Round Spacers

Micro Plastics' announces a new product line of "Special Standard Round Spacers". The new line of molded nylon round spacers include over 250 sizes, with diameters of 1/8" through 1 ½" and lengths from 1/8" to 2 ¾". These tough resilient spacers can be used in a variety of assemblies. Useful in electronic and electrical applications, they may also be used as bushings, bearings, rollers, gliders and bumpers.

Micro Plastics' nylon round spacers are resistant to vibration, abrasion and corrosion. They are electrically insulating and have a high strength-to-weight ratio.

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Special Standard Round Spacers

plete list of nylon fasteners that are available. FREE samples are available upon request. Contents include: standard and metric machine screws, cap screws, nuts, washers, spacers, insulators, grommets, bushings, rivets, hole plugs, clamps, printed circuit board accessories, suspended ceiling hooks, wire routing kits and many other hardware items.

For a copy of their new full line catalog #39 contact Micro Plastics', PO Box 149, Flippin, Arkansas 72634. Visit www.microplastics.com.

#### New Littelfuse Terra Power Systems Battery Disconnect Switches at Waytek

Waytek introduces new Master Disconnect Switches from Littelfuse Terra Power Systems to help increase the life of your batteries in trucks, emergency vehicles, off-road and industrial mobile equipment.

Waytek carries a new line of Littelfuse Terra Power Systems Battery Disconnect Switches to cut-off electrical power, protect against electrical fires and theft when equipment is not in use, provide reliable shut-down of power during maintenance and protect batteries from excessive drain. New master disconnect switches isolate high current DC circuits from battery sources and are capable of carrying 300 amp continuous current. Ignition protected to SAE J1171 and ISO 8846 for operation in hazardous atmospheric environments in battery box or on vehicles carrying hazardous loads.

Waytek offers three case design options in surface mount, panel mount or floor padding trim mount. Many features on the master disconnect switches were designed for harsh environments, including tin-plated copper studs to provide maximum conductivity, stainless steel hardware for corrosion resistance and IP67 rated housing for moisture and dust protection. Waytek, Inc. carries more than 10,000 electrical supplies, including wire and cable, terminals and connectors, circuit protection parts, switches and more, for OEM and MRO mobile equipment markets. Founded in 1970, the company has seen continued expansion in the electrical supplies industry. Waytek carries large quantities of stock items and is able to ship most stock items the same day, allowing customers to carry smaller inventory, yet still have products when they need them. Browse our electrical solutions at www.waytekwire.com, or call 800-328-2724.

#### APPLICATORS / CRIMPING PRESSES / TOOLING



Mini Left to Right



Mini (2 Post) Air Left to Right



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#### Wiring Harness News SEPTEMBER/OCTOBER 2013 45

### **Multi-Station Fume Extractors**

ost employers care about the health and safety of their workers but are faced with limited work area or limited resources to set up fume extractors at individual work stations. At Sentry Air Systems we understand this reality and have designed multi-station fume extraction systems that offer both spatial and fiscal solutions.

The Occupational Safety and Health Administration (OSHA) cites poor Indoor Air Quality (IAQ) as being tied to symptoms like headaches, fatigue, trouble concentrating, and irritation of the eyes, nose, throat and lungs. Also, some specific diseases have been linked to specific air contaminants or indoor environments, like asthma with damp indoor environments. OSHA goes on to recommend engineering control methods to better protect the quality of indoor air

such as local exhaust, general dilution ventilation and air cleaning.

Our engineering team developed the above conceptual system capable of supplying up to 20 workstations with bench top fume extraction access.

This system utilizes a single Sentry Air Model 450 unit affixed to appropriate tubing or piping outfitted with the desired amount of self-supportive, flame-retardant flex arms.\*

The Model 450 comes with a standard variable speed control (115V only) that delivers customized airflow dependent on the number of arms attached, the length of piping utilized and the filter media installed.

This sleek, highly effective system allows sourcecapture fume extraction for a variety of applications including solder, chemical, and wiring fume control as well as light grinding dust collection. The single unit system saves thousands in potential costs if you were to purchase separate fume extractors for individual operators. For example, if you were to purchase 10 individual fume extractors design a fume extractor with flex arms at 3 different locations along the bench, allowing operators to easily grab a hose from wherever they are on the bench without having to move the fume extractor unit.

Using appropriate tubing/piping\*, this system easily fit to their existing workbench and is an economical solution to their source-capture needs.

\*Sentry Air Systems will supply the fume extractor, self-supportive flex arms and the appropriate filtration media but is not responsible for providing tubing/piping or the attachment of any elements to the apparatus.

If you need an economical, highlyeffective solution to improving your indoor air quality consider a multi-station fume extractor from Sentry Air Systems. All of our units come equipped with a variety of filter media including



HEPA, ULPA, ASHRAE, Carbon and Specialty Blended Carbon. We strive to create a system that suits your unique needs and offer free consultations, quotes and photo realization graphics to show how the unit will look in your work environment.

Sentry Air Systems, Inc. engineers clean air through the design and manufacturing of high quality air purification systems. Our patented line of floor, bench top, mounted and portable air cleaners offers simple and effective solutions to fume control and extraction.

In addition, we carry a line of ductless fume hoods, ducted exhaust hoods, custom hoods, portable clean rooms and a variety of filter media and accessories. We serve multiple industries including welding, soldering, manufacturing, laboratory, pharmaceutical and many more.

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that offered up to 100 CFM each, that would cost approximately \$9,160.00. Instead, a multi-station fume extractor with 10 arms and similar CFM would cost approximately \$5,000.00.

Sentry Air designed this multi-station fume extractor for a client to give their operators more flexibility at workstations. Their existing fume extractor was not adequately sized to reach the full length of their 72-inch long soldering workbench. As a result, potentially harmful renegade fumes and smoke were not being captured.

Our solution was to

Now includes the Brady360<sup>™</sup> Wraptor Basic agreement for the first year of ownership. This includes a Support Engineer setup/training visit, loaner availability, and reduced emergency on-site support fees.





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#### Schleuniger, Inc. to Exhibit Latest Wire Processing Solutions at The Assembly Show

Schleuniger, Inc., a leading international manufacturer of high-precision wire processing machines, will be exhibiting at The Assembly Show, a premier event

designed to help suppliers, buyers and users of assembly equipment in manufacturing plants connect, learn, share and explore all things assembly. This exclusive showcase will be held on October 28th through 30th at the Donald E. Stevens Convention Center in Rosemont, IL. Schleuniger will be at booth #133 providing hands-on demonstrations of innovative solutions for stripping, cutting, crimping and marking all types of wire and cable.

As part of the exhibition, Schleuniger



will demonstrate the newly released CoaxStrip 5200, a semi-automatic, multistep coaxial cable stripping machine for coaxial, multi-conductor cable and single conductor wire. Thanks to the universally designed blades, centralizers and clamping jaws, the machine can process a full range of cables without the need for mechanical adjustments, saving the user valuable time and increasing output when switching between applications. The CoaxStrip 5200 also offers user-friendly features such as easy access to the LED lit working area and an intuitive, menu-driven data input system that allows cable programs to be created, saved and recalled quickly, ensuring consistent, repeatable results each time.

The company will also provide demonstrations of other popular benchtop stripping machines including the innovative UniStrip 2300, UniStrip 2550, and RotaryStrip 2400. These programmable wire stripping machines feature an intuitive touch screen user interface, are able to strip different wire sizes without requiring mechanical adjustments and have a highly responsive trigger sensor that is great for small, flexible wires. Each of these machines provides users with the highest level of quality and precision on the market today.

The CrimpCenter 36 S, a fully automatic crimping machine that quickly and efficiently cuts, strips and terminates a wide range of wire types and sizes, will also be demonstrated. The advanced technology and productivity make it possible to replace multiple legacy machines with



Schleuniger CoaxStrip 5200

one CrimpCenter 36 S thereby reducing floor space, power consumption and labor requirements while expanding flexibility and capability. Equipped with high precision technology, the CrimpCenter 36 S features a compact modular design offering space for up to six processing stations, such as seal loaders, twisting and tinning stations.

Crimp cross-sectional analysis has quickly become an integral part of the crimp quality process. To complement its crimping solutions, Schleuniger will also show the MicroGraph System for high quality crimp cross section analysis. With Schleuniger's MicroGraph System, crimp cross-sectional images can be created in a fraction of the time compared to conventional methods. The system includes modular components that can be combined according to individual needs.

In addition, equipment from Schleuniger's line of cut and strip machines including the PowerStrip 9550, PowerStrip



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9500 and OmniStrip 9450 will be shown. These machines offer a wide range of processing capabilities that meet a variety of unique wire processing needs.

Schleuniger's wire processing experts will be on hand to answer any questions you may have as well as to analyze your wire samples and help you find the equipment that is right for you.

Additional products to be demonstrated include the FiberStrip 7030, UniStrip 2545, FiberOptic 7010, UniStrip 2600, CoaxStrip 5500, CoaxStrip 5300 RX, PreFeeder 2200, Inkjet Printer, JacketStrip 8310, CableCoiler 1300, UniCrimp 200 and StripCrimp 200.

More information about these products can be found at www.schleunigerna.com. Should you have any questions, please e-mail sales@schleuniger.com or call (603) 668-8117.

#### IPC'S Revised 2013 PCB Forecast Lowered but Still Positive

IPC — Association Connecting Electronics Industries® announced the June findings from its monthly North American Printed Circuit Board (PCB) Statistical Program. Based on the market's slow response to order growth this year, IPC has revised downward its 2013 PCB sales forecast.

#### June Results are Mixed

Total North American PCB shipments decreased 3.4 percent in June 2013 from June 2012, and bookings decreased 6.1 percent year over year. Year to date, PCB industry shipments were down 4.7 percent and bookings were down 1.3 percent. Compared to the previous month, PCB shipments in June were up by 12.0 percent, but bookings were down 3.6 percent. Shipments outpaced bookings in June for the first time in seven months, causing the PCB book-to-bill ratio to slip to 1.05, which is still a positive result.

Flexible circuit sales con-

the leading indicators suggested. Based on the market's unusually slow response to order growth, and the industry slowdown worldwide, we are revising our outlook for 2013 North American PCB sales growth," she explained. "We expect to see sales strengthening in the second half of this year, resulting in 2013 sales growth of less than 1 percent."

IPC's revised 2013 forecasts for the North American PCB industry will be published this week in the August edition of IPC's North American PCB Market Report. The monthly report includes more detailed findings on rigid PCB and flexible circuit sales and orders, including separate rigid and flex book-to-bill ratios, military and medical market growth, demand for prototypes and other timely data. This report is available free to current participants in IPC's PCB Statistical Program and by subscription to others. More information about this report can be found at www.ipc.org/market-research-subscriptions.

The book-to-bill ratios are calculated by dividing the value of orders booked over the past three months by the value of sales billed during the same period from companies in IPC's survey sample. A ratio of more than 1.00 suggests that current demand is ahead of supply, which is a positive indicator for sales growth over the next three to six months.

Year-on-year and year-to-date growth rates provide the most meaningful view of industry growth. Month-to-month comparisons should be made with caution as they may reflect cyclical effects and shortterm volatility. Because bookings tend to be more volatile than shipments, changes in the book-to-bill ratios from month to month may not be significant unless a trend of more than three consecutive months is apparent. It is also important to consider changes in bookings and shipments to understand what is driving changes in the book-to-bill ratio.

The information in IPC's monthly PCB industry statistics is based on data provided by a representative sample of both rigid PCB and flexible circuit manufacturers selling in the USA and Canada. IPC publishes the PCB book-to-bill ratio near the end of each month. Statistics for the current month are not available until the last week of the following month.

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tinued their year-on-year growth in June, but flex bookings growth remained below last year's levels. Rigid PCB sales and order both underperformed last year's levels, but the negative margin has been improving in recent months.

"Until this June, monthly PCB orders outpaced sales every month since January, which has produced positive book-to-bill ratios for the past six months," said Sharon Starr, IPC director of market research. "A turnaround in sales growth this year still seems likely, but is not happening as quickly as

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#### **NEWS PLUGS** continued

#### LADD Distribution Releasing **New DEUTSCH Connector Instructional Videos**

LADD Distribution announces the release of new instructional videos for TE Connectivity's DEUTSCH industrial environmentally sealed electrical connectors. The new videos provide in-depth assembly instructions for key DEUTSCH connector series including the DRB, DRC, DT, HD10, HD30, HDP20, Quick Connect, and STRIKE connector series. The videos include product overviews, wire-crimping instructions, demonstrations of contact insertion

and removal, and connector mating and unmating. Visit LADD Distribution's website at www.laddinc.com or LADD's YouTube channel at www.youtube. com/laddindustries to view the videos online. To request a free copy on DVD, contact LADD Customer Service at 1-800-223-1236.

LADD Distribution is the exclusive authorized US distributor of TE Connectivity's DEUTSCH industrial environmentally sealed electrical connectors. DEUTSCH industrial connectors are designed for harsh environments and critical applications in the off-highway, engine, marine and agricultural industries. Contact LADD Distribution for all of your DEUTSCH industrial connector needs.



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## **5 Hidden Costs of "Cheap" High Voltage Connectors**

By David Galambos, President **Canton Connector Corp** 

veryone is trying to stretch their dollar a little more these days, especially businesses. So it's not surprising that supply chain personnel are looking to save a little here and there and hopefully get the same product they would if they spent a few more dollars. Well, the old saying "you get what you pay for," could not be more right in the world of high voltage connectors, cable assemblies, and wire & cable. There are hundreds of interconnect manufacturers in the United States, not all of them are equal, some have high prices with low quality, some have low prices and low quality. This is not a guide to help you find a interconnect

manufacturer, just some tips on what causes a poorly made connector, and what the hidden costs are. Because, at the end of the day using a cheap connector is going to give you issues and will be the weakest link in your euipment.

#### What causes a poorly made connector?

Bad design - Engineers are not experienced in designing high voltage connectors and assemblies. Designing a high voltage connector is very complicated, having a working knowledge of how high voltage connectors work is important when designing them.

Poor workmanship - Unqualified, untrained, and careless assemblers make poor quality cable assemblies. Organizations should have trained, qualified, and

careful assemblers to ensure that products being built are high quality. Cables can fail in the field if they make it that far, or get sent back from quality control leading to lost time, lost money, and missed shipping dates.

Low quality raw materials - Supply Chain may be trying to save money but in fact they are buying poorly made and poor quality raw materials. Even if you have the best assemblers, bad material going into the assembly will always make it fail. Counterfeit MIL-SPEC products is a large issue today, purchasers may purchase counterfeit product unknowingly or knowingly. Performing vendor audits or quality checks can help avoid these problems.

Bad management — Pressure from the top to save money focus on the bottom line can shift workers mindset from quality products to getting products out the door. While everyone is in business to make money, focusing too much on the bottom line and not enough on quality can cause serious issues.

#### Now let's take a look at the bidden costs...

Bodily barm - High voltage is extremely dangerous, when there is 50kV going through a cable assembly that is poorly made there is a high risk for electrocution. The last thing any business needs is OSHA knocking on their front door, or a manufacturer getting a lawsuit for faulty products leading to bodily harm.

*Equipment downtime* — The amount of revenue lost from down equipment can vary from company to

> company and industry to industry, but the common denominator is money is being lost. Besides loss of revenue down equipment can cause a lot more problems, for example, if a cable assembly in the field for a military radar fails and the military cannot operate its radar then security and soldiers' lives can be in danger.

> Cost of getting the right product - After all the costs of down equipment the added cost of finding a new supplier or getting the right product from your existing supplier adds up. If you choose to ditch your current supplier and go to someone new the time and effort from supply chain to find the new supplier can be very large.

Reputation — Your Company's reputation may get tarnished if you are supplying your customer with equipment that has faulty connectors in it. We can all think of a company that has failed or spent millions to get their reputation back for delivering bad products, Ford/Firestone in early 2000, Toyota in the late 2000's, etc. The PR campaigns to re-instill product quality in the end users eyes cost millions and millions of dollars, for a small company this can put them out of business. Loss of business -Many large corporations have preferred suppliers and if you have a bad mark against your company name than you may be skipped over for new projects.

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## Automatic Coax & Cable

Continued from page 1

That basic proposition fuels Gary's passion. "I like to figure out the process," he said. "I can see from A to Z and what the missing pieces are in the middle to make it work. That is the real focus for me. I want to help customers, and then we usually end up getting their business because they are thankful we were able to come through for them.

"Our ability to make additional aids to make products better and faster sets us apart from other companies in the harness and cable industry," Gary said. "We are confident we can figure out how to make almost anything. The couple's intensity for their business even is reflected in the unique ACC slogan – "A company with a sense of urgency." Glenda stated it mirrors her and Gary's personalities. "We are both driven, Gary especially," she said. "Whatever it is, we want to get it done."

Gary related that the slogan applies to meeting customers' needs by having products ready to ship when customers call, a practice counter to the notion of minimal inventory. "As long as customers are willing to take products by the end of the year, we will build ahead and stock them. Then customers know that when they want something, they can get it right away."



The above machine was made by ACC and allows them to make 25K assemblies per month — terminating and testing ten wires in 15 seconds.



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ACC has a staff of 30 who work one shift. Twenty-two, including four temp employees, are in production, and the balance in management.

If an order is for 25, for example, ACC will build 100 "and take a chance that more will be taken as long as it's a viable program," Glenda said. "We look at cost and set-up time. If the order is only for 25, the cost will go higher. It's hard to cut production when we know more will be needed."



One of the many military cable assemblies from ACC.

ACC, which has ISO 9001:2008 certification, makes cable assemblies, wiring harnesses and electromechanical assemblies (EMAs). Quantities can be as low as 1-5 or as high as 6,000, but 100 is average. The products are built to IPC/WHMA A-620, ITAR and UL standards as required.

Cable assemblies, which comprise 40 percent of ACC's income, range from a simple 25-cent jumper to a complex \$7,500 unit for an F-16 fighter jet. Harnesses are 25 percent of the product portfolio and tend to be simpler, not "a lot of big harnesses that take 10-20 hours to build," Gary said.

EMAs, including control panels and power supplies, are 15 percent of the product mix and can cost between \$50 and \$15,000. A simple one is a piece of sheet metal with a printed circuit board and a cable. Conversely, a scanning device for the U.S.Transportation Security Administration is four feet high, two feet deep and 18 inches wide.

The remaining 20 percent of sales is due to kitting, molding and machining. All the processes are done in a building constructed and owned by the Martinets. Before ACC moved into the structure, the firm was located in rented facilities since 1988. The building has 10,500 square feet of space.

"It was a big milestone when we moved into the building," Gary said.

"Then we put every dime into paying it off. We don't like debt, and we don't have any debt, company or personal."

ACC has 100 customers, 25 of them major. Sixty percent is in commercial, industrial and medical, and the 40-percent balance is in military (U.S. Departments of Defense and State). Subcategories of industries served are law enforcement, gaming, transportation, video systems, simulation instrumentation, test equipment, security, avionics and automation.

Continued on page 54



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#### ACC's first customer was National Cash Register in Lake Mary, Fla. Small cables and harnesses were produced. They were as part of Gary's learning

sales and marketing efforts.

Continued from page 53

Besides the defense and state depart-

ments, ACC's customer line-up includes

Invacare, Dover Industries, CTS, DRS

Technologies, Eaton, Elbit Systems, L3

Communications, Sanmina, Raydon, and

Northeast and the Midwest," Gary said,

noting more sales reps are being hired

to supplement the current eight. They

represent the major thrust of the ACC

"We want to get stronger in the

five divisions of General Dynamics.

curve, since when he bought the equipment in 1988 "I did not have a clue how to do anything," he said.

Combined with his enthusiasm and his entrepreneurism, Gary's background enabled him to learn quickly, though. After graduating with an anthropology degree from the University of Central Florida he worked for 84 Lumber as an assistant manager. He met Don Haag, a friend of Gary's father, and moved to Chicago to work at Moldtronics, which specialized in injection molding.

Gary returned to Florida and pursued two ventures before starting ACC, which first was called Multi-Methods. Glenda

Continued on page 56



Automatic Coax & Cable

Roger of ACC at one of the injection molding machines.

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## **Automatic Coax & Cable**

Continued from page 53

handled the financials and made cables. However, she continued her career as a dental assistant, which she did for 12 years before becoming full time at ACC.

The Martinets have seen their business change, as at its height in the late 1990s they employed 64 people and had annual sales of \$4.6 million. "We were making big quantities, but a lot of that went to China," Glenda said, noting one account was \$523,000 a year. "We had to make a niche in the industry and get our process down because we were making lower volumes. That was a big learning

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Today ACC has a staff of 30 who work one shift. Twenty-two, including four temp employees, are in production, and the balance in management.

Glenda is president, and Gary is VP and general manager. Their daughter Amanda Varmuza, 36, is the production manager. They have another daughter Audrey. She does not work there. However, she did design the web page banner.

The other administrative staff members are Cliff Cochran, purchasing; J Casper, engineering; Myami Plantilla, customer service; Henry Porrata, quality; Mike Paschal, shipping and receiving; Glenn Harber, accounting; Roger Cigelske, molding; Rick Culbreath, scheduling; David Mayhew, IT; and Diana Lopez, process plans.

According to the Martinets, one of their exceptional employees is Ray Ward, who started at ACC at age 21. He is skilled as a problem-solver and fabricator.

"He is like our son, and there's nothing that we would not do for Ray," Gary said. "He can make everything happen, and he is very much responsible for our success. He once designed and built a machine that an engineer from Lockheed Martin said it was incredible because it would have taken three guys from his plant to build it.

In the last few years the Martinets had to switch from profit-sharing to year-end bonuses based on annual profits. Health and dental insurance coverage is handled with each employee receiving \$250 monthly to apply to one of three plans. "I would love to be able to give the people who work for us way more money, more benefits, more everything," Glenda said. "But, it's a business, and we have to do certain things to keep the business flowing.

"We would not be a business if we did not have all these people with us," Glenda said. "We do a little bit, but they do a lot. It's a real team effort, and there's a lot of camaraderie."

Similarly, Gary is grateful. "I am most proud of our people," he said. "Glenda and I are just caretakers. I've been struck by how lucky we have been. It's by the grace of God.We were given an opportunity, and we did something with it. But, it's not something we would have done on our own."

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