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Could Grease be the Answer to Reducing Electrical Connection Failures



TMA Cables

By Joe Tito Wiring Harness News

I f you like a good turn-around story, you'll like this issue's profile. TMA cables is in Albuquerque, New Mexico and provides contract manufacturing services for cables, wiring harnesses, coaxial assemblies, coil winding and box builds. They also do PCB assemblies including thru-hole technology, and have in-house engineering and design capabilities to support all of it. It's probably best to let Kristean Alcocer, one of the principals of the company, tell the story as revealed in a recent interview:

WHN: Tell us about the history of TMA.

Kristean: TMA has a long history here in Albuquerque. It was started by some guys who were working at Los Alamos National Labs. They saw the need for a niche business supplying high-quality wire and cable assemblies here locally. It's been

A Day in the Life of a Standards Trainer Discussion with Frank Honyotski of STI

HN ran into Frank Honyotski, Lead Master Instructor for STI Electronics, Inc. at a recent trade event. Among other things, STI is a leading training center for the IPC/ WHMA A-620 specification. Frank had some great insights on training and committee involvement, so we vowed to catch up with him for an interview.

Frank has been doing instruction for electrical assembly for over 26 years. He got his start in the Navy and has traveled to over 40 countries teaching classes. He came to STI 19 years ago from a large soldering iron manufacturer. Having entered STI as a rework and repair instructor and J-STD-001 specialist, he is now lead master instructor, and teaches all the programs STI has to offer (J-STD-001, IPC/WHMA-A-620, IPC-A-610, IPC-A-600, IPC-7711/7721, NASA-STD-8739.1/.4, as well as basic soldering and custom classes).



Frank Honyotski

ed out, they're not just teaching it, they're doing it. STI's manufacturing lab encompasses 26,000 square feet of floor space containing two surface

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Gino Sanchez, President of TMA Cables.

around since the seventies and has gone through three owners, of which we are the third, but it has always been under New Mexico ownership. Through the history, we've been doing a lot of work for Sandia National Laboratories, Los Alamos, and some of the government agencies that are local.

WHN: Tell is about the new own-ership.

Kristean: We bought the company in January of 2017. I'm one of the owners and also the VP of Sales. I've got two partners, Gino Sanchez, the President of the company, and Alex Vera, our Project Manager.

WHN: What are your back-grounds?

Kristean: I've been part of the local industry as a manufacturers' rep. My lines included switches, wire and cable, connectors, PC boards and other products in the electronics world. Gino has been building cell phone towers all over the world, but mostly in Central and South America. Alex

has been a key part of TMA's engineering for 12 years.

WHN: What products are your specialties?

Kristean: Throughout the years I'd say the specialty of the company has been coaxial cable assembly manufacturing. Anything that is coaxial, from the RG's to the LMRs, SMAs - that has really been the strength of the company. We are expanding into other areas, and the company has always made assemblies using ribbon cable and communication cables such as Belden, but the specialty is still coaxial.

WHN: What markets do you serve? *Kristean:* Telecommunications, transportation and the military markets are our big focus. We make a lot of cables for Lockheed Martin, Sandia and Los Alamos. We have a number of other small companies in the area who make equipment for aircraft, and we do assemblies for them.

In addition to technical training services, STI is also a manufacturer of electronic assemblies.As Frank pointmount lines, automated through-hole processing, and multiple flexible work cells for final assembly, rework and repair, box build, harnesses, and test.

Following are highlights from our Q&A session:

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Improving Cable Quality and Reliability *Electrically Checking Crimps with Multiconductor Testers*

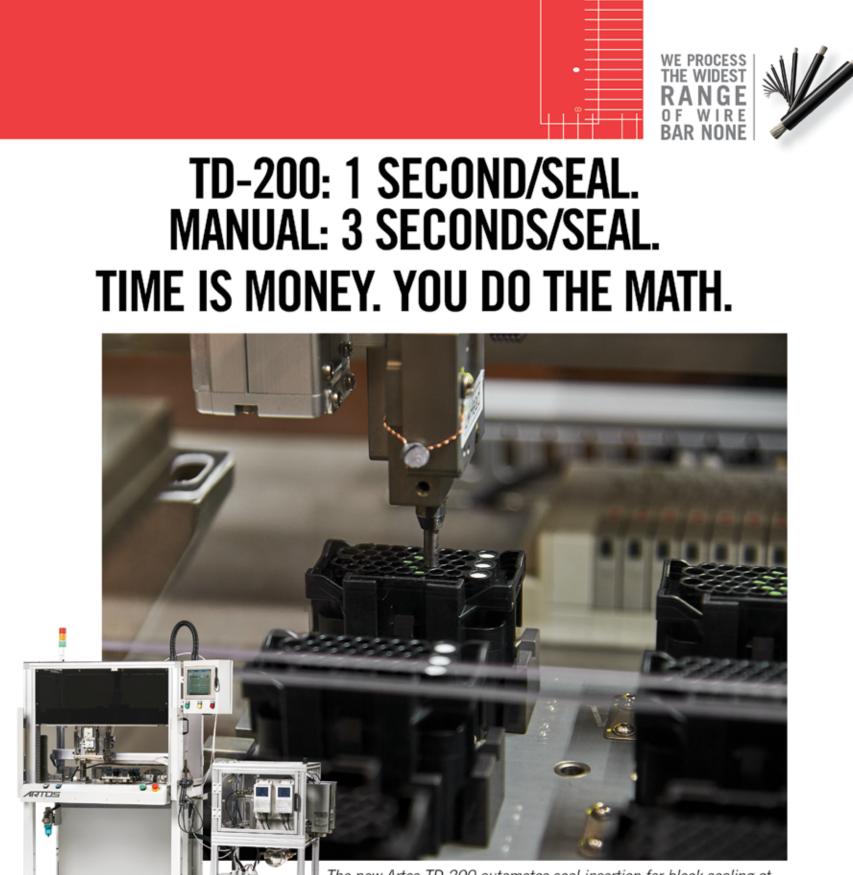
rimped connections may be defective mechanically and/or electrically. Multiconductor testers are powerful tools used for qualifying electrical integrity. Delivering empirical data, they can provide full measurement data for every pin-to-pin connection. Here we discuss the best practical way to test for electrically bad crimps.

Crimps with a mechanical defect resulting from insufficient pressure during the closure process can be detected with a crimp-pull tester - this is a mechanical device that applies controlled physical separation pressure to the crimp confirm that it is adequately tight. Crimp Force Monitors (CFMs) can detect missing strands, crimp-caught insulation, and more. Such crimp testers do not directly check actual electrical integrity.

Today, most companies manufacturing and/or integrating cables and wire harnesses, will test electrical integrity with programmable, automatic multiconductor testers - timesaving, productivity-boosting equipment that checks for and locates faults across all conductors of the Unit Under Test (UUT) without operator intervention.

Continued on page 10

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Jim Brown jim@wiringharnessnews.com Phone (708) 594-7764 Copies of *Wiring Harness News* (ISSN 1097-0789) are distributed bi-monthly to wiring harness & cable assembly shops, cord set manufacturers, companies that process electric wire & cable (including fiber optic) for use in their own products, their suppliers and other interested parties.

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Wiring Harness News PO Box 669 • Schererville, IN 46375 USA wiringharnessnews.com

Office Hours: 8:00 a.m. - 4:00 p.m. CST -(Monday-Thursday) Printed in the USA



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A Day in the Life of a Standards Trainer

Continued from page 1 _

WHN: At what point do companies turn to you for training?

Frank: The majority of companies contact us for training because they have landed a contract that requires them to be certified/trained or show proficiency to a particular specification, whether that's the A-620 spec, the NASA spec, or any of the others. As a result, they start looking for a provider. So, usually we find its contract driven, but we have also helped a number of companies that are just starting out. They've got a workforce, but they don't know exactly what it takes to build a cable assembly.We go in and give them the hands-on skills for that.

Some companies train again and again. Others get the certification, perform the work to finish the contract, and move on to something else that doesn't require certification. But most companies see the value in being able to market their certifications or proficiencies. Basically, you can go for bigger and better contracts when you can tell customers you have a certified/trained staff.

WHN: At what point do companies see it beneficial to have in-house instructors?

Frank: If you have a small workforce of, say 20 to 30 individuals, then it may be more beneficial just to have an outside company come in because

they're going to instruct on what is the latest and greatest. If they have someone in-house, they may only get the opportunity to train people once every two years or so.

If you have hundreds or thousands of employees, then it doesn't make sense to bring us in to do the training for your workers because we can only train a relatively small number of employees per class. So, I'd say with over about 30 employees, it begins to become cost effective to have inhouse trainers.

WHN: How often do in-house trainers have to be recertified, and what's involved in that?

Frank: Currently every two years for both NASA and for IPC specs. Right now, for the A-620 instructor, it is a two-day class. There's lecture for about a day and a half, and then they take an industry-standard test on the IPC Edge 2.0 portal. It's a 75-question open book test with a 25-question closed book test.

WHN: Are classes at your facility, or are their satellite locations?

Frank: Most courses can be customized to meet a specific need or requirement and can be conducted at STI's facilities in Indiana, Alabama and Texas, or at a customer's site throughout the world.

WHN: Is it just contract manufacturers you train? What about OEM's and component manufacturers?

Frank: We recently did training for a large defense organization. The audience was engineers who design weapon systems. The intent was for them to know the process and inspection standards. You can design almost anything, and you can even build a prototype. But you can't necessarily put it into production because it just can't be built on a mass scale, or even in batch quantities. So, having the engineers attend helps them to design for manufacturability.

From time to time, we do train some of the component suppliers. They need to know what their customers are doing with their product. They may also want to be able to market themselves to their customers by saying 'we have certified IPC 620 instructors on staff.' That way, they can better understand what their customers are asking them to do.

WHN: What types of suppliers have come to you?

Frank: Typically, connector manufactures, but there's a large wire manufacturer in our town and we recently did some training for them so they could better understand how their customers meet the J-STD solderability criteria. You test your wire or component to see how solderable they are. That standard requires you to do a wetting balance test where you dip the wire into a solder pot and have it wet up on the, wire then measure how many newtons of force it takes to break the surface. So, if I'm selling wire and I'm going to give the certificate of compliance to meet the requirement of the J-STD, it's helpful if I know how to perform the test.

We don't currently deal with the manufactures of the [processing] equipment. It's not that we wouldn't like to. I think it would be great for them to see what their customers are doing. It's just that, for the most part, they have their own in-house specifications and don't really see the need for any outside training.

WHN: IPC and WHMA are always encouraging folks to get involved in A-620 committees. From your standpoint, what are the advantages of getting involved in this and other committees?

Frank: The biggest benefit is instead of being reactionary, you can be proactive because you see the changes coming. I don't know if you heard about the new 620 D, but a significant change that was voted on and passed, was the removal of the target classification. You will just have an acceptable process indicator and defect. So, companies can actually find out what's happening before it happens, and they can prepare for it.

Continued on page 6







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A Day in the Life of a Standards Trainer

Continued from page 5 _

You can also help direct the industry. If you build a lot of harnesses, you can provide data to the committee to get a particular requirement changed to something that is actually real. Of-

ten you look at a spec and say, 'that's not actually how that works.' But nobody has presented data to say it's wrong, and until they do, it just stays there revision after revision. Participation allows you to help make the document better, not only for your



company, but for others as well.

WHN: You also mentioned the Training Committee at the show. What is the advantage of that and, what type of folks make up that committee?

Frank: If you're on the training committee, you can help direct what actually needs to be covered for the industry. Not everything in the book is equally critical. Some pieces are more important than others.

Most of the people that are on the training committee are actual trainers, so they have an idea of how a training course should go. But there's also people who actually build the hardware. They can help direct what needs to be covered, and then the trainers can come up with the best way to cover it. You don't want just trainers on the committee, because you end up with a course that only the trainers like. It might be easy material to teach and easy for students to understand, but it may not be the material that the audience really wants.

I think a lot of OEMs and contract manufacturers think 'well there's no reason for us to go to the training committee, we just care about the document.' But the training committee is not required to design courses covering everything that's in the document. They can pick and choose what parts they think would be best

for training. So, the stakeholders are definitely an important part of the committee...if they will show up.

We have eight trainers. If we have two of our trainers at the committee, that's a significant portion of our workforce, and it takes away our ability to make revenue for that week. But that's a commitment that we make because it's very important to us as a company, and also to our customers.

WHN: What should folks look for when choosing a company to do training?

Frank: look for people who actually know the technology and are involved with the committees. Anybody can read the book, but do they actually understand the technology and have they done it themselves? There's no way to be proficient on everything in the book. But you can have somebody who's proficient in the majority of the things in the document. So, look for a provider who supports the committees. Make sure they are active in the community for wire and cable harness building. You don't want a training center where you read the book and take an exam. You can do that at home!

WHN: How can folks prepare themselves to get the most out of training?

Frank: First they can let the train-

_ Continued on page 8





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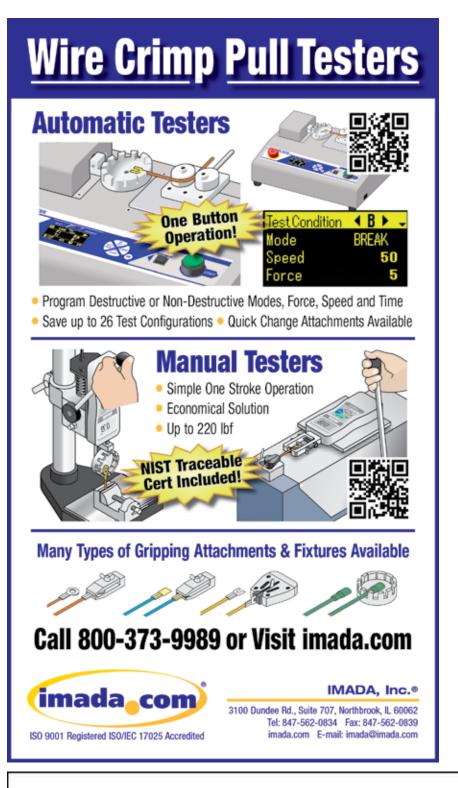
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A Day in the Life of a Standards Trainer

Continued from page 6 ____

ing provider know exactly what it is that they are looking for. One of the first things I do when I go to location, is get a tour. I go around the floor to see what they're doing. Then I can throw real-world examples of workmanship into the training program. They often say, 'how did you know we do this?' Because I walked around and looked, and I understand how these things are built so I understand what you're doing. That way I can tell them what changes they can make to meet requirements. Beyond that, they should make sure they have the actual tools necessary to build the product. You'd be surprised how many companies are attempting to build harnesses and don't even have the right tools to do it. I've been in manufactures talking about pull testing and they say, 'oh yes we do pull testing - I pull on the wire with my hands, and if it doesn't come out it's good,' so be prepared.

WHN: Why are standards like the A-620 so important anyway?

Frank: Because it gives everybody a starting point. In the past, you would essentially sit down with two blank sheets of paper, and the customer and supplier would each write down all the things they wanted. Now they can both look to the standard, and it's already written down. Having the standard is quite nice for the industry because, I was around before the A-620 came out, and there was a lot of confusion between harness suppliers and their customers. It took over 10 years to develop the A-620. I don't know if you saw the original A-620 but there wasn't a whole lot in it. But at least it gave us a starting point. Even though some of the things in it were blatantly wrong, it brought people into the IPC training community to say, 'Hey this is wrong, and here's the data to support that.' So, the document keeps getting better after every revision, and our cable building courses are really taking off.

WHN: Anything else to ad on training?

Frank: If the company is starting a new training program, we can help in setting it up. If they're uncomfortable with a certain part of the training, we can step in and help them, or we can actually design a training course for them.

We also do corrective action training. If a company has been told they need to initiate corrective action for training on a particular procedure, we can help them with that. We've done that on numerous occasions. It's hard do it yourself, because that's where you're deficient. You didn't realize your training wasn't meeting your needs.

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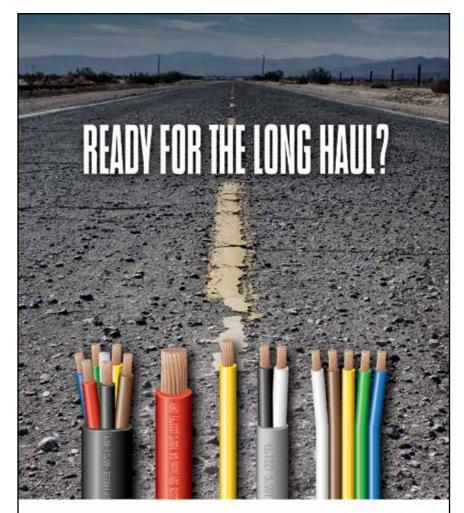
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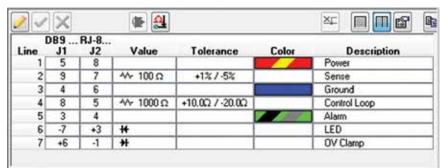
Improving Cable Quality and Reliability

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The best practical way to test for electrically bad crimps is to first perform a standard continuity and resistance check (Fig. 1), followed by an intermittent connections test where signals are constantly sent through the cable while you flex the connectors and apply stress (including pull) to the cable itself (Fig. 2). A stray wire strand, for example, may cause an intermittent short to a neighboring pin, crimp-caught insulation may cause intermittent changes in line resistance, and a wire with enough cut strands will simply fail the resistance check.

The Production Manager or Production Engineer will have previously programmed the tester with well thought out UUT-specific pass/fail electrical parameters including tolerances. To optimize yield, advanced testers allow tolerance settings in absolute or percentage terms as well as asymmetrically (e.g. +1% -3%) - see Fig. 1.

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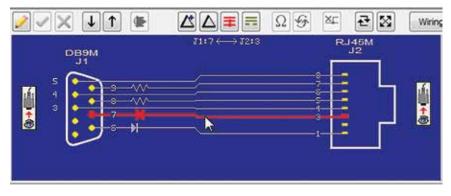


Figure 1. Netlist and Graphic Test Display.

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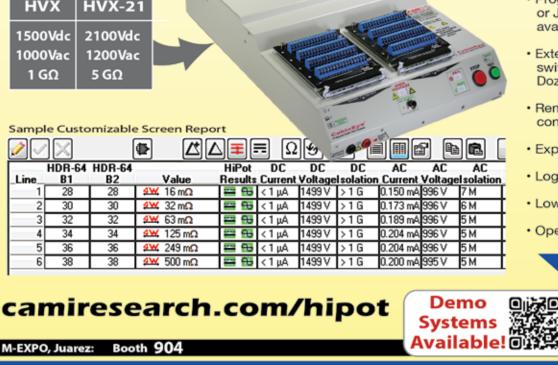
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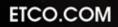
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Improving Cable Quality and Reliability

Continued from page 10 _

If all of these tests pass, then any unfound severed or stray strands or partial-crimp-over-insulation on a wire will be safe to use in practice. In other words, for electrical performance, it is not essential to ascertain how many strands (if any) have been cut in the stripping process, or if insulation has been caught in the crimp, only whether the final crimp passes the required electrical continuity, resistance, and intermittence tests. Professional multiconductor cable testers can perform all of these tests.

Too often, checking for intermittent faults is omitted either from the Work Instructions or from the performance of the Work Instructions, so take an impromptu visit to the electrical testing work stations to note whether testing for intermittence is being done.

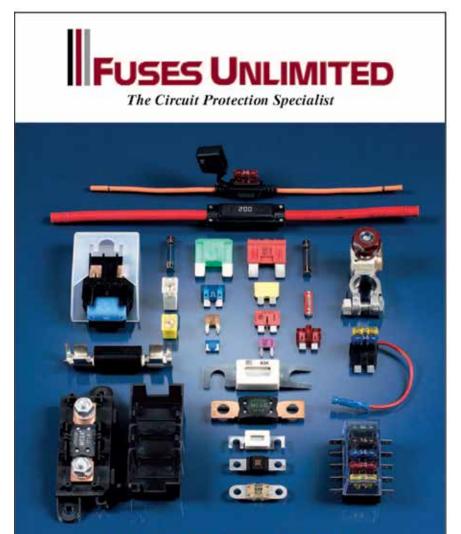
Sensitive, Accurate, and Precise Resistance Measurement

Four-Wire Kelvin measurement (Fig. 3) with multiconductor testers makes it possible to accurately and precisely measure resistance values less than 0.1 ½ while eliminating the inherent resistance of the lead wires connecting the measurement instrument to the component being measured. In some cases, your resistance check should be carried out with this technique.

Continued on page 14



Figure 2. Intermittent Fault Check.



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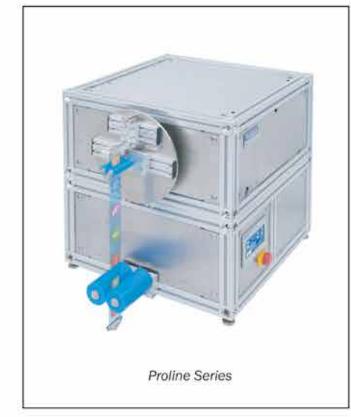
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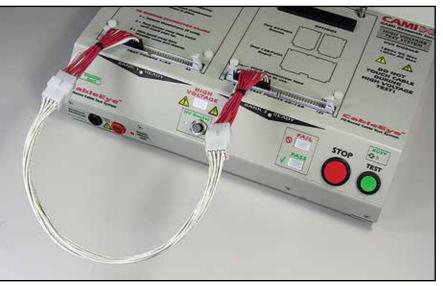


Figure 3. UUT Attached to CableEye test system.

Side note: Figure 3 shows a UUT (all-white cable) attached to a CableEye® test system via two 4 Wire test fixtures (red/white cables). The 4-wire test system requires twice as many test points as a standard twowire resistance test. Consequently, the test fixture requires two wires [one Source (red) plus one Sense (white)] for every pin on the UUT. You can see that 48 test points are required to test this12-conductor cable.

Precise and accurate low-value resistance measurements become necessary when testing cables intended to carry significant current, or when extremely high reliability must be ensured in medical or military applications. For cables intended to transmit power as you might find in AC power

distribution or radio transmitters, low-resistance connections that have faulted to high-resistance create the real danger of fire or explosion.

Although cables used in some high reliability applications do not carry significant current, questionable connections to hair-thin wires connecting a monitor to high-precision sensors could create life-critical measurement error or circuit misoperation.

Cut (or Missing) Strands

It is a common misconception that the more sensitive 4-wire resistance measurement technique will easily detect a single cut or missing strand of wire when applied by a multiconductor tester. Typically, in



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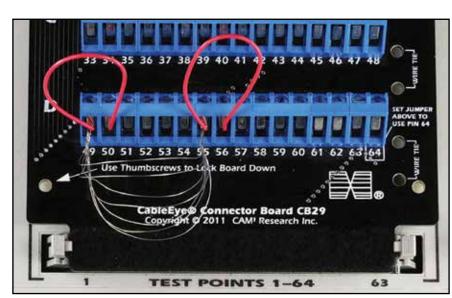


Figure 4. Experimental set-up with 7 intact strands.

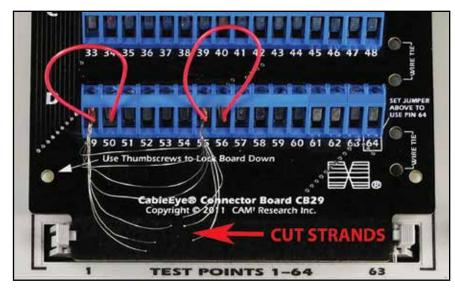


Figure 5. Experimental set-up with 4 intact strands.

fact, the electrical performance of a cable due to a cut (or missing) strand is not sufficiently degraded to be measurable. Several affected strands, however, might be detectable as an out of tolerance resistance measurement as shown next.

This demonstration of 4-wire measurement sensitivity begins with a 3.5" (8.9 cm) length of 22-gauge 7-strand wire, UL07730 connected between two screw terminals. The UUT runs between Source test points 49 and 55, with corresponding Sense

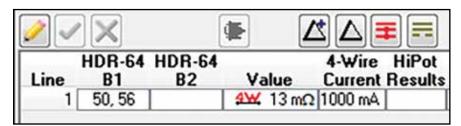


Figure 6. CableEye screen report of 4 wire test.

test points 50 and 56 appropriately linked, as shown in (Fig. 4). The system is programmed for a 1A test current.

The strands will be cut, one-byone, with resistor measurements made at each step, to determine how the resistance varies with the number of intact strands. Figure 5 shows three cut strands with four strands remaining.

Here (Fig. 6) you see the screen report from the CableEye tester with all but two strands cut.

Table 1 summarizes how the resistance changes as strands are cut, and as a function of dwell time. Interestingly, with only one strand remaining to carry the 1ÊA test current, no heating was detectable by human touch, although clearly the resistance increased slightly with the current applied for 1 second or longer compared to the initial short 50 ms dwell.

The most flexible testers allow Users to set different test currents and dwell times for different conductors within the same UUT, and for this matrix of conditions to be tested 'simultaneously' on initiating the test. This flexibility is especially necessary when the UUT contains an array of signal and power conductors.

Continued on page 16

| Strands | Resistance $m\Omega$ | Resistance mΩ | Resistance $m\Omega$ |
|-----------|----------------------|---------------|----------------------|
| Remaining | Dwell = 50 ms | Dwell = 1 sec | Dwell = 60 sec |
| 7 | 3 | 3 | 3 |
| 6 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 4 | 6 | 6 | 7 |
| 3 | 8 | 9 | 9 |
| 2 | 13 | 13 | 14 |
| 1 | 21 | 24 | 24 |

Table 1. Experimental results - Change in resistance as strands are cut.



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Improving Cable Quality and Reliability

Continued from page 15 _

Even a 4-wire test sensitive to a milliohm and passing 1 A of current continuously through the cable cannot pick up a defective crimp where the crimp is tight and the defect is crimp-caught insulation.

Summary

Application of 4-wire Kelvin measurement techniques will improve the quality and reliability of your cable and harness products. Multiconductor testers with 4-wire capability are typically limited to a sensitivity of 1 m Ω . Precision resistance measurements of less than 0.1 Ω reveal wiring defects not visible to less sensitive measurements, including bad solder joints, and pin contact contamination. Resistive losses resulting from these defects in applications carrying current above 1 A may cause excessive heat generation or fire in wiring, or

in the case of measurement circuits which obtain input from precision sensors, may cause false reporting or circuit misoperation. The 4-wire Kelvin resistance method not only makes it possible to obtain milliohmsensitive measurements precisely, but also eliminates any effect of incidental resistance that would be introduced by test leads or the test fixture.

While this is a more sensitive measurement technique than standard two wire resistance testing, it still lacks the sensitivity to diagnose single-cut strands, single-stray strands, or crimp-caught insulation. However, combining continuity, resistance, and intermittence testing with use of appropriate test settings (wire resistance values, tolerances, dwell times etc.) provides confidence of the electrical integrity of the part backed with direct empirical evidence.



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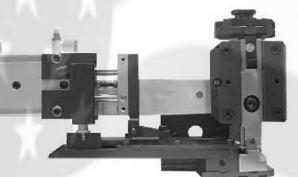




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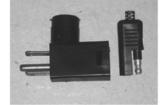
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TMA Cables

WHN: How do you generally market your company?

Kristean: Government registrations, word-of-mouth and an increased online presence. We are registered in SAM (Federal Award Management Registration) and we have the cage code (Commercial and Government Entity) so the military folks can find us in their database. Still, a lot of it has been word-of-mouth generated from our local customers. We also recently revamped the website, and we definitely have a major online presence. I don't think the company ever had

the presence on the web that we do now.We try to make sure that when somebody searches for cable assemblies in our local area or surrounding states; Colorado, New Mexico, Utah or Texas; that we come up.We make use of AdSense technology for that.

Continued from page 1 _

WHN: What makes you folks stand out in your customers' eyes?

Kristean: We're fast and we stress quality. I think the military customers really like us because we're so familiar with their product, and we can



TMA coaxial assembly.

make the types of products they need fairly quickly. We can make it right the first time, even if it's complicated.

Another reason we stand

out is we make a lot of assemblies for the technology companies, so we end up having stock of components that tend to have long lead times.We just have them in stock because of our other builds. It's just another way we can respond really quickly.

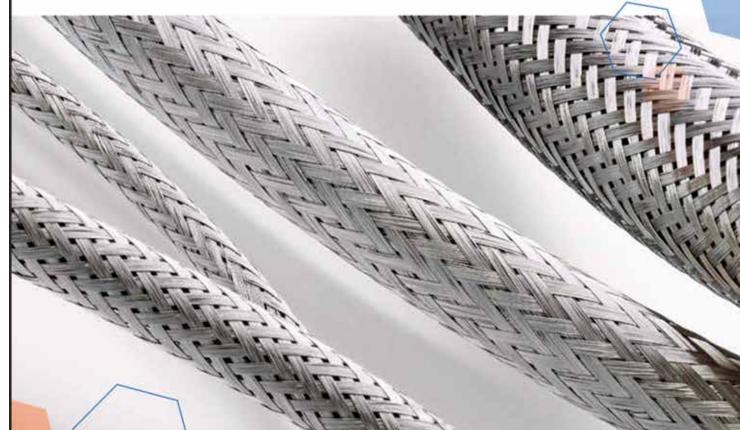
WHN: What are some of the things that surprised you coming into this industry?

Kristean: I think one of the things that really surprised me was the need there is domestically for good, quality driven cable assembly harness manufactures. We hear it a lot that there just aren't enough people out there who can respond as quickly as we do, and that really surprises me. There are some folks who just aren't going overseas to have their cables manufactured, and I'm always surprised by the lack of suppliers in that arena.

Also, here in Albuquerque, there is just such a strong need for this type of manufacturing. I think we benefit from just having technology companies supplying Kirtland Air Force Base around us. Throughout the years, the company has built a business around the fact that there's Air Force work being done in the area. The thing about all this that has surprised me, is the high-quality labor that you can find here in Albuquerque. It's very hard to build these products. There's a lot

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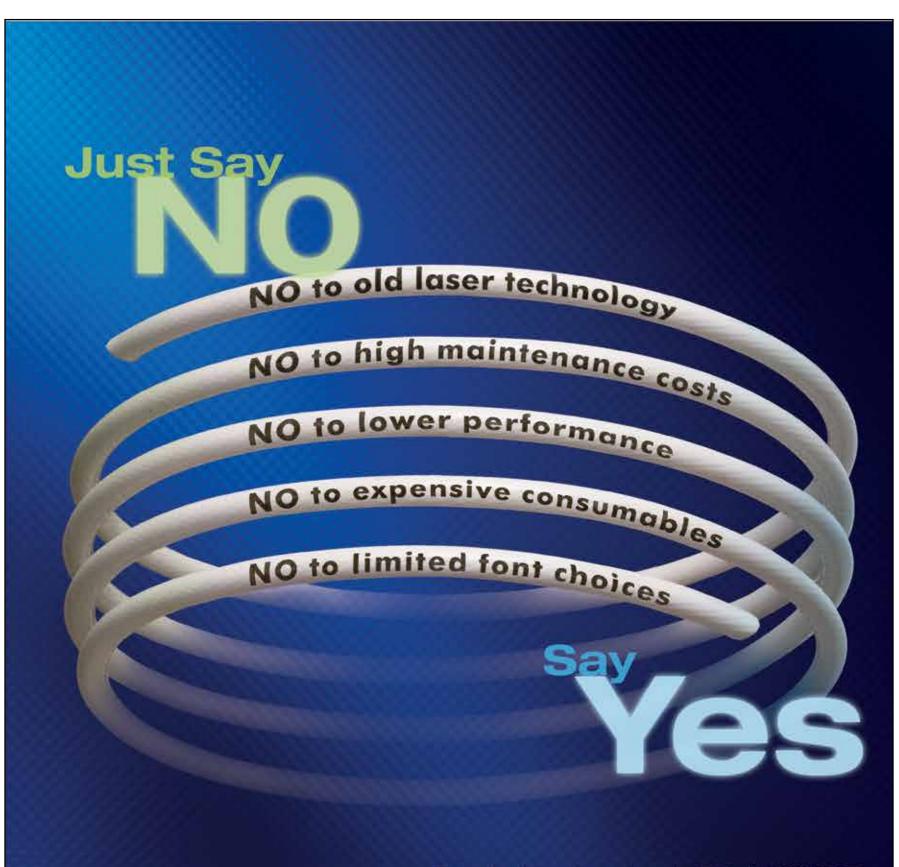
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TMA Cables

Continued from page 18

of skill involved, and we are so fortunate to have great local talent.

WHN: What quality standards do you adhere to?

Kristean: We have an IPC certification so we adhere to IPC/WHMA A-620, IPC-A-610, and IPC J-STD-001C for assemblies that require soldering. We will likely look at ISO in the future. We would have to hire someone, and maybe 40% of their work would

be keeping up with ISO requirements in order for that to happen. We're just not there right now, and our customer base is really not asking for that...yet.

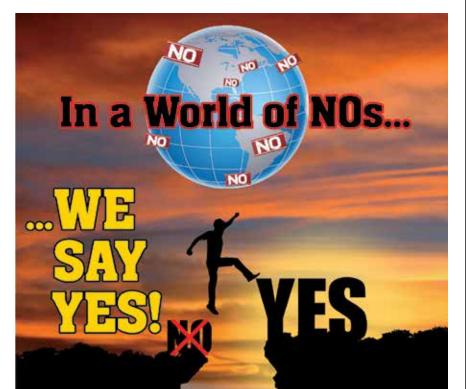
WHN: Tell us about the buyout.

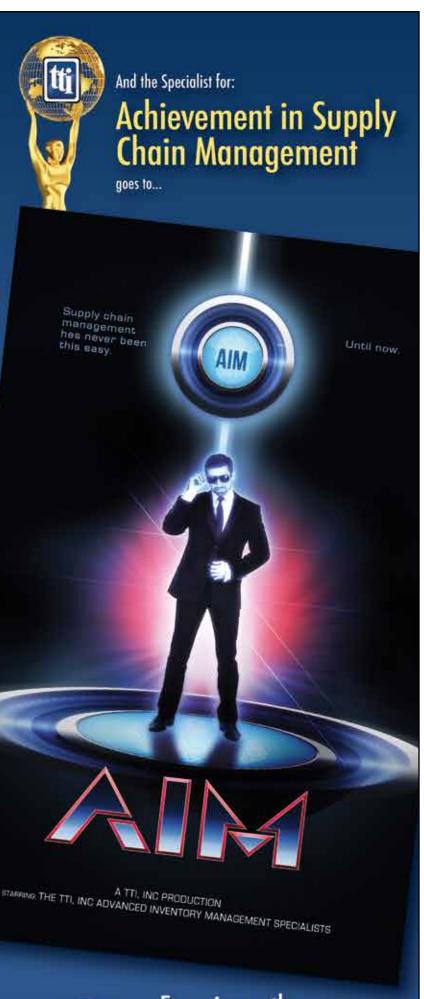
Kristean: Well, you know, we just had such a good buyout experience. When we made the purchase announcement to the company, we

Continued on page 23



Rose assembling a delicate coaxial assembly.







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TMA Cables

Continued from page 21

said Greg Pflum will continue to be here, and will be accessible to us as a resource if there's any project where we need his expertise. For the first three months, we bugged him quite a bit. This was especially true when it came to making sure we had the right contacts at the right companies. He's still a great friend of ours. I try not to bother him too much anymore because he's enjoying his retirement.

Greg was holding on for as long as he could because he did not want to let people go. I remember the first week, when we were going through the transition. He looked at me and said, "Man, I wish I would've met you five years ago." I'm still trying to figure out what he meant by that. I think he meant that he really wanted to retire then, and he would have liked to have given us a much bigger business. Back then he had about 20 people working in the company. He just couldn't find anybody that he connected with who he wanted to sell the business to.



TMA assembly for transportation.

I talk to him every now and again, and he's pretty excited and proud that we kept the company going, so we have a good relationship with Greg. We are two years into this. We've grown about 40%, and this year is looking great. It's just really cool and we're just so excited about what's happening. We've got some good people here, and that makes it all worth it.

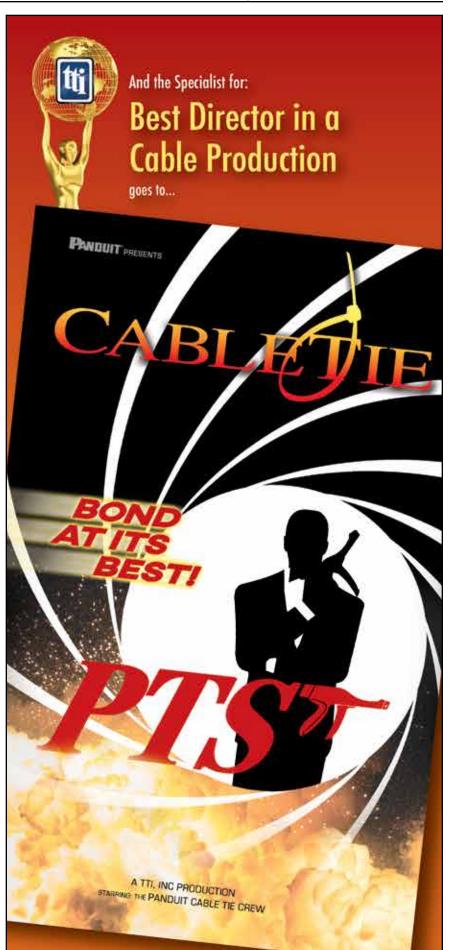
WHN: Plans for the future?

Kristean: We are about to bring more people on board. We've been offered an incentive at the business park where we are currently located. They are offering us additional square footage that will allow us expand and double the amount of space. So that's the plan by June or July of this year.

WHN: Anything else you'd like to add?

Kristean: I think the one thing that I would like to say is that we are proud to be in New Mexico, and we want to be a New Mexico success story. Instead of this being one more business that just closed because there's nobody to take over, we were able to jump in, service the customer base, and keep things going. We are ecstatic! It's now a story about saving New Mexico jobs.

More and more people here locally are seeking us out and asking us to quote their jobs, and it's not just here in New Mexico. We have customers in Texas, Wisconsin, Colorado, Arizona and California. It's very exciting. The energy here in the office is really high, and we are very encouraged about the future.



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Mexico — The New China

ike Bowen is a busy man. And there's good eason. With his company, Ammex, he has been very busy helping manufacturers who wish to open shop in Mexico. But it's not like it was back in the 1980's and 90's when a lot of companies were moving production out of their US facilities and into Mexico. Instead, most of Mike's customers are looking to move at least some production from China, back closer to home. In addition, many companies who are at the point of critical mass with production, and would have typically looked to the Far East to take advantage of cheaper labor, are discovering nearshoring is the better option.

The Trump Administrations tariffs have played a role in the recent uptick in nearshoring, but the scales had begun to tip even during the previous administration. There are two basic reasons for this. First, the overall cost of doing business in China has risen over recent years. The welcoming government policies of just a few years ago are refocusing on sustainable growth. No longer is there an endless pool of workers to be tapped from outside the big cities. A victim of its own success, China has seen a rise in labor costs.

Second, companies are finally realizing the total cost of ownership (TCO) when outsourcing to China. Cost of inventory is high as goods move through a supply line as long as six weeks or more. Intellectual property rights are another concern, with knockoff products costing companies billions. Communication issues, time zones, and red tape all add up to make the low piece price, not so low.

The increased visibility, relative proximity, and a more congenial business atmosphere of Mexico, coupled with a low-cost yet educated labor force, has companies coming to Mike in droves for help in setting up shop in Mexico. And it's helping the US economy. These operations subsequently use US purchased machinery and components, and they often use US logistics companies to move the goods. For the US, it's not as good as "Made in the USA", but Mike likes seeing the business come closer to home. "As an example, there's a wire harness company that relocated here from China that we've been working with for about two years, and all of the components for their cables, and all of the parts for the high-tech semiconductor part of their business, are sourced in the US."

About Ammex

Mike has been in the maquiladora industry since 1989 and is seeing things come full circle. He has been involved in many things; from sewing operations to luggage, and yes, wire harnesses. Ammex itself has been around for 26 years, but four years

> ago, the owner, a friend of Mike's, decided to retire, and sold the business to him.

Ammex offers two basic types of services. The first is manufacturing services, and that's for companies who want to take advantage of Mexican labor, but don't want to make the full commitment on their own. "They want to test the waters," mentioned Mike. "They're not familiar with working in Mexico, so they come to us with their materials, their machinery, and their expertise. We provide the people, the building, and all the knowledge in doing business down there." Ammex brings the customers goods into their US facility, cross docks them (transfers them to other trailers without storage) then ships them to their Mexican facility where the value-added is done. The finished goods are then shipped back to the Ammex US facility where the customer picks them up. This all happens under the Ammex entity. The second level of service, and the one Ammex has been most successful with, is incubating companies. "Companies come to us," Mike described, "and we start them off small, sometimes with as little as 20 to 30 employees. Then, as they get more comfortable, they say, 'hey Mike, I got this,' and they start running the production side with the employees, but we still handle the Mexican taxes, import/export



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regulations, and all the legal issues that can get you in trouble with the Mexican government."

At this point, Mike and his team will help them set up their own operational entity. These entities gain more and more independence as the customer becomes comfortable doing business in Mexico. "Then, usually after about five to seven years, we hand you the keys and you now have the people, the infrastructure and the expertise it takes to handle all the legal compliance. So, we've basically incubated an operational company for you, and we've done this for about 50 companies in Reynosa."

And it's not just US companies Mike is helping. "In the wire harness industry, we did this for GSW (George Suzuki Wiring) out of Japan. They started in the early 2000's with about 45 employees, and they're now in their own 150,000 sq. ft. facility with around 2000 employees right here in Reynosa."

The majority of Ammex's business right now is from companies looking to transition production out of China and closer to the US. Mike admits there has been increased interest in services like his due to the more recent tariffs. "But those guys, I'm just not interested in," he advised, "because they're looking for a quick fix." There are other companies who are very comfortable with their Far East operations, but due to cost and logistics reasons, have looked seriously at Mexico. And these are the folks Mike and his team can help best. "We're now working with these companies to move, not always all, but a significant portion of their production to Mexico in order to take advantage of costs that are favorable to those in the Far East, particularly China."

One recent harness and electronics assembly company Ammex worked with was a smaller family owned business. One particular and growing portion of their product mix required them to look outside the US in order to be competitive. The company automatically thought China would provide the best option, but Mike was able to show them a better way. "They were scared to death about the prospect of doing business in China for a myriad of reasons, but we were able to show them a way to achieve their goals while still having high visibility and control of production," he explained.

Having operations closer to home opens up some doors for the companies Mike helps that had closed when they moved production to China. "A lot of these companies have had to turn down business because of long lead times – 90 days or more. With a facility in Mexico, they can produce in Mexico at pretty much the same cost, and well within a 30-day lead time."

Things to Look Out For

There are some differences and Mike pointed out some things to be cautious of when considering making the switch. "One of the biggest things is determining if there are enough people in the area the company is looking at. There have been significant shortages of labor in some border towns." It's also important to understand how unions control labor in certain regions. "In some towns, there is only one labor union, and I know of a few companies who been hurt by the lack of competition in the labor pool."

Mike also advises a clear understanding of the full cost of labor."For example, in Mexico you have four payouts per year that are lump sums to your people. They are the Savings Fund, the PTU, the Aguinaldo (the Christmas bonus) and unused vacation pay." The savings fund is a savings plan mandated by the Mexican government. The PTU is basically profit sharing. He explained since maquiladoras are not profit centers, there are a couple of ways it can be calculated. It can either be based on the value of assets or on the export activity. He strongly advises making sure all these are included in any labor rate calculations.

_ Continued on page 27



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Mexico — The New China

Continued from page 25

Like any country, Mexico has its layers of bureaucracy. But as he pointed out, they're easier to understand because they are much more Americanized." Especially on the border," he stressed, "there's just more treacherous bureaucracy in China with regard to moving things in and out."

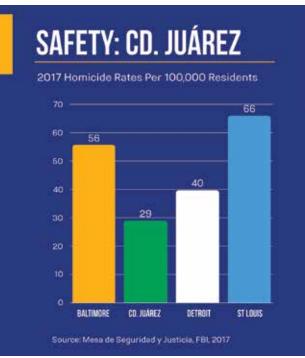
There are other subtle differences in doing business in Mexico versus China, but Mike once again stressed that its very much Americanized and familiar. "One interesting thing is that Mother's Day is really a big deal in Mexico, even bigger than here in the US.A lot of companies open their doors and hold a party for employees and their moms to honor them." Mike also thinks it's not a bad idea to bone up on some soccer nomenclature. He likes to have TV's in the break rooms for folks to catch up on game highlights.

Safety - The 800 Pound Gorilla

Broaching the topic of safety and security, Mike was quick to point out that things have greatly improved since 2010. "I'm up front with people. There is violence, but I want to make sure folks understand that the problems stay away from the industrial parks." He indicated that, even at its azimuth, the crime was mostly the bad guys fighting each other. "There are places and neighborhoods you just stay away from, and we counsel folks on that, but we've got folks who cross every day and have for years without any issues."

In some respects, it's not unlike some US major cities. For example, Figure 1 shows that the violent crime in Juarez has slipped below that of Baltimore, Detroit and St. Louis. "The cartels don't want to disrupt everyday business in the maquiladoras because it brings too much heat on them, so those areas, along with access routes, are safe."

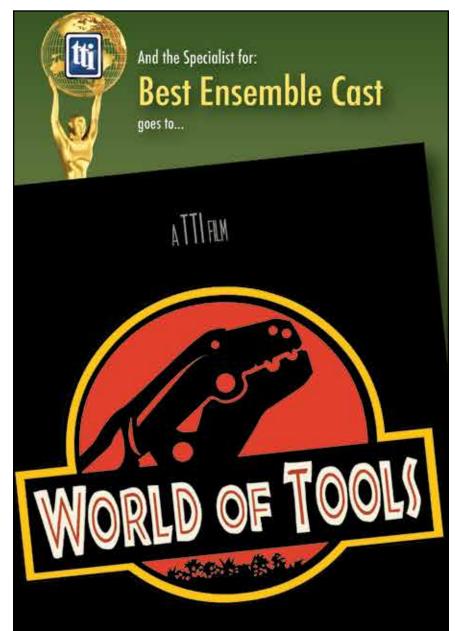
If you'd like to find out more about the prospect of nearshoring business in Mexico, you can contact Mike Bowen at (956) 631-7916, or email him at m.bowen@ammexproducts. com. Check them out on the web at www.ammexproducts.com.



Crime statistics in Juarez relative to some US cities.



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Panduit[®] Invests in Consultative Application Engineering Program to Support Heavy-Duty Equipment OEM Customers

Panduit, a leading global provider of electrical and network infrastructure solutions, has invested in further expanding its Consultative Application Engineering program. The program, which provides industry best practice recommendations, application specific observations and an optional engineering review, is customized to each OEM customer's application, resulting in new, innovative designs and products for its customers.

"Panduit draws on its more than 60 years of application engineering experience and robust heavy-duty cable management solutions. We partner with our customers to support their most challenging wire and cable management applications and needs," said Mark Pfaller, cable tie product strategy manager, Panduit. "From project start through successful completion, we work with designers to identify the right products to achieve optimal application performance for the lowest possible installed costs."

Consultative Application Engineering is an example of what helps set Panduit apart from many others in the industry. Panduit has moved beyond simply selling customers a product. Having dedicated technical experts providing personalized application support is the culmination

of a journey that began more than a decade ago.

"During conversations with our customers, we wanted to better understand their challenges and problems. Taking the time to ask more questions that go beyond a specific product was critical in this journey. Customers helped us recognize a gap that many of them had when it comes to in-house expertise and best practices of specific wire harness applications," said Pfaller.

This specialized support can be beneficial to both OEMs and the wire harness manufacturer or subcontractor that the OEM may work with for wire harness applications – because they collaborate on producing the best possible final products and both should be knowledgeable in the best practices for the unique applications they're working within.

The Consultative Application Engineering Program supports OEM design engineers with best practice recommendations, including:

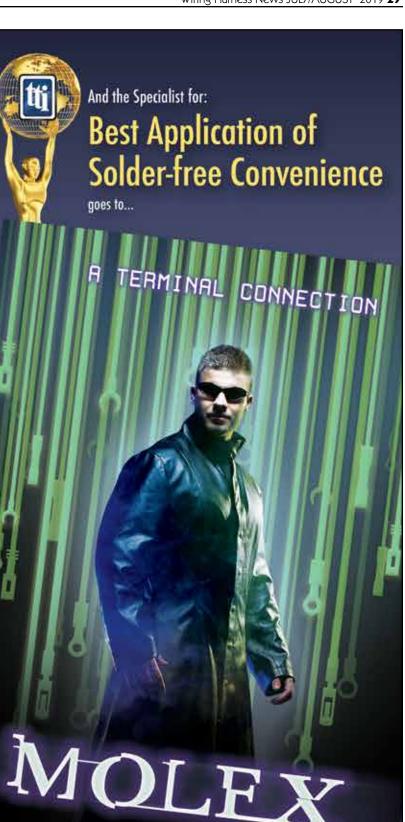
• Material Review: Panduit will assess material capabilities and call attention to any issues related to high temperature, high vibration conditions, and UV exposure.

___ Continued on page 30



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INDUSTRIAL INFO-TAINMENT

Panduit[®] Invests in Consultative Application Engineering Program to Support Heavy-Duty Equipment OEM Customers

Continued from page 29

• Installation Practices: Panduit will evaluate installation practices to improve operational productivity and identify opportunities for part consolidation and material use reduction.

• Tooling Maintenance Program: Panduit will further develop a designer's tooling maintenance program to promote uptime and reduce the lifetime cost of ownership.

• Develop Customized Products: Panduit ensures custom solutions are built to optimize every step of the operation for its customer application needs by consulting multiple

departments including production, engineering, and quality control.

The initial focus of Panduit's value-added consulting was Heavy Equipment and Heavy Truck customers because their wire management applications are often more severe and complicated. Today, it's a service that extends to Panduit customers in many other industries.

"The customers who see tremendous value in this service have engineers that are typically very wellversed when it comes to the system they're working on but they may not have as much expertise in the appropriate wire and cable management best practices for their unique application, so they lean on their partners," said Pfaller.



Dedicated Research & Development and Testing for OEM Design Engineers

Panduit spends time with each customer to talk about industry best practices, including wire management concepts that have successfully solved problems for other customers and the financial benefits when applying similar solutions to their own applications.

But recognizing general examples don't necessarily address a customer's unique needs. A dedicated team of technical sales engineers, advanced product development, and technical application team with deeper expertise provide the next stage of value-added services. Sometimes this means creation of a custom product to fit the exact specification.

Through significant investment in research and development, as well as participation in industry standard bodies to meet new and complex regulatory requirements, Panduit works with its customers to meet their exact specifications for the next product cycle, and for technologies on their roadmap in the future. Panduit also ensures rapid integration within and delivery of a high-quality product that is responsible to cost and innovation.

Global Footprint & Strong Partner Ecosystem Provide Customer Support

Panduit has a global footprint to support customer operations anywhere in the world, including global manufacturing, warehousing, and diverse technical and sales support teams. The company's strong distribution channels reach includes key transportation logistic distributors together optimizing supply chain operations and comprehensive solutions to ensure that OEM design engineers receive the specifications they need in a reliable, timely, and cost-effective manner.

To date, Panduit has secured more than 2,000 patents, including several for wire harness products. With operations in 35 countries and customers in 120 countries, Panduit distributes products, provides design expertise, and supplies technical support to customers on an international scale.

For more information on this program, contact the Panduit Customer Service Group or a local Panduit Sales Representative at 800-777-3300 or cs@panduit.com.

Since 1955, Panduit's culture of curiosity and passion for problemsolving have enabled more meaningful connections between companies' business goals and their marketplace success. Panduit creates leading-edge physical, electrical, and network infrastructure solutions for enterprisewide environments, from the data center to the telecom room, from the desktop to the plant floor. Headquartered in Tinley Park, Ill., USA and operating in 112 global locations, Panduit's proven reputation for quality and technology leadership, coupled with a robust partner ecosystem, help support, sustain and empower business growth in a connected world. For more information, visit www.panduit.com.



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N & A 101: Lessons learned from decades of deals

A Component Nightmare

By Loren Smith

sk me to describe the most frustrating, frenzied day in all my years owning and operating a wire harness company, and I will have an immediate response: the day every single plant manager of a multinational manufacturer of construction equipment was calling me and venting. That's because the absence of my wire harnesses had caused shutdowns of their production lines. Here's my cautionary tale.

The roots of the nightmare had actually been planted some years before when this leading manufacturer of construction equipment (we'll call them "Co.A") decided to specify one supplier ("Co. B") of connectors and terminals for all future designs. This seemed like a good idea. Co. B had a complete product line that appeared to be an excellent fit for Co.A's construction equipment industry applications.

What ensued, however, was a classic case of bureaucratic incompetence. Shortly after we began purchasing the components from Co. B, we encountered delivery issues-followed by a Co. B management change. One would hope the new management team would acknowledge past delivery problems and promise to effect changes to enable them to catch up and meet future demand with on-time deliveries, right? They did acknowledge and promise (while blaming past delivery delinquency on the management team they had replaced).

Unfortunately, despite the personnel changes, chronic delivery failures continued over the years, creating an ongoing operational challenge. (Not until Co.A replaced Co. B with a competent supplier was the issue finally resolved--but that was long after my frantic experience.)

So, my nightmare was twofold. First, needing to explain to exasperated plant managers that their lines



Loren Smith CEO Blue Valley Capital

are down because their company sourced a supplier, who, despite receiving adequate lead time, failed to meet a delivery commitment is not a comfortable conversation. Especially when the conversation keeps getting repeated throughout a very long day. Second, I was caught helplessly in the middle.As much as I wanted to, I was unable to say the magic words: "You'll get your harness today."

But now, the good news:

1. These days, more harness components are available from distributors than in the era of my nightmarish day. That change removes a major challenge the harness industry formerly dealt with.

2. We can draw valuable lessons from this tale. In addition to being grateful for today's sizable number of distributors, companies can invest in safety stock. Although purchasing from distributors may add cost--and spending on safety stock comes at a price--those considerations pale against the risk of putting your customer's line down. That can cost you a customer or even your business.

Loren Smith can be reached at lms@blvcapital.com or www. bluevalleycapital.com



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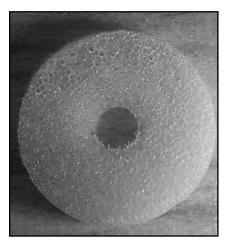
In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

Solid vs. Foamed Cable Insulation

ommunication cables use a variety of insulation materials to achieve precise electrical characteristics. Without this precise control, the successful transmission of communication signals would be impossible, rendering modern communication equipment useless.

What is insulation?

Cable insulation can be identified as the part of a cable that is typically applied directly to conductors. Cable insulation works because it has a high resistance to the flow of electrons. The resistance provides electrical insulation from other cable



Cross Section of Foamed Coaxial Cable Insulation

components. Insulation acts like the pipe that keeps the flowing electrons contained inside the conductor.

One of the key considerations for communication cable designers is the insulation's dielectric constant. Generally speaking, a lower dielectric constant is desirable in a cable because it results in less capacitance and less stored charge on the cable. This allows the majority of the charge, or signal, to get to its desired destination.

Solid insulation doesn't mean it's rigid

Solid insulation is the most common kind of insulation used in the wire and cable industry. It is a layer of solid polymer that covers the conductor. It should not have voids or bubbles in it. Solid insulation provides durable mechanical and electrical protection for the conductor and is generally lower in cost and complexity to manufacture than foamed insulation. Made of a plastic or rubber polymer, solid insulation remains flexible while sacrificing very little crush and impact resistance.

Simple and low-cost with excellent mechanical and electrical performance, solid insulation is used for control, power, instrumentation and flexible wire and cable applications. Some solid insulation materials

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have a dielectric constant sufficiently low enough that they can be used to make excellent performing communication cables. A low and stable dielectric constant is the electrical characteristic needed to achieve high levels of performance in the most demanding communication cables. As you might expect, the polymers that provide low dielectric constants tend to be expensive.

High performance from reduced material

Foamed insulation usually has a lower dielectric constant than solid insulation and is therefore used almost exclusively for high-performance communication cables. It is comprised of a layer of extruded polymer with bubbles of air or nitrogen throughout. These gas bubbles give the foamed insulation its low dielectric constant. Because the gas itself has a low dielectric constant, the gas and polymer blend reduces the dielectric constant relative to the solid version of a given polymer. In fact, foamed insulations can achieve very high levels of electrical performance, which is often necessary for communication cables. The nature of foam allows the insulation to be thinner than a solid insulation that has comparable electrical characteristics. Obviously, the reduced thickness is useful in applications where space is limited.

One drawback associated with the cellular structure of foamed insulation is that the bubble size, shape and dispersion throughout the foam are sometimes difficult to control. Precise control can provide outstanding performance, but that performance comes at a cost. Variations in foam density, bubble size and location can drastically reduce the performance of a communication cable. It is important to understand that the added difficulty may increase the cost enough to offset the reduction in cost that comes from the reduced polymer volume.

Handle with care

Foamed insulation is not as physically robust as solid insulation. Modern materials can have a foam expansion rate as high as 80 percent, which means there is more gas than polymer in the cable insulation. Having such high levels of gas reduces the density and mechanical durability of the insulation and may result in a kink in the insulation around tight bends or greater chance of being crushed. Kinked and crushed insulation can cause a significant variation in the electrical characteristics, often greatly reducing the performance of the cable. Modern manufacturing techniques have allowed for extremely high-performance products with outstanding quality. Understanding the role of the insulation and its special handling requirements should make your next application of foamed insulation more successful.

For questions or more information, contact your Anixter representative or visit anixter.com.







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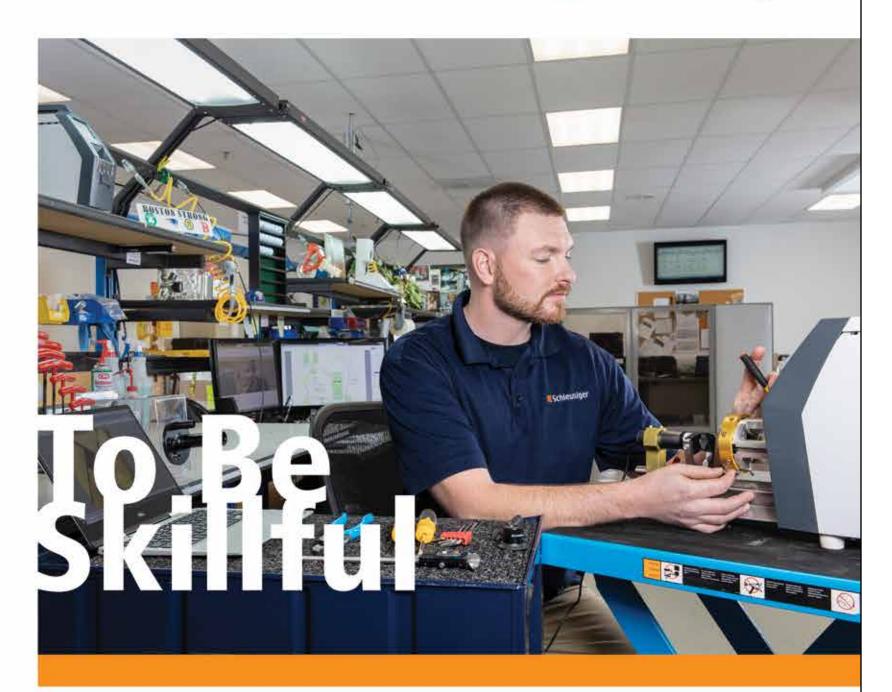
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By Paul Hogendoorn

of those headlines have little to do

with anything that really makes a

difference to manufacturers, but the

significant policies they put in place

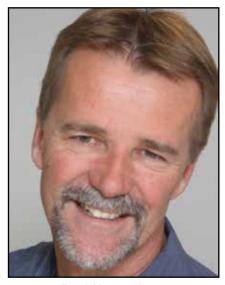
really do. It is worth examining these

policies objectively, independent of

ardly a day goes by with-

out a political headline,

and unfortunately, most



Paul Hogendoorn

for zero tariffs, up from 62.5 percent under the old NAFTA, and 40 to 45 percent of the parts have to be made by workers who earn at least \$16 an hour by 2023. Mexico has also



EADERSHIP

America is the new USMCA, which

replaces the NAFTA agreement. The 2 biggest differences in the new agree-

ment are the country of origin rules

and new labour provisions. It was

largely the Trump administration's

agenda that caused NAFTA to be re-

negotiated and replaced by the new

Under the new agreement, au-

tomobiles must have 75 percent of

their components manufactured in

USMCA.

PUTTING INSIGHTS INTO ACTION

Trump, Trudeau, and the USMCA

the leaders or the parties they belong

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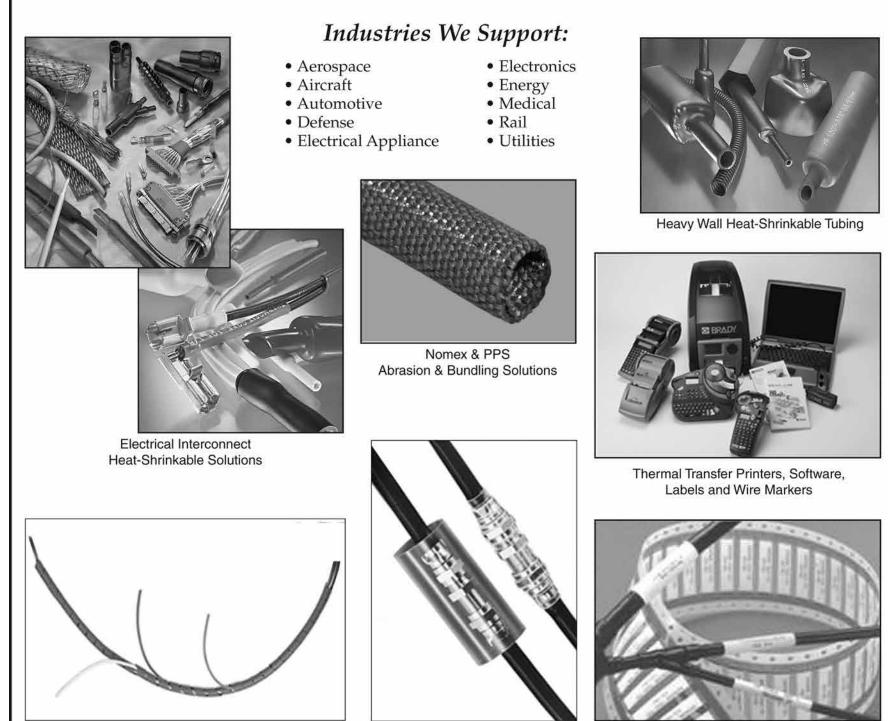
tio is likely .5:1, meaning the average worker is not likely able to afford the cars they help build. In my opinion, this is not the automobile companies' doing, as most of these companies recognize their factories do more than just build cars, they help build a consuming market for them too. (Ford initially created the middle class by literally doubling wages, forcing all manufacturers to do the same to attract workers. Toyota

Continued on page 38

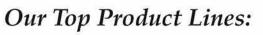
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Trump, Trudeau, and the USMCA

Continued from page 36 _

has often stated, and demonstrated, that they "will build their cars where their customers are buying their cars".) Trump's policy may have been intended for the US worker, but it will have significant positive impact for the Mexican work force as well.

Meanwhile, in Canada, the Trudeau government's Carbon Tax and Energy policies are likely to have a significant negative effect on manufacturing. As Asian and European automakers are scrambling to open assembly or Tier 1 sup-

ply plants in North America, the higher costs of manufacturing in Canada due to the new tax and the already high cost of energy, very few are likely to end up north of the border. Responsible governments attract responsible investments from responsible manufacturers, while irresponsible governments do not. Ontario and Queretaro provide good examples of that. The province of Ontario has only had one major "green field" investment by an automaker since the mid 1980's. Through the McGuinty and Wynn governments, artificial incentives were required just

to keep the large plants Ontario had, and even that wasn't enough. Even though Doug Ford's newly elected provincial Conservative government is working hard to demonstrate "Ontario is open for business", the federal government's energy policy and carbon tax will likely throw a wet blanket on their efforts.

The Queretaro region in Mexico, on the other hand, has widely been recognized as having the most consistently responsible governments in that region for decades, and it has been rewarded with signifi-

> cant investments from major automobile producers from every part of the world – Europe, Asia and North American – and it looks to be attracting far more as a result of the USMCA – including from a lot of Canadian owned companies. (And who can blame them?)

> From a global environment and human rights point of view, the USMCA is a net positive. Keeping plants open in the US and Canada is better for the environment globally, as environmental regulations are tougher and more likely to be enforced in those countries. Improving wages, worker's rights and protecting human rights is also net positive globally, but for Canada, it may be simply a matter of holding on the manufacturing industry they still have.

Beyond the noise of the headlines of the current leaders, the policies and decisions their governments



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Paul Hogendoorn is president of FreePoint Technologies. "Measure. Analyze. Share. Don't forget to share." He can be reached at paul.bogendoorn@getfreepoint.com



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Could Grease Be the Answer to Reducing Electrical Connection Failures?

By Brian Kinkade Nye Lubricants

ccording to the Bureau of Labor Statistics, musculoskeletal disorders caused by repetitive motion account for 31 percent of all workplace injuries.

These injuries not only cause serious health problems, but also cost employers billions of dollars in workers compensation. If you assemble large wire harnesses, you know that mating connectors can often require a great deal of insertion force. Over time, after mating hundreds or even

thousands of connectors, great strain is put on the body, which can lead to muscoskeletal disorders, such as carpal tunnel.

The number of electrical connectors and circuits in devices such as cars, planes, industrial machinery, trucks, and boats, is continuously

growing. With these advancements comes more complicated wire harness assemblies that include more connectors and more potential points for failure. How can designers address these issues while at the same time looking out for the wellbeing of those who manufacture wire harness assemblies? The answer is simple contact lubrication.

Ease Mating

Have you ever tried to slide down a dry slip-and-slide? If so, you probably did not get very far, and the friction might have even burned your skin. Inserting an unlubricated connector is not all that different. Just as it takes more force to slide down a dry slip-andslide, it also requires more force to mate unlubricated connectors. When a slip-and-slide is wet, the water creates a barrier between your skin and the plastic that reduces friction and eases your path down the slide. When a thin layer of grease is applied to a connector, it reduces friction between the connectors which eases mating. If mating force is reduced, it puts less strain on the body-which can be very important in assemblies with many connectors.

Reducing mating force with lubrication improves more than just ergonomics, it also improves the performance and reliability of your product. A design engineer could lower mating force by reducing the contact plating thickness or relieving some of the mechanical tolerance, but both approaches increase the chance of connection failure during use. Alternatively, applying a lubricant during production ensures a solid connection that will last throughout the entire life of the connector. This is particularly important in the assembly of military and aerospace markets

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Application Considerations

Beyond the assembly line, wire harness manufacturers must be especially cognizant of how their systems will work in the field. In northern regions, for example, connectors in cars and trucks see excessive exposure to corrosive road salt spray. Other applications may be more prone to dust and dirt or moisture and water spray. Contrary to popular belief, grease does not attract dust and dirt. In fact, grease creates a barrier on the electrical contact surface to protect against

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dirt, dust, moisture and aggressive chemicals to prevent wear.

Connectors in cars, planes, trucks, and other moving vehicles are also susceptible to fretting corrosion. Fretting corrosion is caused by micromotion that wears the surface of terminals and generates an oxide layer on the contact surface. This insulative film between the connector contacts can create an open circuit that increases the voltage drop across the termi-

ODYSSEY CRIMPING PRESSES



nal. This causes product failure as a connector becomes a resistor that consumes power rather than passing it through to the end device. The proper lubricant will minimize metal-tometal contact during vibration which protects the connector from metal wear that eventually exposes the metal to oxidation. Even stationary connectors can experience fretting corrosion. Thermal expansion and even small motions such as a nearby door closing can cause fretting corrosion.

Choosing the right lubricant for your connectors is the first step, but choosing a lubricant dispensing method is just as important. Does your facility need to lubricate thou-

sands of connectors per hour? In this case, automated dispensing equipment should be used to ensure precise, repeatable, at the correct production rate. For field repairs and small production runs, syringes, tubes and pipettes are useful to ensure precise manual application. The recommended method is to apply a small volume of grease inside of each female contact. Often OEMs request that the female connector be enclosed with a bag or cap to keep the rest of the assembly free of the grease.

Connector Greases

For more than 25 years, OEMs like Ford, General Motors, Navistar, Paccar, and Chrysler have been protecting their contacts with NyoGel® 760G, the universal standard dielectric grease. Nvo-Gel® 760G is just one product in our complete line of connector greases formulated specifically to address high temperature and high vibration operation. In trucking, automotive, and marine applications, it is particularly important that the lubricant within your assembly can withstand harsh environmental conditions. To address these needs, our connector greases have superior salt spray resistance with little water washout or grease evaporation. With some wire harness assemblies, material compatibility can become an issue as you must ensure that the lubricant will not eat through plastic components. NyoGel[®] 760G, along with our other connector greases, are resistant to harsh chemicals and are compatible with a wide range of plastics and elastomers.

As a trusted supplier, we work directly with design engineers to form a partnership and assist with proper grease selection to ensure performance, avoid warranty claims, and prevent costly, time-consuming repairs. For design engineers outside of the automotive industry, we also offer specialty connector greases with low outgassing properties or low toxicity to meet the unique requirements of wire harnesses in aerospace, medical, and semiconductor applications. To accommodate different requirements, Nye offers a variety of grease packages to suit both high-volume production dispensing and small volume manual dispensing.

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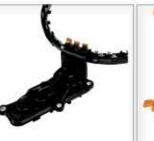
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Saeed Mogadam Announces Retirement

f you have attended the Wire Processing Expo or WHMA events over the years, you are no doubt familiar with Saeed Mogadam. Saeed is President of TEL-SONIC Solutions, LLC, and recently announced his retirement. A true gentleman, he is not one to talk about himself. But with some convincing, we managed to sit down with Saeed to discuss his career and accomplishments in the field of ultrasonic welding.

Saeed moved to the US at age 19 and enrolled in City College in New York. "At that time, they referred to City College as the 'poor man's MIT," he remembered. Studying engineering, he received his degree in mechanical engineering and went on to graduate school where he obtained a masters degree in mechanical engineering, with a specialization in fluid mechanics and heat transfer.

As fate would have it, Saeed would never use those particular engineering skills in his life's vocation. "I finished school, and just about the time I was to begin my thesis, I was offered a job with Delphi Packard, and moved to Ohio," he described. Upon his arrival, and knowing he had extensive research experience, they told him there'd been a change of plans. "I walked in the first day, and they said, 'we hear there is this new process called ultrasonic welding.' They wanted to get away from crimping and soldering and told me, 'that's now your job." After much research, Saeed and his team introduced the technology to Delphi, and was instrumental in bringing it to the automotive industry in general.

Saeed became enthralled with the principles of ultrasonic welding.After a few years, he began to realize his options for really digging into the



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technology at Delphi would be limited, and began to look outside the organization. "I happened to meet the founder of Stapla Ultrasonics in Germany, a gentleman by the name of Dieter Golde, and told him I really wanted to start my own business, so together, we started Stapla Ultrasonics in the US."

During his tenure there from 1986 until 2009, Saeed and his team made many innovations to the product line to meet evolving customer needs. The initial challenges with the equipment were daunting. He recalled that tooling changes for different splices initially took 45 minutes, "and all of a sudden, we got those changeover times down to 15 minutes," he instructed.

Stapla was purchased by Strunk Connect of Germany in 1997, but Saeed was able to run his division somewhat autonomously for a number of years. As Strunk began to seek more direct involvement in their successful US operations, both sides began to feel there was no longer a good organizational fit, and Saeed and Stapla decided to part ways.

He then started a company called Sonic Solution Systems where he collaborated with Telsonic Ultrasonics of Switzerland. Saeed was doing what he knew best, adapting the Telsonic technology and equipment to meet the needs of metal welding in the wire processing industry. "Eventually, it became obvious the only way we could really work together and open up new markets was to marry the two, so I sold the company to Telsonic."

Saeed remained at the helm as President of Telsonic Solutions, the division of Telsonic located in Massachusetts and dedicated to metal welding. In 2018, he decided it was time to form an exit strategy. "I had worked since I was 19 years old, even during school, and had never stopped." His dedication to the industry kept him



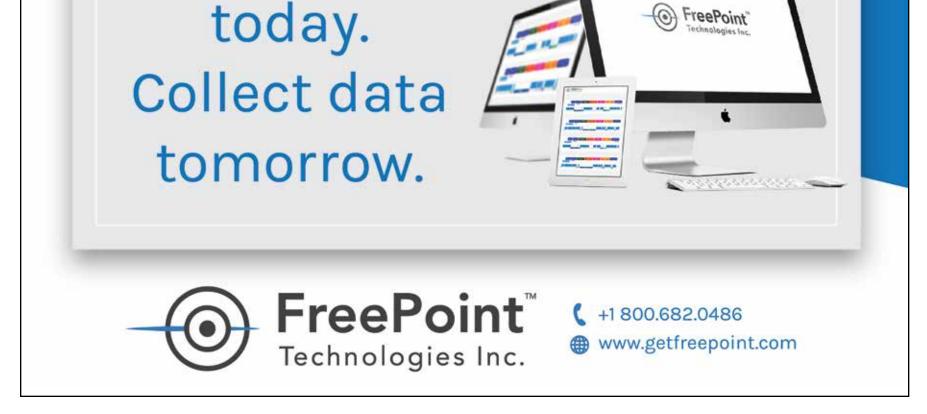
Saeed Mogadam

from spending as much time as he would have wished with his wife and family, and his plan would allow him to spend quality time with his family, especially his six grandchildren. He brought in Gustavo Garcia as his eventual replacement. Gustavo had some great industry experience with Leone and Schleuniger, and seemed the perfect fit. "Gustavo is a very highly technical person, very intelligent and very hard working, and will continue to grow the division," Saeed cited.

Gustavo's involvement has allowed Saeed to dial back his work schedule. Back in January, he went to a three day work schedule. Starting June of 2019, he will work in an advisory capacity three days a month. "It was the right way to do it, and for me personally, it gave me the opportunity to slow down but make sure everything is going well."

Saeed truly represents the class and dignity of professionals in the wire harness industry. There aren't many industries left like this, and there aren't many guys left like Saeed. His hard work and dedication is greatly appreciated by the folks he has worked with. It's no doubt his customers of many years also appreciate the insight and innovation he brought to the industry. We wish him much happiness in his retirement.

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Wire to terminal



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Learn How You Can Contribute to the IPC/WHMA-A-620 Standard That Your Company, Customers and Suppliers Depend On

By Christine Siebert

o you design wire harnesses? Do you build wire harnesses? Do you purchase wire harnesses? If you answered yes to any of these questions, then this article is for you!

If you work in any of the above areas, then you have heard of the IPC/WHMA-A-A620 Standard. This standard remains the only industryconsensus standard Requirements and Acceptance for Cable and Wire Harness Assemblies. The IPC/WHMA-A-620 standard prescribes practices and requirements for the manufacture of cable, wire and harness assemblies. The standard describes materials, methods, tests and acceptability criteria for producing crimped, mechanically secured and soldered interconnections, and the related assembly activities (corresponding lacing/restraining criteria) associated with cable and harness assemblies. Any method that produces an assembly conforming to the acceptability requirements described in this standard may be used.

The IPC/WHMA-A-620 standard sets expectations between you and your customers for what is considered acceptable quality workmanship for cables and harnesses. It's a certification that demonstrates commitment to compliance and quality for cable and wire harnesses. The IPC/WHMA-A-620 is also a universally recognized workmanship standard within the wire harness industry that has created an understanding between manufacturers and OEMs.

Have you ever wondered how the IPC/WHMA-A-620 Standard was developed? How and why certain criteria were included? Would you like to assist in making this standard even better?

IPC and WHMA are continuously working together to update and maintain this standard. Since this Standard remains the only industry-consensus standard for Requirements and Acceptance of Cable and Wire Harness Assemblies, IPC/WHMA standards committee has created a formal A-620 Task Group.

The A-620 Task Group is comprised of people within the industry. We need members from all market segments for this committee to represent the standard. It is critical for YOU to be involved. There are several areas of improvements that need input: Technical, Editorial and New Content. We need your technical expertise to improve the A-620 standard. Participation can take place in meetings, teleconference, or by e-mail. So being at a distance should not deter you from participating. The committee meets twice a year so it's minimal time commitment.

Other reasons to participate on the committee is that you'll personally benefit from developing a network of experts with similar interests, sharpen your negotiating and presentation skills and build your resume by showing potential employers that you're keeping up with technological changes in the industry. If you're interested in joining this A-620 Task Group, please email Answers@ ipc.org and reference IPC/WHMA-A-620D and provide your complete contact information, including your address, phone, and fax number. They will get in touch with you on the best way to get involved. Committee communications are conducted through e-mail, so it is mandatory to provide a working e-mail address.

If you are not ready for full participation but would like to submit an area for improvement, there is a form in the back any of the IPC/WHMA-A-620 books or there is a form located on the ipc.org website.

Some key factors for successful submission:

- Clear statement of issue and supporting information - The more detail the better
- · Propose a solution with sup-

porting information

IF the committee reaches out to you for more information or clarity, respond back to their inquiry

I hope I have answered all your questions on how and why you should participate in developing the IPC/WHMA-A-620 Standard. Your input is very valuable and needs to be heard. If you are interested in other committees such as the 620 Training Committee, IPC-HDBK-620, 620-S Space Addendum, IPC-A-610, J-STD-001, or others, check the IPC website for details. www.ipc.org/status or email contact.us@whma.org







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IPC to Offer Schleuniger's Unique Wire Processing Expertise Through Online Training Courses

S.University

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IPC has officially contracted with the Swiss-based technology group Schleuniger that will now serve as an official online training partner offering IPC members S.University training course offerings. Schleuniger, renowned for their high quality and precise knowledge transfer in wire processing, debuted S.University in 2013 and launched the storefront globally in 2018. In creating this partnership, IPC has responded to the Wiring Harness Manufacturer's Association's (WMHA) request for more wire industry training tools.

IPC, known and respected for its leadership and global footprint in providing standards and quality programs supporting the electronics industry, secures with Schleuniger an online training partner that is also a prestigious, trusted and highly competent player in the wire harness industry. Based on almost half a century of industry experience, Schleuniger

Continued on page 46

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IPC to Offer Schleuniger's Unique Wire Processing Expertise Through Online Training Courses

Continued from page 45

continuously sets global standards for top quality and as a strategic system partner accompanies its customers through their production processes with a wide range of machines, software and test equipment, as well as customized and fully automated solutions

David Hernandez, IPC's vice president of education, was the driving force behind the creation of this new partnership. Commenting on the new online training partnership Hernandez stated,"IPC strives to provide the best training possible to our member companies, and when we saw the quality of Schleuniger's S.University wire processing course offerings, we determined it was in the best interest of our members to develop an online partnership with Schleuniger."

Knowledge Acquisition Made Easy

Companies will be able to easily train their employees online from the comfort of their offices via the IPC EDGE training portal in early 4th quarter 2019, providing highly professional, fundamental and innovative knowledge in wire processing to their teams. With Schleuniger's S.University courses, operators, supervisors and maintenance personnel can be instructed according to their level of expertise. Additionally, new employees and students can be onboarded with programs covering the foundations of wire processing, and the whole team can be kept up to date on the latest techniques and technology developments thanks to refresher courses.

IPC will initially offer Schleuniger's S.University courses on its IPC EDGE platform including, a six-

module course in wire processing foundations, a two-module course in wire and cable construction, as well as training lessons on crimp quality, pull testing and crimp height measurement. All courses will be available in English and Spanish. Marc Lussier, Head of Group Technical Service & VP Technical Services North America and creator of Schleuniger's S.University training universe, concludes, "It is important to us that we address a global audience, so we already have plans to expand not only the variety of course offerings but also the languages in which we offer them."

About IPC

IPC (www.IPC.org) is a global industry association based in Bannockburn, Ill., dedicated to the competitive excellence and financial success of its 5,000+-member company sites which represent all facets of the electronics industry, including design, printed board manufacturing, electronics assembly and test. As a member-driven organization and leading source for industry standards, training, market research and public policy advocacy, IPC supports programs to meet the needs of an estimated \$2 trillion global electronics industry. IPC maintains additional offices in Taos, N.M.; Washington, D.C.; Atlanta, Ga.; Stockholm, Sweden; Brussels, Belgium; Moscow, Russia; Bangalore and New Delhi, India; Bangkok, Thailand; and Qingdao, Shanghai, Shenzhen, Chengdu, Suzhou and Beijing, China.

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Intelligent Vs. Non-intelligent Part Numbers: Which are better in manufacturing?

By Adam Amos Flux Connectivity

In the world of manufacturing, there are different methods by which parts are managed. And, in the cable and harness production industry, there is an ongoing debate about which of those methods are best. There are two, in particular, that we're referring to: intelligent part numbers and non-intelligent part numbers. By their very names, you'd think there was no debate at all.

When has being "non-intelligent" ever been better than being "intelligent", right? Well, as you may have guessed, there is more to these methods than their names. So, let's break down what each of them really means.

What is intelligent part numbering?

There are numerous companies within the manufacturing realm that swear by the intelligent part numbering method. Intelligent part numbering is a process by which descriptive details about the characteristics of each part are provided. The overall objective of providing such clear information is to avoid any confusion about the parts and to save time.

Professionals who vouch for the intelligent part numbering method highlight how easy and efficient it makes searching for parts. By clearly labelling a cable assembly "CAB", for example, it makes the part easy to locate and sort among the many others that may be necessary on a production line.

The "intelligent" method also helps to specify the groups to which every part belongs. Locating parts that are in the wrong groups is made easy. This allows for efficient processing.

Opponents of intelligent part numbering, on the other hand, note the challenges associated with having to train workers on how to appropriately define and label each part. Differentiating the names of each part can be confusing when they start to share some of the same characteristics. A misnamed part can wreak havoc on a product's design if it is mistakenly used.

list of serial numbers is created and assigned to each separate part. Proponents for the non-intelligent part number method believe that much less training is required in order for workers to learn it.

After all, you don't need to know anything about the part in order to assign it a number. However, those who prefer the intelligent part numbering method contend that it's much harder to locate parts based on random serial numbers. When perusing through a spreadsheet, for example, it's difficult to tell one part from the other without any descriptions or names.

Opponents also cite having no frame of reference when trying to select a part. Again, numbers don't provide descriptions, so being confident that the right part has been chosen doesn't come easy. *Choosing the right method all depends on your business.*

Manufacturing companies that are large in size often have multiple product lines. Training large staffs can be difficult, so such organizations often opt for the non-intelligent part numbering method to make things easier. It's important to take into account the size of your company and its overall objectives. Each part numbering method is designed to meet different requirements and specifications. Which one would work best for you?

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What is non-intelligent part numbering?

Non-intelligent part numbering is a process by which no descriptive details about each part is provided, but instead, a numbering system is used to differentiate each part. Instead of any descriptions, a

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Heat-Shrink Products and Their Application Demands

By Adam Amos Flux Connectivity

Heat-shrink tubing has been a staple in the electronics industry for more than 50 years. It is used for sealing, protecting, insulating, strain-relieving, and identifying wires and cables.

By cross linking polymers, you achieve a material that allows you to do things you cannot do with uncross-linked materials. For heat-shrink tubing, a tube of plastic, such as commonly used polyolefin, can be heated and expanded to several times its diameter. When cooled, it will remain in its expanded state. When the tubing is heated again, it will contract back to its original size. Because the tubing is shrunk over a substrate somewhat larger than its original size, the tubing fits tightly and securely against the substrate.

Heat-shrink tubing has many uses in electronics. Four of the main uses are:

• To insulate an electrical component

• To seal against moisture and other contaminants

• To provide strain relief, especially at terminations

• To protect against abrasion and other mechanical abuse



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Heat-shrink tubing can be made of many different materials to meet different application needs. Polyolefin is widely used for most applications. Polyolefin-based tubing is available in a wide range of formulations to extend its application over a broader spectrum of application needs. Other materials allow better abrasion resistance, a wider temperature range, or protection against aggressive chemicals and solvents.

The thickness of the tubing wall

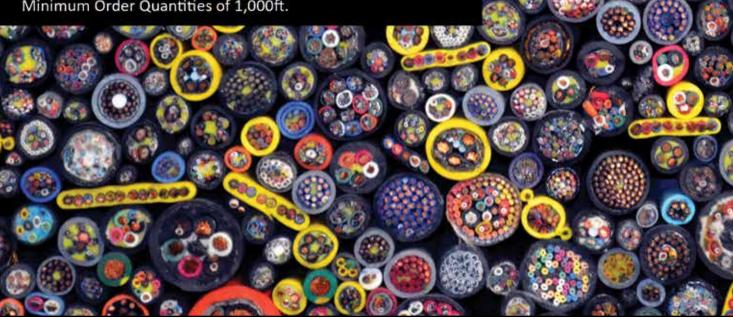
can be changed to provide better flexibility or increased stiffness. Thin walls tend to be more flexible, while thicker walls provide more rigidity and abrasion protection.

Dual-wall heatshrink tubing offers an inner layer of heat-sensitive adhesive. When the tubing is shrunk back to its original size, the adhesive bonds the tubing to the substrate.

Trend toward Special-Purpose Tubing

As noted, polyolefin is the workhorse material for heat-shrink tubing. Much of the recent innovation in heat-shrink products involves either modifying polyolefin formulations to meet special requirements or using other materials to expand the range of possible applications. Tubing used in space applications, for example, must exhibit low outgassing properties. This need for very "clean" materials makes the formulation very important. Specific application needs drive tubing development.A few examples:

NBCCS: In military applications, nuclear,



biological, and chemical contamination survivability (NBCCS) requires materials that do not absorb contaminating agents and can withstand the harsh materials of washdown and cleanup.

Medical: For medical needs, materials meeting U.S. Pharmacopeia Class VI standards allow tubing to withstand repeated sterilization by autoclave, gamma radiation, ethylene oxide, steam, and dry heat. Polyether block amide copolymer (PEBA) eliminates the requirement for expensive processing

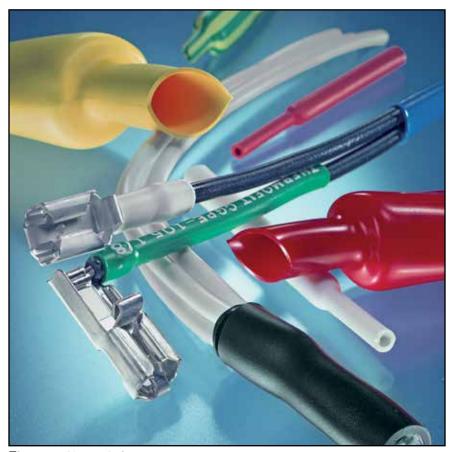


Figure 1. Heat-shrink tubing is available in a variety of colors and materials to meet many application ranges. (Source: TE Connectivity

aids such as an overtube or fusion sleeve. In addition, the PEBA can be modified to achieve different degrees of flexibility or rigidity.

High temperatures: Heat-shrink tubing must provide performance equal to the harness on which it is used. As the heat environment of many applications increases, so does the need for harnessing components to withstand elevated temperatures.

Since heat tends to degrade plastics, special attention is needed for tubing that will be used in high-temperature environments. Polyolefin, for example, has an upper service temperature of around 125°C (although this can be adjusted with additives). PTFE and FEP fluoropolymer tubing can handle +200°C, but are more expensive.

The temperature rating for heatshrink tubing can typically refer either to the shrink temperature that must be applied to achieve optimum shrinkage of the material or to the operating temperature range. Both are important to consider in selecting heat-shrink tubing, as is the temperature rating of the components it is used on. **LSZH:** Low-smoke, zero-halogen (LSZH) tubing does not emit toxic fumes or generate smoke when exposed to fire, making it the ideal complement to LSZH wire and cable used in the mass transit industry.

Molded Shapes

The ability to mold heat-shrink materials into shapes adds a new dimension of convenience to harnessing. Molded shapes can be used for transitions and cable breakouts, for strain relief on cable backshells, and for similar needs. The key is that the molded shape does, indeed, have a specific geometry matched to its application. Molded shapes are available in off-the-shelf configurations matched to common applications or in custom shapes.

Traditionally molded shapes have tended to be thick-wall materials with more rigidity to relieve strain and protect terminations or branches in electrical systems. As the market drives toward smaller, lighter circuits, we find molded shapes following this trend also. Micro-boots are now a popular commodity.

Continued on page 52



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Figure 2. Molded parts give greater application flexibility in breakoutsand in covering oddly shaped parts.(Source: TE Connectivity)



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NEWS PLUGS



Atlas Holdings Announces Acquisition of International Wire Group

Atlas Holdings LLC announced today that it has acquired International Wire Group Holdings, Inc. ("IWG" or the "Company") (OTC PINK:ITWG). Headquartered in Camden, New York, IWG is a leading designer and manufacturer of highly-engineered copper-based wire products. The company's over 1,600 associates operate 17 manufacturing facilities and one distribution location across North America

and Europe. IWG serves a wide range of customers, primarily in end markets such as industrial, energy, electronics and data communications, automotive and specialty vehicles, aerospace and defense, medical products and appliances.

Atlas also announced that longtime industry leader Gregory J. Smith has been named the company's new President & Chief Executive Officer. Smith succeeds Edwin Flynn, who is stepping down after eight years of service to the company.

IWG is recognized for its highly-skilled and experienced workforce, broad product line, superior manufacturing and technical capabilities, built through a number of strategic acquisitions. It serves blue-chip customers via relationships that, in many cases, have spanned several decades.

With broad manufacturing and in-house engineering capabilities, IWG offers fellow suppliers, distributors and OEMs the industry's most robust and missioncritical product portfolio. Its offerings include bare, silver-plated, nickel-plated and tin-plated copper wire, engineered wire products and high-performance conductors.

"IWG is a perfect fit as the newest Atlas company," said Timothy J. Fazio, Atlas Holdings Co-Founder and Managing Partner. "Our team has spent decades grow-

> ing and strengthening businesses in the engineered products sector and today we own and operate many global manufacturing and distribution companies. With a highly-skilled team around the world, loyal customers and a product mix vital to the global economy, IWG's future is very bright. We are extremely pleased to welcome International Wire Group to the Atlas Family."

> Newly-named CEO & President Gregory J. Smith comes to IWG Marmon Engifrom neered Wire and Cable, a Marmon/Berkshire Hathaway company. In his decade at Marmon, he led several businesses to profitable and sustainable growth. In his most recent role as Sector Vice President, he was responsible for supplying products and services used in mission-critical, high-value applications in a wide range of industries, including aerospace, nuclear, fire safety, transportation, O&G and mining.

"Greg is the ideal person to take the baton from Ed Flynn and lead IWG into the future, and we're thrilled he has agreed to join the team as CEO," said Fazio. "Greg is a results-driven leader whose unique combination of product expertise, customer familiarity and vision for growth will help take IWG to the next level." "IWG plays a vital role in industries that power commerce, communications and safety across the globe, and I am thrilled to join its outstanding team," said Smith. "Ed Flynn and the company's dedicated associates worldwide have created a strong foundation. Together, we'll spend each day



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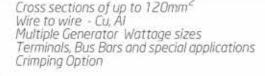


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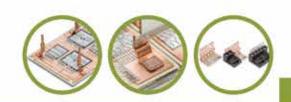


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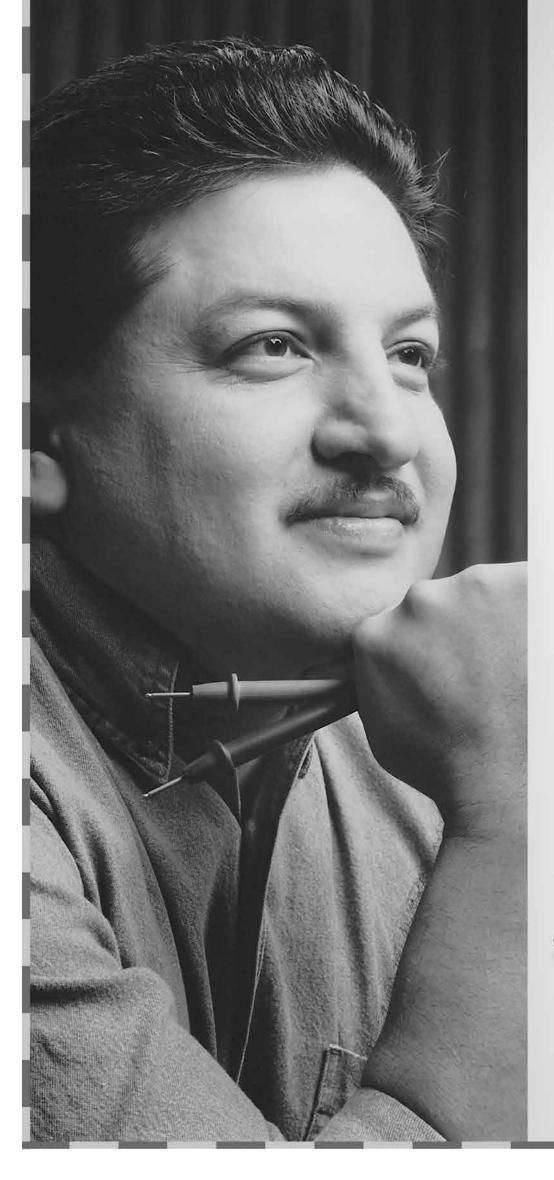
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> > Continued on page 54



Mando Can Do.



When Armando Zacarias goes out on a Eubanks service call, unusual things happen.

"Once I helped round up a cow that got loose in a customer's plant.

"Another time, while driving to a customer's site, our rep's car caught fire. We eventually arrived there that night and finished the job in time for the morning shift," Mando reports.

Customers report something unusual too: Mando's "can-do" attitude.

George Price, vice president of J&M Products, for example, writes how Mando takes time to answer questions, explain machine operation and even gave "tips on stripping some shielded cable that others said could not be done."

"Can't be done" is not in Mando's vocabulary—either English or Spanish. On his own initiative, he solves problems, leads training classes, helps boost plant

efficiencies, and makes lasting friendships while doing it.

Mando exemplifies the Eubanks



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Heat-Shrink Products and Their Application Demands

Continued from page 49 _

Tapes and Wraps

Wiring harnesses and cable assemblies may need repaired or modified to extend their useful service life. Insulation becomes abraded or cut. Connectors need contacts replaced. Quick field repairs may be needed while awaiting permanent replacement parts. Tapes and wraps overcome the impracticality of using

heat-shrink tubing in such situations by allowing side entry. Adhesive-lined tapes provide sealing and robust insulation.

It's a Family Affair

As the environmental and mechanical demands on harnesses increase, every component must be carefully evaluated for suitability. To simplify selection of heat-shrink components, look for suppliers taking a system-

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4705 S. Coach Drive Tucson, AZ 85714 (520) 747-4500 (520) 747-5800 fax info@atlaswirecorp.com level approach by offering tubing, tapes, and molded shapes as a matched family suited to the application environment.

Supporting Sustainable Designs

Application demands are one

drive for sustainable designs are another. Environmental con-

cerns are driving toward safe and recyclable materials. Environmentally friendly wire and cables require materials free of halogens, heavy metals, and other materials to allow easy recycling; as products come on the market, there is also a demand for companion heat-shrink products. While application requirements and environmental friendliness are often seen as polar opposites, the challenge is to make them co-exist. Heatshrinkable products are among those on technology's forefront offering challenging solutions to industry and the environment.

Conclusion

At the low end, heat-shrink tubing is thought of as a commoditized product. It is available from a range of



thing. The envi- Figure 3. Molded heat-shrink parts have shrunk. ronment and the Micro-sized parts save space and weight.

(Source: TE Connectivity

suppliers to meet general-purpose needs of sealing, insulation, and protection. But not all tubing is a generic commodity- differences exist in the material expertise used to formulate specialty polymers and for production process controls that lead to exceptional uniformity in shrink properties, low longitudinal shrinkage, and long-term aging stability. For demanding applications, few suppliers have the expertise to use new materials and adjust formulations to achieve such requirements as low outgassing, resistance to the widest range of fuels and chemicals, and performance at extreme temperatures.

(see disclosure on electronic version of this article at wiringharnessnews.com)



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Are You Doing Business OR Thinking About Doing Business in Mexico?

SA - Mexico Trade is not about selling to each other - it is about building things TOGETHER. The Mexican State of Chihuahua and the city of Cd. Juárez is an easy place to start. Doing business in Mexico within wire and cable assemblies, wire harnesses and other related processes has become a large market for many organizations. Finding the right area of Mexico can be challenging with a population of 132.2 million. Now, I'm here to tell you some interesting facts about the State of Chihuahua and the city of Cd. Juárez that should develop your interest to growing your Wiring Harness business in this area.

The State of Chihuahua has been nicknamed "The Wiring Harness Capital of the World" or "the valley of harnesses" due to harness manufacturing being a highly skilled and complex industry. The harness maquiladora industry located in Cd. Juárez involves world-class harness production, that includes innovation, organization, technology following ISO, ITAR, TS and other customer standards. Cd. Juárez is the largest city in the State of Chihuahua bordering with El Paso, Texas and Santa Teresa, New Mexico.

Interesting Population and Logistical Facts:

• The State of Chihuahua has over 3.5 million people

• Cd. Juárez is the most populous city in the Mexican State of Chihuahua with 1.4 million people



• Cd. Juárez shares its borders with both Texas and New Mexico with total of 10 Border crossing and 5 Ports of entry

• 29,391,513 crossings in 2017 among all bridges combined

•Cd. Juárez is a major point of entry and transportation into the U.S. for all of central northern México

Interesting Manufacturing Facts in Cd. Juárez:

• Among Mexico's largest Manufacturing Centers

o Over 300,000 mfg jobs

o Over 320 "IMMEX" plants

o Main markets: Automotive, Appliance, Aerospace, Electronics, Industrial, Metal

• Over \$99 billion in US-Mexico Trade (2016)

o \$55 billion exports o \$45 billion imports

• Over 550 manufacturing operations

With the advanced manufacturing "know-how" of this advanced region, the preferential access to the foreign markets, the highly trained workforce in wiring harness and competitive labor force, why wouldn't you do business in the State of Chihuahua and Cd. Juárez?

I hope I've given you some great reasons to check out the area and either expand your business or showcase your products to some of the businesses in these areas. There is already a great manufacturing presence in this area if you are a supplier to the wire harness industry. There is massive potential and tremendous interest for wire & cable processing equipment, tools, materials and technology suppliers and distributors.

That is why a local show about wire and cable processing technologies was created to give Suppliers an opportunity to exhibit to qualified decision makers of International firms and national businesses in this local region of Cd. Juárez. I am referring to the 3rd Annual M-EXPO Wire Processing Technology event. This event is co-located with the EXPO-MRO, at the Cuatro Siglos Convention Center on October 9th-11th, 2019. This three-day event is a high energy show and the are booths are constantly buzzing with conversations while connections are being made.

If you're looking to expand into México's Wire Processing Industry, this is the opportunity to showcase your latest wire and cable processing equipment, tools, materials and technologies. M-EXPO gives you the opportunity to exhibit to qualified decision makers. They are in search of suppliers with latest technology and equipment to assist them in improving their processes and overall competitiveness.

If you're looking to expand into the Maquiladora Industry, you do not want to miss M-EXPO!

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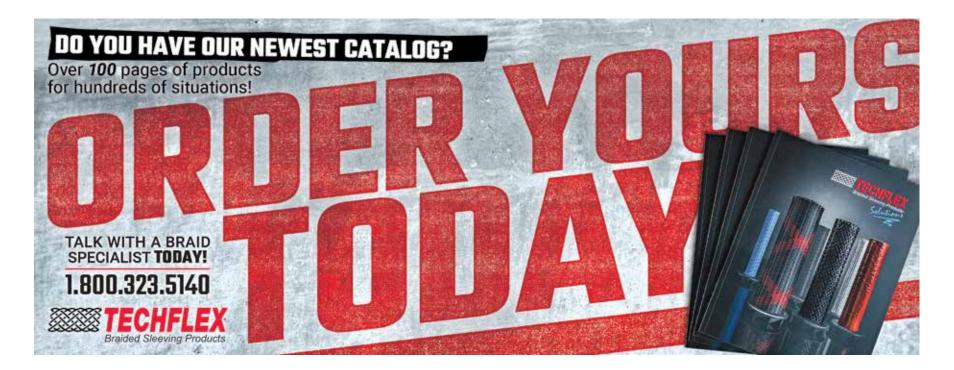
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NEWS PLUGS continued

Continued from page 50

ensuring the safety of our associates, improving our products and meeting the expanding needs of our customers. It is an exciting time at IWG, and I can't wait to get to work."

International Wire Group Holdings, Inc., through its subsidiaries, is a manufacturer and marketer of wire products for other wire suppliers, distributors and original equipment manufacturers. Its products include a broad spectrum of copper wire configurations and gauges with a variety of electrical and conductive characteristics and are utilized by a wide variety of customers, primarily in the industrial and energy, electronics and data communications, automotive/specialty vehicles, aerospace and defense, medical products and consumer and appliance industries. T

For additional information, please visit www.internationalwiregroup.com.

Headquartered in Greenwich, Connecticut and founded in 2002, Atlas and its affiliates own and operate 19 platform companies which employ more than 18,500 associates at more than 150 facilities worldwide. Atlas operates in sectors such as aluminum processing, automotive, building materials, capital equipment, construction services, paper and packaging, power generation, pulp, supply chain management and wood products. Atlas' companies together generate more than \$5 billion dollars in revenues annually

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TE Connectivity Announces Definitive Agreement to Acquire the Kissling Group

TE Connectivity (TE), a world leader in connectivity and sensors, has signed a definitive agreement to acquire the Kissling group of companies (Kissling or Kissling Group), a provider of high-power relays and ruggedized switches used in the commercial vehicle, transportation, industrial, military and aviation industries as well as

> other applications. The transaction is expected to close May 30, 2019, following the completion of customary regulatory approvals.

> With this acquisition, TE further expands its portfolio of specialty relays and switches to support the needs of industrial and commercial transportation customers - truck, bus, construction and other specialized vehicle manufacturers, facing evolving high voltage and power management requirements as they design next-generation vehicles. Integrating Kissling's range of products into TE's existing hybrid and electric mobility solutions (HEMS) portfolio further strengthen's TE ability to develop and provide integrated, highly engineered solutions for customers worldwide.

> "Kissling has an established reputation as an innovation leader in building mission-critical hardware with products that have a solid performance track record in the commercial vehicle, transportation

> > in



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owned company that has about 450 employees at sites in Germany, Switzerland, Slovakia, Spain and the U.S. TE and Kissling will continue to operate as independent companies until the acquisition closes, after which Kissling and the Kissling brand will become part of TE's Industrial & Commercial Transportation business.

Cirris Systems Introduces New Test System, The 4200 Series

The new 4200 Series Cable Testers are the latest easy-to-use testers from Cirris Systems. Available in two configurations, the high voltage 4250 tester and the low voltage 4200 tester, these systems have the same quality expected in all Cirris products.

Both tester models accurately analyze cables for short, open, and miswire errors and can expand up to 1,024 test points (128 per expansion box). The high voltage 4250 tester can reach voltages up to 1500 VDC or 1000 VAC. One of the most anticipated benefits of the 4200 Series is the integrated networking capability via Cirris Hub Software. Store test programs in one location on the network and print test reports to any network printer.

The 7" full-color capacitive touch screen makes it easy to navigate the software, set up test programs, and test cables. A new software interface means no advanced skills or training are necessary to begin testing. The graphical display supports Roman languages and graphical languages such as Chinese. Add more capability by connecting the 4200 Series tester to a PC and testing with Cirris Easy-Wire Software.

Customers familiar with the Cirris 1100 Series will easily adapt to the 4200 Series. The 4200 Series can use many of the same accessories and features found on Cirris benchtop testers. For example, digital I/O works the same on both the 4200 Series and the 1100 Series. Continue to use your same test programs and fixturing from current testers and share them with the new tester.

For cable and harness shops looking for a quality tester that is capable yet easy to use, the new 4200 Series will fulfill your needs without breaking your



The new 4200 Series Cable Tester



Heilind Electronics Receives Award for #1 Electronics Distributor.

budget. Visit info.cirris.com/4200 to learn more about the 4200 Series.

Heilind Electronics Voted Best Electronics Distributor Seventh Consecutive Time

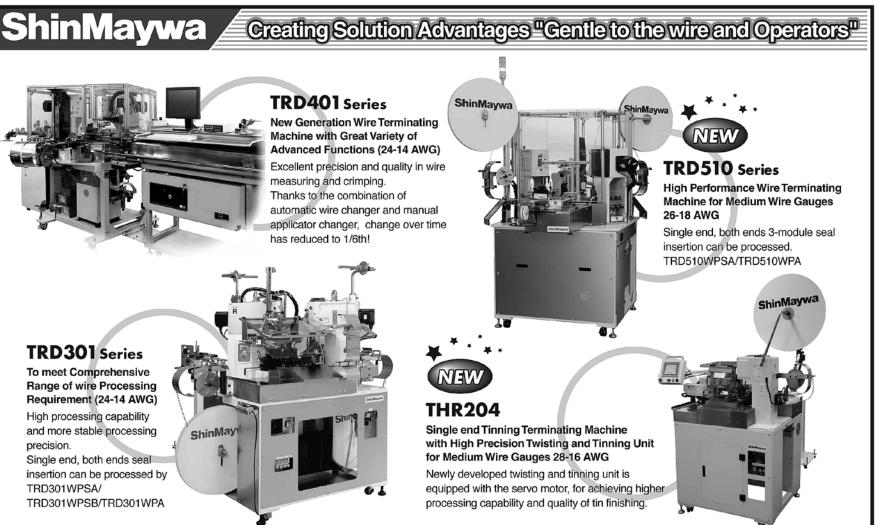
Bishop & Associates has honored Heilind Electronics with this year's award for #1 Electronics Distributor. This is the seventh time in a row Heilind has received this distinction.

Heilind Electronics, a leading global distributor of electronic components, was just named this year's #1 electronics distributor. The award was announced at last week's Electronic Distribution Show (EDS) in Las Vegas, and was based on results from an annual customer satisfaction survey conducted by Bishop & Associates — the leading market research firm for the interconnect industry.

Over 1,000 participants completed the survey, which compared the performance of the top 11 electronics distributors in North America. The 2019 award is the seventh consecutive for Heilind, who ranked #1 in nearly every category — including on-time delivery; breadth of product offering; sales and technical support; and ease of doing business. The company ranked high in terms of overall distributor preference.

"I am thrilled to accept this award on behalf of everyone at Heilind," said Bob Clapp, founder and CEO of Heilind Electronics. "The fact that we were rated first again in almost every category is a testament to the dedication of our team members throughout the company. It also demonstrates that our customers are our top priority."

Heilind Electronics, Inc. (http:// www.heilind.com/) is one of the world's leading distributors of connectors, relays, sensors, switches, thermal management and circuit protection products, terminal blocks, wire and cable, wiring accessories and insulation and identification products. Founded in 1974, Heilind has locations throughout the U.S., Canada, Mexico, Brazil, Germany, Singapore, Hong Kong and China. Follow Heilind on Facebook at facebook.com/Heilind and on Twitter at twitter.com/Heilind.

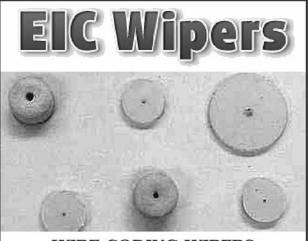


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NEWS PLUGS continued



New Modular Cable Entry System Provides Flexible Management of Pre-assembled Cables

Weidmuller is pleased to announce the new Cabtite Cable Entry System for pre-assembled cables and cables without plugs. This new modular frame system is replacing an earlier version of Cabtite, and offers users increased flexibility in the cable management of control cabinets and OEM equipment in manufacturing environments. A flexible cable entry system helps speed up installation, facilitates service and minimizes downtime.



Cabtite Cable Entry System

Cabtite features a modular design that includes three basic components— a frame, snap-in inlays and sealing grommets. The frame is made from fiberglass reinforced plastic and is avail-

able in four different sizes. An optional internal locking frame is available for added tamper proof protection. The one-piece frame is configurable when using the snap-in inlays which

> provide an easy, configurable method to generate small to large entry points with sealing grommets of various sizes (full range: .06" -1.4" dia.). This permits a number of configurations to accommodate a wide range of sizes for cables, conductors, hoses, pneumatic and hydraulic lines. Two conical-shaped sealing grommets (large/small) are available to reduce grommet complexity as the two grommets cover a cable range of .08" - 7.4" diameter and provide a reliable selfforming seal for a variety of cable diameters and shapes.

The unique Cabtite design offers quick installation whether it be installing from the inside of an enclosure out or from the outside in via the cable entry cut-out. The frames and accessories securely seal pre-assembled and unassembled cables with grommet seals that meet IP66 and NEMA 4 – 12 protection, and integrated strain relief in accordance with DIN EN 62444. The Cabtite Cable Entry System has an operating temperature range of -40∞F to +248∞F (-40∞C to +120∞C). Weidmuller's focus is to collaborate with customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. The Weidmuller Group manufacturing owns plants, sales companies and representatives in more than 80 countries. For more information, contact Weidmuller Inc. at (800) 849-9343, or visit them on the web at www.weidmuller.com.



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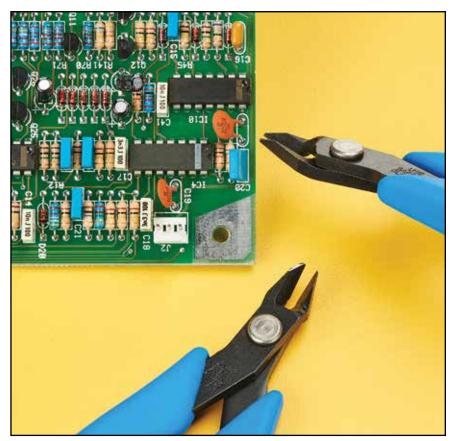
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The Xuron[®] Model 9250ET Micro-Shear[®] Flush Cutter

Xuron Extra Tapered Fush Cutter Provides Easy Access to PCB and Other Components

A precision ergonomic flush cutter that is designed to let users work more efficiently on today's subminiature components and more densely populated PC boards has been introduced by Xuron Corporation of Saco, Maine.

The Xuron[®] Model 9250ET Micro-Shear[®] Flush Cutter features an extra tapered head for easy access into extremely restricted areas such as ultrahigh density PC boards. Providing optimum control, this ergonomic hand tool is designed with cushioned Xuro-Rubber™ grips, Light Touch™ return springs, and a glare eliminating black finish to help reduce eye strain.

Ideal for working on miniaturized products with smaller and more densely populated electronics, the Xuron® Model 9250ET Micro-Shear® Flush Cutter cuts from less than 1 mil up to 18 AWG (1 mm) soft wire. Optional ESD-safe hand grips are available along with a line of ultra-precise needle nose pliers for holding and forming wire less than 1 mm thick.

For more information contact: Xuron Corp. Abby Robey, Marketing,(207) 283-1401 FAX (207) 283-0594email: arobey@xuron.com. Visit www. xuron.com

Heilind Electronics Adds Brady Printer M611 Mobile Label Printer

Brady's new BradyPrinter M611 mobile label printer offers a convenient remote solution to industrial label printing and authorized distributor for Brady, has added the BradyPrinter M611 mobile label printer to its line of Brady identification products.

With more and more identification tasks being completed outside of the traditional office setting, the need for mobile labeling solutions becomes critical. Brady's new M611 mobile label printer fulfills this need by offering a way to print labels remotely. The new printer utilizes the Brady Workstation Express Labels mobile app, featuring a touch-screen interface for fast and easy label creation. It also includes smartcell technology that communicates with the software, labels and ribbon materials - ultimately streamlining the label setup and creation processes, resulting in time and labor savings.

The M611's convenience and ease of use are complemented by its durability. The printer operates on a lithium-ion battery that remains powered throughout the day. Additionally, it features a rugged design that withstands even the harshest environments.

Each unit presents a diverse set of connection options, including Bluetooth, Wi-Fi and USB 2.0. The units also feature an auto cutter and a 300 dpi print head for crisp output. This versatile printer is ideal for mid-volume industrial printing in sectors like contract manufacturing and logistics. Specific applications include the identification of products, distribution facilities, electronic components and wires.

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Heilind Electronics, a leading global a distributor of electronic components

Visit Heilind's website at www. heilind.com for more information about BradyPrinter M611 mobile label printers.



Brady's New BradyPrinter M611 Mobile Label Printer

THE **POWER WOMEN** OF THE WIRE HARNESS INDUSTRY .

S avita Deshpande is the Engineering and Quality Manager at Amphenol-CTI in Ontario, Canada. As she worked in the wire harness industry for many years, she has a strong overall knowledge of wire harnessing. Savita moved to Canada from India, where much of her family still resides.

Savita attended the school system in India and also attained her college degrees in India. Her Bachelor's degree was in Mechanical Engineering and her Master's degree was attained in Computer Management. She had exposure to engineering fundamentals through her family connections as well as via the school system. In India, all students were required to take physics, chemistry, math, and biology as core classes in what would be considered the equivalent of high school in the United States. At that time, she considered a career path in either engineering or in the medical field. Both were on her radar as her father derived from a family of engineers and alternatively, her mother's family yielded several physicians.



Savita Deshpande

Both sides of the family had strong math skills, so strong that Savita describes her mother as being a 'math genius'. In her final year of high school, Savita was accepted to both the medical and engineering universities. Unlike college in the USA and Canada, Savita pointed out that admission acceptance in to each of the programs was very difficult to attain. Between the two fields, she opted to attend engineering school. She admits that she did not prefer biology, which was a large component of the medical program. Also, she had early experience in engineering as she attempted to help her father with engineering projects. At first, her support was a simple as folding schematics, fortuitously taking time to review the content. When she was only in 5th grade, she surprised her father by mastering the slide-rule, a predecessor to the modern-day calculator.

After completing her degree in Mechanical Engineering, Savita took a position with Phillips Consumer Electronics. There, she worked on audio systems including car stereos. After about a year, she was moved to their Research and Development (R&D) Division. In this position, she was involved with equipment design for products such as oscilloscopes. Phillips had a large presence in India; Savita worked with about 2000 people on site with another 7000 located nearby. Savita noted that she was the only female engineer in the R&D group of her company at that time. After working in the group, she was later asked to be the Mechanical Design Leader of the team. While there, Savita learned several skills including plastic molding, which would benefit her later in life. She also attained her Master's degree while working at Phillips.

After leaving Phillips, Savita took a project-based position in Osaka, Japan working with Fujitsu on computer-aided parametric design for buildings. This project enabled her to combine her mechanical engineering experience with the IT background as the focus was on 3D building software. Although Savita was offered to stay and work on the 2nd phase of the project, she had already received notice that her immigration request was approved. She and her family would be relocating to Canada, where her husband was offered an engineering position.

Once in Canada, Savita started to work for Beck Electric as their Design Engineering Supervisor. Beck, later NOMA automotive, specialized in automotive wire harnesses including ignition cables. NOMA later was acquired by Prestolite. At that point, large pieces of business were moved to Mexico. Savita was responsible for the technical knowledge transfer from Canada to the Mexico team. Subsequently, Savita was again involved in transferring projects from Mexico to India. After the transfers, her previous boss at NOMA asked her to consider a position at CTI, a wiring harness manufacturing company where he was now working. She took the position and is now the Quality and Engineering Manager for Amphenol CTI Industries (Amphenol bought CTI).

She acquired her P.Eng. license from Professional Engineers Ontario. Also while at Noma, Savita was given additional responsibility as a quality manager. In order to be prepared for her new assignment, she completed two certifications from the American Society of Quality (ASQ): certified quality engineer and certified quality manager. She became more involved

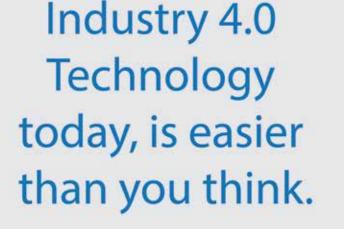


Melissa Femia

with this organization and continued on to be on the ASQ executive committee for the last 16 years, holding positions such as Volunteer Committee Chair, Special Projects Chair, and Outreach Chair. She is now the Chair-Elect for the Toronto section of ASQ and will be the Toronto section chair next year. Congratulations to Savita for reaching this honorable position!

In terms of her experience as a female in a professional engineering environment, Savita advises that she never felt that she was treated any differently than her male counterparts. In her first month of training, she designed a part and requested the tool room employees to build this prototype part for her. They declined, advising her that the part was not manufacturable. So, she asked them if she could utilize the lathe and other equipment to attempt the part construction herself. They approved so she spent the next 8 hours building her own prototype in the tool lab. She processed the part in two different sections, then conjoined the pieces. Ultimately, she successfully built the part that the experienced gentlemen in the tool room suggested could not be made. Through that effort, she gained their respectthey even asked her for guidance on some future build initiatives. In this instance, she may have been overlooked somewhat because she was

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female but perhaps also because she was an inexperienced, recent engineering graduate.

Savita recommends that female engineers choose a job by selecting an area that they really enjoy and then stay with the company to gain exposure in different areas. She is not an advocate for moving from job to job. She was able to work in different areas at a couple of different companies, gaining experience and exposure. Through promotions and increased responsibilities, her management recognized her efforts and achievements. She also advises that anyone should not feel embarrassed to seek help from others. She has no hesitation in learning new things from experienced operators or junior engineers as they have different perspectives and knowledge.

Thank you, Savita, for sharing your history and insight with Wiring Harness News.

If you are interested in sharing the stories but missed the original WHN distribution, the articles are available on the Jana Diversity Solutions website at www.janadiversity.com, or at wiringharnessnews.com.

If you know a female engineer who would make a great candidate to feature in the Power Women series, please direct them to me at melissa. femia@janadiversity.com

How Reason Codes Help Reduce Machine Downtime

By Paul Hogendorn

The worst enemy of any manufacturer is machine downtime. How to control and mitigate downtime is a constant battle for manufacturers trying to increase efficiency and maintain peak production. At FreePoint, through machine monitoring and production tracking technologies, we work with manufacturers to minimize downtime as much as possible, while maximizing machine output.

One of the ways we help manufacturers control their machine downtime is with Reason Codes, the backbone of downtime narration in our ShiftWorx platform. When a machine becomes idle, operators can apply a reason code to categorize that downtime period. Rather than seeing a machine offline for 20 minutes with no explanation, plant managers can see in real-time what the cause of the delay is— and address it. Those small increments of time add up, 10 minutes here or there can be worth over 6 figures in a year.

Using Reason Codes, you can:

- Diagnose Machine Downtime Causes and Apply Solutions
- Alert Decisions Makers in Real-Time to Plant Floor Issues
- Identify Machine Maintenance Needs
- Empower Employees to be Part of the Solution

able data for plant managers seeking to increase efficiency and achieve seamless production in real time. If someone has transparency into delay causes, they are more motivated to solve the cause of the delay. This makes the overall process more efficient and engaging.

Keeping Everyone in the Know

Reason codes also help mitigate machine downtime with real-time alerts. When reduced productivity or machine delays are detected, notifications are sent to all devices connected to our ShiftWorx platform -through SMS or email. Real-time alerts increase response time to problems that impact production—meaning solutions are found faster, and the length as well as frequency of downtime can be decreased.

Identifying Downtime Patterns

By comparing actual performance to projected performance, you can benchmark productivity against past data to identify opportunities for improvement. A recurring reason code could indicate a machine issue in need of maintenance, or another machine consistently causing delays. Identifying these factors better positions plant managers to rectify them and prevent them from happening in the future.

It is important to understand that all data is good data. Even un-anticipated downtime, machine breakdowns or inefficient scheduling can give you crucial insight into your operation. When machine monitoring hardware works in tandem with data visualization, you can see every performance detail from any machine, regardless of industry or age of machine.

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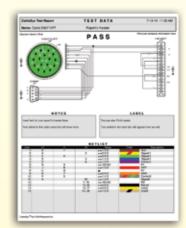
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| Trigger Test Signal | Foot pedal, remote control |
| Relay Control | Lock & Release Latches, Diverter Gates |
| Printing | Reports & Labels |
| Speech | Guided Assembly |
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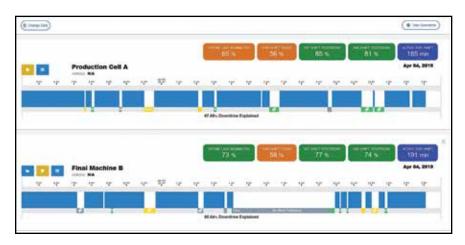
Netlist/Schematic



Identify Downtime Causes

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Wire-to-Wire Success Once Again at the Electrical Wire Processing Technology Show

high this year at the 19th Annual Electrical Wire Processing Technology Expo held May 8 & 9 in Milwaukee at the Wisconsin Center. Billed as the "Nation's Largest Dedicated Wire Processing Event", the show's 3005 attendees represented a 4.5 percent increase over 2018.

Over 190 world class suppliers and service companies showcased the latest equipment, instruments, tools and supplies used in wire & cable harness assembly, inspection and repair. Exhibitors needed more space this year and the show's footprint expanded from 44,200 to 64,200 square feet.

Workshops were extremely popular with full registration not uncommon. Presenters were CAMI Research Inc., El Paso Foreign Trade Zone, IPC/ WHMA and Schleuniger Inc.

All seminars, some Standing Room Only, were free. The seminar room was sponsored by Wire & Cable Technology. Topics covered included:

"Make IPC/WHMA A-620 Work for You"

• "Crimping: Beyond the Basics. Preparing for the New Reality."

• "OEE (Overall Equipment Effectiveness) in the Context of Digitization as a Success Factor for Companies"

• "Trends in Overmolding"

• "Fully Automatic Wire Harness Manufacturing"

• "Large Cable, Large Problems: Considerations for Innovation in the Large Cable Market"

• "Interesting and Unusual Applications of Cable and Wire Harness Testing"

Since its inception, the EWPT Expo has been produced by Expo

ttendance hit an all-time Productions, Inc. EPI is a full-service exposition and management company with a focus on trade shows and event planning. EPI President and Show Manager Jay Partington, along with Sales Manager Cheryl Luck, are highly visible on the show floor to maximize the experience for both exhibitors and attendees. Their tireless efforts continue to increase exhibitor ROI while providing attendees the most comprehensive platform for the wire harness industry. Jay mentioned, "Walking the floor we were encouraged by the enthusiasm of the attendees to not just gain information and knowledge, but to make purchases at the show. It's exciting to see the industry in general is doing very well."

> Attendees also enjoyed red-carpet treatment with a Wednesday Morning Break sponsored by Komax and a Mimosa Bar sponsored by Schleuniger. The Afternoon Break was held by Schafer. The spectacular After Hours VIP Party on Wednesday was co-sponsored by Komax, Panduit, and Wiring Harness News, and featured incredible buffet stations and live music.

> The Thursday Morning Break was sponsored by Schleuniger with TE covering the Bloody Mary Bar.WHMA provided Lobby Coffee both days. Direct Manufacturing sponsored the Winners Circle Café and CK Technologies covered the Charging Stations.

> Exhibitors received some special treatment with a Tuesday Beer-n-Brat Party after setup sponsored by Assembly Magazine. A Wednesday Exhibitor Breakfasts was co-sponsored by Wire & Cable Technology and the Milwaukee Center. The Thursday Exhibitor Breakfast was sponsored by Wiring Harness News.

> As a manufacturer in the wiring harness industry, you simply must put the May 13 & 14, 2020 show on your calendar. If you are considering exhibiting, you should know that demand for floor space is high. Time is of the essence, so contact Cheryl Luck at 800-367-5520 or cheryl@ epishows.com for details. We'll buy you a beer in Milwaukee!















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This is M-EXPO's 3rd year (co-located with the 9th Annual EXPO-MRO) and was initiated as a response to the interest of exhibitors who participated in previous EXPO-MRO shows. Many of the participants expressed interest in a more focused and exclusive show for the wire and cable processing industries. M-EXPO is the only wire processing technology exhibition of this type in the El Paso/Juárez region despite being an area with a high concentration of activity.

Why attend?

M-EXPO is a regional show with proximity to the State of Chihuahua, known to be the "Wire Harness Capital of the World". Companies such as ECI, Lear, Delphi (Aptiv), Yazaki, Sumitomo, Furukawa will attend this show. These are the decision makers of the purchase of wire processing technology equipment. Typically the budgets are set at corporate level but the decisions are made here! Attendees titles such as plant maintenance, supervision, process engineering, technicians, etc.

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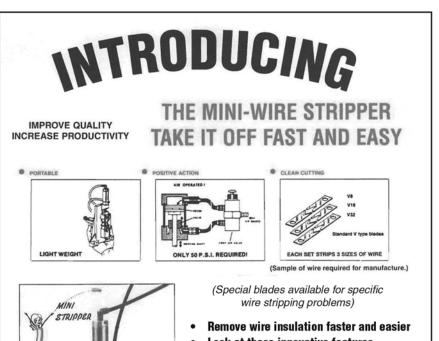
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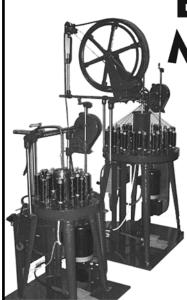
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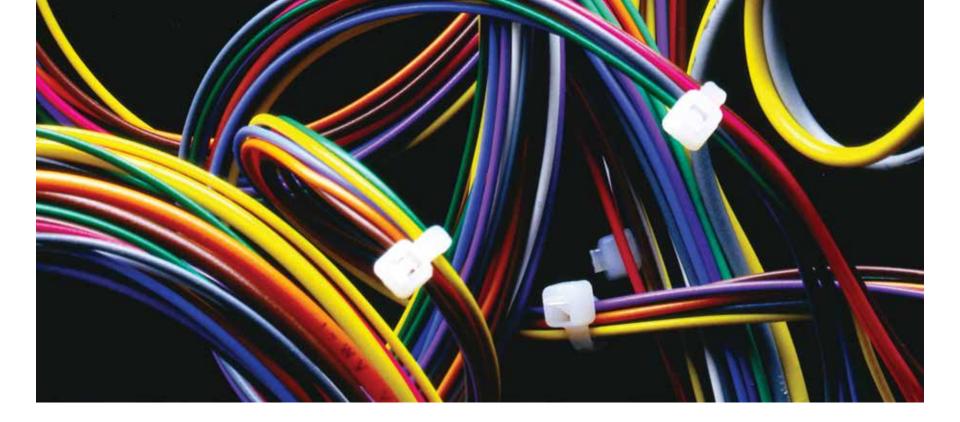
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