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- Update from Reshoring Initiative
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# **Cesar-Scott**

### Straddling the Border with Innovative Thinking

#### By Joe Tito Wiring Harness News

corporated in 1988, but it wasn't until the mid 1990's that they began to concentrate on the contract manufacturing of wire harnesses. Since that time, they have built assemblies for the appliance, automotive, electronic and industrial markets. Their mainstay is the 20-26 AWG range, but they also produce many assemblies in 12 thru 18 AWG. They are ISO 9001:2015/ISO 14001:2015 certified and build to the IPC/WHMA-A-620 Standard.

As a somewhat regional supplier, most of their business is in the Borderplex between Ciudad Juárez, México and El Paso, Texas. Many of their customers have corporate headquarters elsewhere, but the facilities they supply to are within this bustling region. WHN recently interviewed the company's President, Gustavo Farell, about their unique strengths and some new avenues they are pursuing.

For many years, Cesar-Scott produced comparatively simple assemblies. However, as Gustavo discussed, that has changed."We've gotten away from simple discrete wiring to more complex harnesses, usually in the lower to medium volume levels," he noted. The State of Chihuahua is widely held as the wire harness capital of the world. In such a tough competitive region, it's easy for a competitor to underbid and snap the simpler designs away. Gustavo has therefore steered efforts towards building higher level assemblies while providing more value for his customers.

The company has also developed a talent for quick changeovers resulting from smaller production quantities. As Gustavo described, "This allows us to preform particularly well when a customer has product families of harnesses with the same connectors and terminals, but with different configurations."

One thing the company is particularly proud of is their ability to design for manufacturability and assembly (DFMA). They frequently con-



Board assembly in Juárez

sult with customers' engineers in the design stage to help ensure the product can be assembled cost efficiently and effectively. "That is something I have always emphasized as key to the contract manufacturing of wire and cable assemblies, or any other product for that matter," Gustavo instructed. He stressed that, for mostly liability issues, while his team is very good at suggesting improvements to the manufacture of products and to a general drawing clean-up; they have the customer sign off on any changes, thus shying away from full-blown harness design. His senior administrative and engineering team has over 150 years of combined experience working towards this goal.

Within the past three years, Cesar-Scott moved their corporate headquarters from El Paso's Westside to a very El Paso-centric location. They had always manufactured in Cd. Juárez, but remodeling a building in an old industrial district in downtown El Paso has opened some additional doors. "This put us in close proximity to the two bridges crossing into Mexico, along with El Paso International Airport and other important transport locations," Gustavo detailed. With the addition of this facility they now have the ability to do some wire and cable assembly and related kitting operations in the US. "This has given us the space and flexibility to work with customers who may not necessarily need or want their production to go across the border." He feels this strategy has been especially important in today's fluid trade regulation environment.

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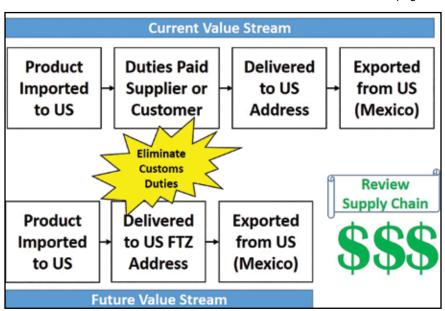
# **Optimizing the Supply Chain**

#### **By David Panco**

ompetition is getting tougher in the wire har-

from, what is the country of origin, and are there customs duties built into the price of the material. There are some golden opportunities wait-

ing for those companies to find. Globalization is creating more foreign content in many of the products built today. More and more companies in the US are purchasing more foreign origin components to build their products. There are costs in the supply chain that most companies overlook, don't pay attention to, or think they are just the "cost of doing business". Sometimes, these costs are buried in a composite number



ness industry. Costs are rising, and companies are looking to find cost saving opportunities that can positively affect the bottom line. Finding those costs to reduce and eliminate are getting harder and harder to find. There is one area that every company should look at, and that is their global supply chain. Where does that raw material really come

where they are not visible to managers and executives.

These are the customs fees. Here is a list of the most common customs fees paid in the US.

- Customs Duties
- New tariffs added to Customs Duties
- Merchandise Processing Fees
- Harbor Maintenance Fees

The costs that are apparent are the

customs fees (duties and tarrifs) paid directly to US Customs and Border Protection by a company importing goods into the United States. The Merchandise Processing Fee (MPF) is paid for importing shipments into the US and are an additional cost to a company. This fee increased on October 1, 2018, and the MPF is based on the value of the shipment (0.3464%)

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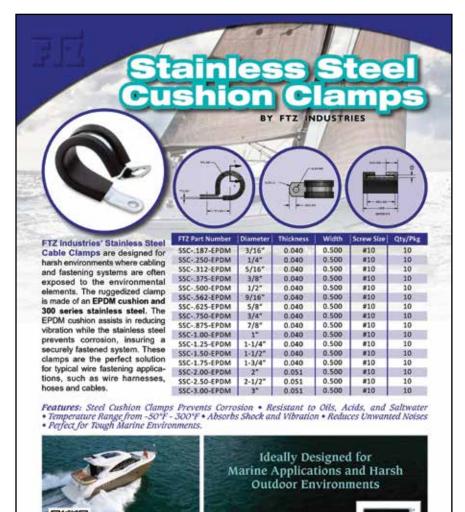
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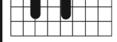
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# ASK ABOUT OUR NEW DESIGN DRIVE SYSTEM

# **M & A 101:** Lessons learned from decades of deals

Why Pay an M&A Fee?

#### By Loren Smith

hy should I pay you a fee to sell my company? This question is commonly asked by owners of wire harness companies who are weighing retaining an M&A firm like mine to help them sell their company versus navigating the process on their own. If you are guessing my response--that the M&A firm's fee will customarily be far exceeded by the increase in sale price--you'd be correct. But can you also explain why that is so often the case?

A couple of examples of recent transactions should illustrate the wisdom of engaging expert help in the sale of your wire harness company.

Exhibit A:A large West Coast wire harness company owned by its founder As often occurs, this successful company had been approached many times over the years by prospective buyers. Then, when the founder finally started contemplating retirement, he almost accepted one of those unsolicited offers to buy his company, but turned to us at the last minute for a second opinion.

We told him that, while he was considering a seemingly excellent offer from a solid buyer, it was highly unlikely the offer fully reflected the value of his company. Unsolicited offers from random buyers rarely reflect a company's true worth because that worth can consist of far more factors than a mere evaluation of the numbers would indicate. Without the knowledgeable, intensive effort required to identify a company's positive attributes and potential, it's not possible to develop a full picture of a company. Moreover, the absence of a competitive process always results in



a discount to a company's true value.

Armed with this recognition, the owner gave us a tight window to see if we could bring more to the table. After putting together a comprehensive document highlighting the company's many strong points and high potential, we contacted a number of industry people we knew along with a breadth of companies that might have an interest in acquiring this type of harness company.

In the end, we were able to provide the owner with a letter of intent 25% above (\$9 million more) than the offer the owner had been close to accepting for his company. In addition, we then guided a vigorous and challenging due diligence process culminating in the closing. After the dust settled, our fee wound up representing less than 10% of the difference between what the owner had been close to accepting and the deal we were able to develop for him.

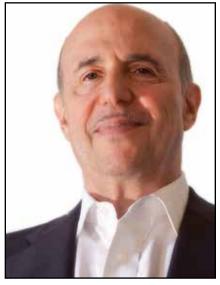
# *Exhibit B:Three times the cash at closing*

Perhaps because this owner felt rushed into selling his company once he had rather suddenly decided to retire for health reasons, he was close to accepting an offer from a buyer he had known for many years. The offer consisted of two parts: 25% of the sale price as a cash payment and 75% to be paid over time as a percent of the company's revenue. Fortunately, however, the owner consulted with us before agreeing to what appeared to be a reasonable offer.

Primarily because of our contacts, we were able to bring an all-cash buyer to the table providing the owner with three times more cash at closing, removing the uncertainty implicit in the offer he had almost accepted.

#### Why bigger isn't always better

One final point about maximizing the value of M&A firms: On occa-



Loren Smith CEO Blue Valley Capital

sion, it pays to compare the extensive resources of a large M&A firm with the personal attention, nimbleness and industry knowledge of a firm like ours. We often see this advantage when a seller has already written a check for a valuation by a large firm but then gets curious about the kind of appraisal we might produce. Fairly routinely, we can substantiate a higher valuation than the large firm has determined in its 50-page document.

Recently, for example, we were able to bring a deal to the table that was almost twice as high as the deal a company had received from a much larger, higher profile firm. And the fee--again--amounted to less than 10 percent of the additional dollars the seller was able to secure with our input.

All of this is not to say that our firm is superior to every other firm. What I am saying is that it behooves sellers to consult with an M&A firm like ours before making a deal on their own, or going with a much larger firm.

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









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# **Redemption Over Replacement**

#### By Wes Gardner

like trucks. All kinds of trucks. In a world gone soft, there is something satisfying about a two-ton tool that gets the dirtiest job done without complaint. Several years ago, I needed a new vehicle and decided to search for a four-wheel drive friend. The only problem was my cash resources were meager to say the least. With only \$1,500 to spare, my Craigslist results yielded either rusted warriors or mechanically wounded veterans. Since bodywork is beyond my skill set, I focused on the wrecked engine category. Eventually, I found a 2000 Ford Ranger, not running, for \$1200. A blown head gasket had stopped it in its tracks. So, with a little negotiation and a wrecker, I drug it home for \$850. And there in my garage a little miracle happened; a miracle called resurrection. I dismantled the engine, reworked the heads, replaced the gaskets, and cleaned everything. It was, for me, a long and tedious labor of love. Yet after many silent hours, the moment of truth came. With a turn of the key, the restored power plant rumbled back to life

This automotive illustration provides an essential truth for the wire and cable industry. When it comes to equipment, employees, or customers, redemption is often better than replacement. Succinctly put, there is power in bringing things back to life.

Before we apply this principle, it's important to grasp it wholly. Perhaps enumerating the steps to redemption will bring clarity. Be careful not to breeze over this section. The depth of meaning far exceeds the brevity of writing.

#### Redeeming means:

1. Looking past the current state and seeing that something or someone previously had value.

2. Realizing the value has been robbed by time, use, neglect or mistakes.

3. Envisioning the person or thing being restored to their original state of value.

4. Considering the cost of redeeming.

5. Investing the necessary means to redeem with patience and persistence.

6. Enjoying the immense rewards of your labor.

Now, with the principle stated, lets apply it in the real world of contract manufacturing.

Continued on page 8



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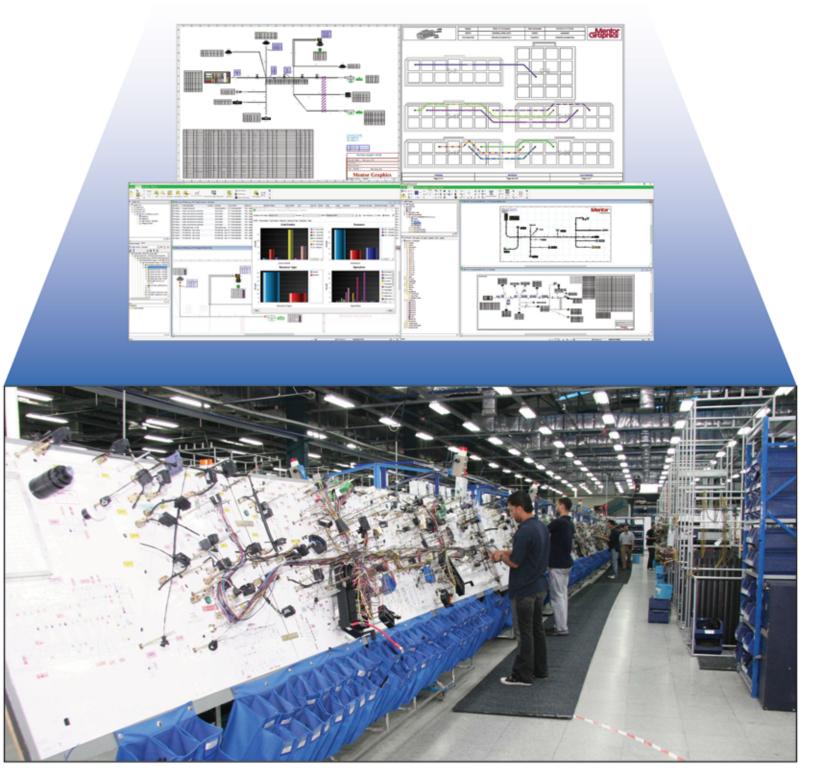
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# **Redemption Over Replacement**

# The Principle Applied to Equipment

SureTech Assembly produces custom cable assemblies from 30 awg to 4/0. Up until recently, our equipment capabilities ranged from 30 awg to 1 awg. For larger gauges we employed a manual cut table. As volumes increased, a common perplexity arose concerning tooling. How do we procure appropriate equipment when the revenue stream has not yet been fully realized? As such, we began to scour the used equipment market for something broken. Better stated, we searched for something we could redeem. Eventually, we located and purchased a used Komax Kappa 240

that was deeply discounted. Deeply discounted! The used machine was paralyzed with electrical problems and would not even boot to a production screen. We applied the steps listed above (you may want to reread them now) and within a few short weeks she breathed life again. It's been a year since that repair, but this morning I heard it running perfectly.

#### The Principle Applied to Employees

SureTech Assembly has utilized this principle extensively in employment. Over the years, we have hired people who are handicapped, destitute, troubled, and even impris-

#### Continued from page 6

oned. One young lady had a recent drug addiction but was now clean and seeking a job. Carefully, she was employed and began as a floor worker. As time and investment accrued her life began to change. Eventually she became a line leader and excellent employee. On another occasion, SureTech employed a person who had been previously incarcerated. We even provided transportation to help the person back on their feet. A final example includes a person who had previously sorted chicken eggs. Obviously, their skill set was very limited. However, with intentional investment, she blossomed into supervising a production line. Sometimes,

the road has been hard, but it has proven to be profitable in ways that can't be measured. The principle is certain, it is wise to put to work what everyone else throws away. In the words of one, "...*I have come to seek and save that which was lost.*"

# The Principle Applied to Customers

Inevitably, some customers experience major difficulties. They lose market share, their industry declines, or leadership changes. In one way or another, they find themselves in a bad place. In these moments, it's easy to discard the customer and search for a replacement. But redemption

support

is often better than replacement. In one

such case at SureTech, a customer moved all

their assemblies over-

seas to a low-cost region. However, our

the same as their pur-

chase orders slowed

to a trickle. Another

customer struggled as

a start up in the phar-

remained

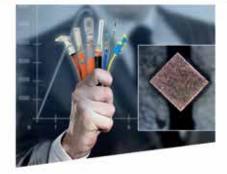


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maceutical industry. We faithfully stayed by their side. In a final case, a customer changed management and imposed unfair terms on SureTech. We patiently worked through each imposition. Today, all three customers remain viable! Indeed, there is power in bringing things back to life. It is a principle that transcends the wire and cable industry. It is a truth that can be ap-

plied to the simplest things in life and the deepest parts of our soul. And when it is applied it works. Five years have passed since that engine rebuild. But this morning, as the odometer clicked past 227,000 miles, my Ranger gladly carried me to work. And we were both joyful for the principle of redemption.



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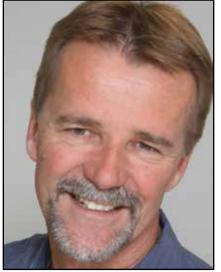


# ADERS INSIGHTS INTO ACTION Smart, Hungry, and Humble

**By Paul Hogendoorn** 

t is easy for me to identify the "true all-stars" on the teams I worked with over the years. They were the performers that not only got things done, but that products, divisions, and even companies were built upon. Some were diamonds in the rough, discovered along the way. Some were fresh graduates with that certain "spark". Some were well educated, and some had great previous experience. It is easy to identify who those exceptional individuals were because the results spoke for themselves. However, it wasn't always as easy for me to identify exactly what it was that made them special, until I heard Patrick Lencioni speak at a conference I attended. His assertion was that the ideal team player was "smart, hungry and humble".

Smart. It's easy to understand that intelligence would be a critical characteristic. All the all-stars on my list are very smart people. Some are highly educated and 'academic', but others had an extra degree of common sense. Others just had a type of internal compass that lead them intuitively through what seemed to others to be random processes, to conclusions that others might not ever

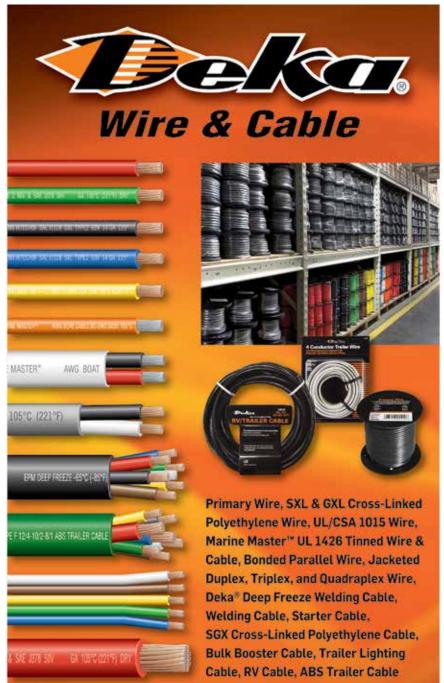


Paul Hogendoorn

get to. They are all, in their own ways, very smart people.

Hungry. This took me a little longer to digest. A few of them came to Canada as refugees, brought over by parents hungry for a better future for them. They knew the world they left, and they saw what the world they came to had to offer, and they were eager to dedicate themselves to the task of achieving it. Others were hungry in other ways. They were persistent in their efforts and driven to achieve the goal before them. Whether it was a new product needing to be completed, a ground-breaking technology being developed, or a

Continued on page 13



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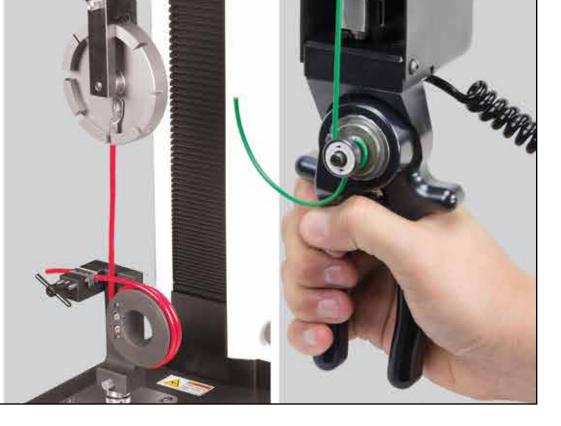


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# Smart, Hungry, and Humble

Continued from page 10

new message that needed to be communicated, the completion of the goal was all that mattered. Tenacity. Persistence. Relentlessness.

Humble. This one took me longer to sort through, but then I realized it might actually be the most definitive trait of the three. Smart people often have trouble listening to the insights and input from others, unless those insights come from people they believe to be a smart, or smarter than themselves. And driven, persistent people often don't have the patience to slow down and consider other voices; their determination often includes an element of stubbornness. Both of these conditions are sort of natural and can be expected; smart and driven people usually rise to the top of the class and move up in the ranks of the company because of their smarts and dedication. So, here's where humble separates the good and very good from the exceptional: humble people are more likely to actively and genuinely listen to all input from everyone, and to consider that input and those insights as just as important, and perhaps even more important, than their own. Humble people are also more likely to praise and "honour up", acknowledging the achievements of people one or two rungs above them. Pride often gets in the way, but not for humble people. Humble people consider each person's insight and opinion as being as valuable as their own, perhaps even more valuable when it fills holes in their own blind spots.Without humility, its often hard to even accept that you have those blind spots.

A friend of mine recently retired as president of a major international technology company. He started when the company had only 30 people. He was an engineer but started his career there in marketing. Eventually he headed that department and soon became vice president. After many years in that role, the then president retired, and he was passed

over for the top role, despite having served very effectively as second in command and helping build the company to a very successful state. He continued to serve the new leader, just as humbly, smartly and dedicatedly as he had the previous leader, but the company's growth stalled. After a few years, the new president was removed and he was asked to take the leadership role, which he did. The company's growth returned, and when he eventually retired, there was nothing that had to be said about his importance or the contribution he made to the company, because the results clearly spoke for themselves. The company was strong, vibrant, and succeeding. I have known him for over 30 years now and can look back on all the conversations I had with him, recalling that he was more interested in hearing my opinion and thoughts than expressing his own, and the times he would genuinely acknowledge and honour not just his subordinates, but also his peers and the people above him. It sounds simple and perhaps easy, but its not. It's actually a very rare trait among people that are very smart and very driven.

Congratulations to M on your retirement. You have set a fine example for others to follow. A big thanks to S, F, M, and K. Having you on my teams was an honour - you have the talent and the drive, but it is your humility that allowed us to get done the spectacular things we got done. And a big vote of encouragement to C, J and B - your future looks bright if you continue to follow your strong internal compass.And, lastly to R, the smartest, most unwavering and humblest person I know; without you on the team, nothing of true importance would have ever gotten done.

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



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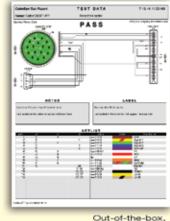
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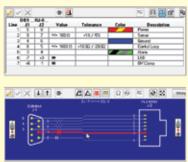


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Diagnostic Netlist/Schematic

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# When in Need, Make It Yourself!

Harness manufacturers invent their own specialized tooling

#### By Joe Tito

oing the interviews for Industry Profile is the best part of my job. There are always so many fascinating details, and it's difficult figuring out what to include and what to leave out. One thing that has struck me over the past several interviews is the amount of in-house innovation that takes place. Almost every one of these operations has developed their own tools and equipment to achieve a specific task. They are tools not generally found in the marketplace that these folks have developed from scratch.

In this article, I went back and spoke with the leaders who foster this innovation, and the engineers who bring them to life. The tools described are in use every day at these facilities in the production of cable and harness assemblies. These companies are doing exciting things, and I'm pleased they wished to share their ideas to make things better for the industry.

#### Terminal Counter for Inventory -Automatic Coax & Cable

Leaders: Gary and Glenda Martinet Innovators: Ray Ward, Larry Ward, Roger Cigelske, Christian Cochran

The Problem: Gary and Glenda run a tight ship and are very detail oriented. One of Gary's particular frustrations was keeping track of their terminal inventory. You've likely got the same setup at your facility with rows and rows of partially used reels. There are formulas for estimating the number of terminals left on a partially used reel, but they can be somewhat subjective, and Garry likes an exact count. He wanted a low cost way of obtaining an exact inventory on terminals.



Reel setup on terminal counter

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Terminal counter in operation

The Solution: Gary gave Ray the task of coming up with a solution. Ray has been invaluable at Automatic Coax over the years for his ingenuity at creating specialty equipment, and adapting existing machines to run product more efficiently. He is lucky to have a team of technicians and machinists to help bring his ideas to life. Ray envisioned a simple counting design and set his group in motion.

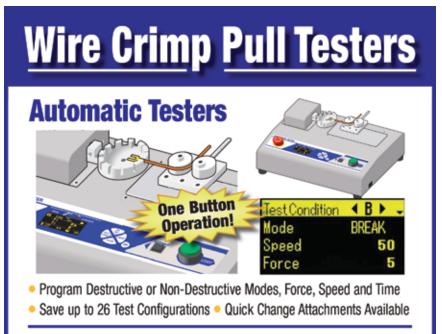
The result was a hand operated counter that uses an infrared sender and detector to count the terminals. It works much like the infrared setup on a garage door. As the light beam is broken, the counter advances. The operator simply places the partially used reel on the machine and feeds the terminals through the counting fixture. The paper feeds separately and the two are rejoined so they spin

on to the take-up reel together. There are two set screws to adjust in and out for different size terminals.

The pickup reel can either be an identical reel, or they can use an adjustable reel to accommodate almost any size terminal. The latter is used when they need to feed the terminals back on to the original reel per customer requirement.

Ray designed and built the board. It is a simple Arduino processor, but it's able to count the terminals at a very high rate. There are many different nylon spacers they use to accommodate varying size terminal reels. Ray estimates they have about \$200 in materials invested, but the result is a counter that takes less time than complicated estimating. It also produces a much more precise inven-

Continued on page 24



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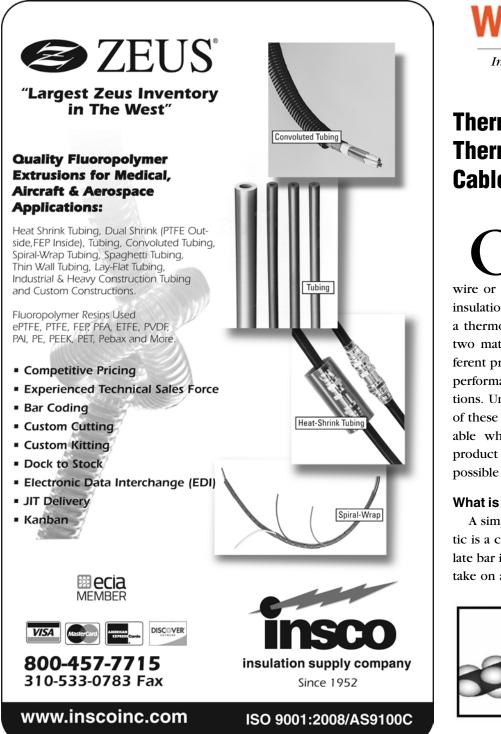
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In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

## Thermoplastic vs. Thermoset Wire and Cable Materials

ne of the most beneficial ways of distinguishing the characteristics of a wire or cable is to determine if the insulation or jacket material used is a thermoset or a thermoplastic. The two materials have significantly different properties that influence their performance in a variety of applications. Understanding the properties of these two materials can be invaluable when selecting an economic product or trying to help prevent a possible meltdown.

#### What is a thermoplastic material?

A simple analogy to a thermoplastic is a chocolate bar. When a chocolate bar is melted, it has the ability to take on a new shape as it cools. This

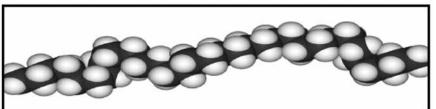
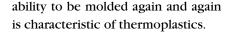


Figure 1: Structure of Polyethylene



Thermoplastics are composed of chains of molecules such as polyethylene. Each thermoplastic molecule is composed of many smaller individual molecules, as seen here in Figure 1. When heat is applied to the material, the added energy will allow the bonds between the molecules to be separated, causing them to move around like a liquid.

#### What is a thermoset material?

If a chocolate bar is analogous to a thermoplastic, thermoset materials can be described as being similar to a birthday cake. Once a cake is baked, it takes its final shape. Baking it longer does not increase or decrease the size of the cake. Ultimately if enough heat is applied, it will burn, but not melt like a chocolate bar. This partic-

Continued on page 18



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ular characteristic is why thermosets are useful as durable materials that do not soften under high heat, such as car tires or flat roofing membranes.

Technically speaking, thermoset materials are those that are formed of basic polymer structures, such as polyethylene, and then cured or vulcanized. The curing process is what turns the plastic polymers into thermoset materials, which are also known as natural or synthetic rubber materials. The curing process can be done many ways, but the results are virtually the same. The long, individual polymer chains of the plastic become cross-linked by smaller molecules (shown as smaller red lines in Figure 2). The figure shows the different molecular structures of a thermoplastic and a thermoset.

Note: Because of the cross-linking required to make a thermoset, they are often referred to as cross-linked materials. In fact, when you see an "XL" in front of the abbreviation for a plastic such as polyethylene (PE), it



Thermoplastic Molecular Chains

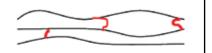
means that it has been cross-linked, not that it is "extra large." Such thermoset materials are called crosslinked polyethylene or XLPE.

#### How do I choose a material for my application?

Knowing that the key difference between a thermoplastic and thermoset is in the way they respond to elevated temperatures can be an important aspect of which material to choose. For example, thermoset materials are often chosen for circuits that may experience an overload. This is because thermoset materials have a reduced likelihood of failure if momentarily operated at the higher temperatures that often accompany an overloaded conductor. Comparatively, thermoplastics are often easier to strip, which makes them easier to process on automated equipment for large volume applications.

There are other considerations when choosing between thermoplastic and thermoset materials. Even

Continued on page 18



Thermoset Cross-linked Molecule

Figure 2: Thermoplastics vs. Thermoset



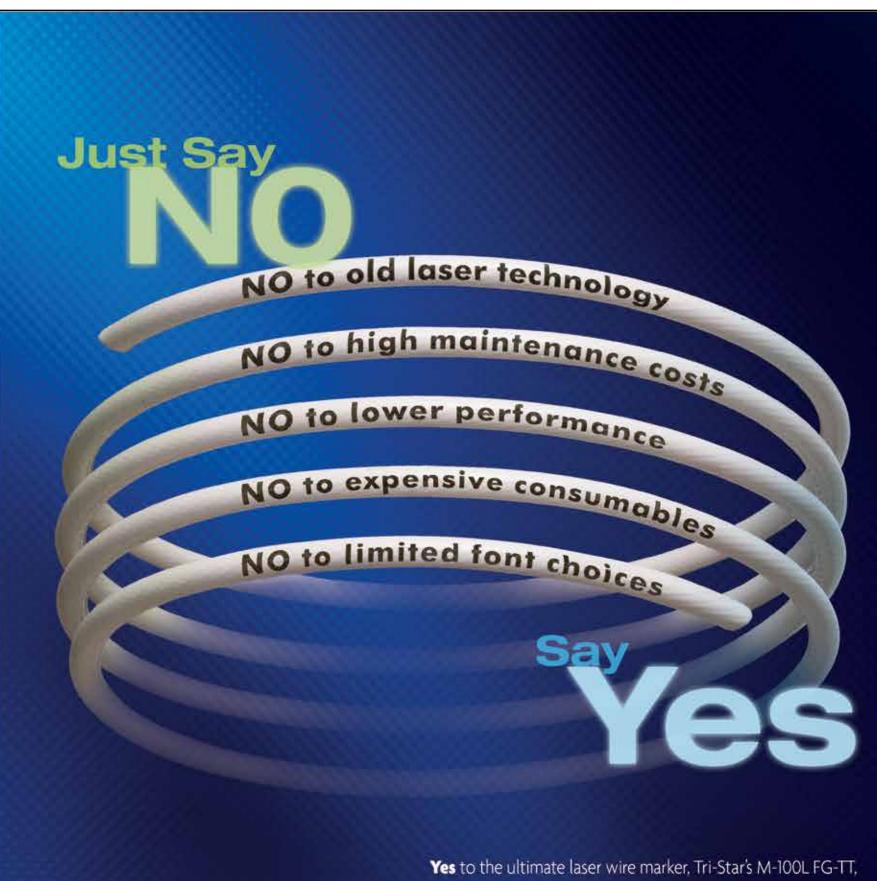
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#### **Thermoplastic vs. Thermoset Wire and Cable Materials** Continued from page 16

though it is not true in every case, Table 1 lists some general characteristics of the two material types and their implications to users.

The variety of materials available to modern wire and cable manufacturers is immense. This results in a wide range of properties within each

material type. The table is a generalized summary that does not apply to every material. It is important to understand how the properties impact the performance of the product in the intended application. Generally speaking, within a given material type, the old adage,"You get what you pay for," still applies.

Table 1 Material Characteristics			
Characteristic	Thermoplastic	Thermoset	How it affects the product
High Temperature Mechanical performace	Poor to good	Excellent	Increases survivability during emergencies or normal usage at high temperature
Coefficient of friction	Very low to moderate	Moderate to very high	Affects pulling tension, wire processing and tactile feel
Elongation	Poor to good	Good to excellent	Measure of stretch before breaking, encountered during installation, processing, and flexing
Tensile strength	Poor to excellent	Poor to excellent	Wide range of both material types, impacts durability and stripability
Colorability	Good to excellent	Poor to excellent	Affects identification, especially in low-light conditions
Heat deformation	Poor to good	Good to excellent	Beomes very soft as it nears its melting point
Cold temperature	Poor to excellent	Good to excellent	Affects storage, handling, installation and usage in cold environments, including air shipment

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# Dr. Cortney Baker to Keynote Women in Electronics Reception at IPC APEX EXPO 2019

r. Cortney Baker, nationally recognized authority on women in leadership, will speak at the IPC APEX EXPO Women in Electronics reception on Wednesday, January 30, 2019, 6:00-7:00 p.m.

Her keynote, "Closing the Gender Gap and Conquering the Mythical Glass Ceiling" will cover the progress women have made in workplace equality despite the continuing gender wage gap, and the underrepresentation of women in executive positions in various industries. Dr. Baker will discuss the challenges women face when advancing their careers, as well as strategies to implement to get beyond these challenges. Participants will gain knowledge of how their organizations can support and promote high potential women into higher level leadership roles.

Host of the talk show "Conquering the Glass Ceiling with Dr. Cortney" and author of "Unlimited: Conquering the Myth of the Glass Ceiling," Dr. Baker was named the 2016/2017 Texas Business Woman of the Year. A researcher, author, trainer, and TEDxspeaker, Dr. Baker is the founder and CEO of KidsCareHome Health, a multi-million-dollar healthcare organization in Texas and Colorado. She holds an Ed.D in organizational leadership from Pepperdine University.

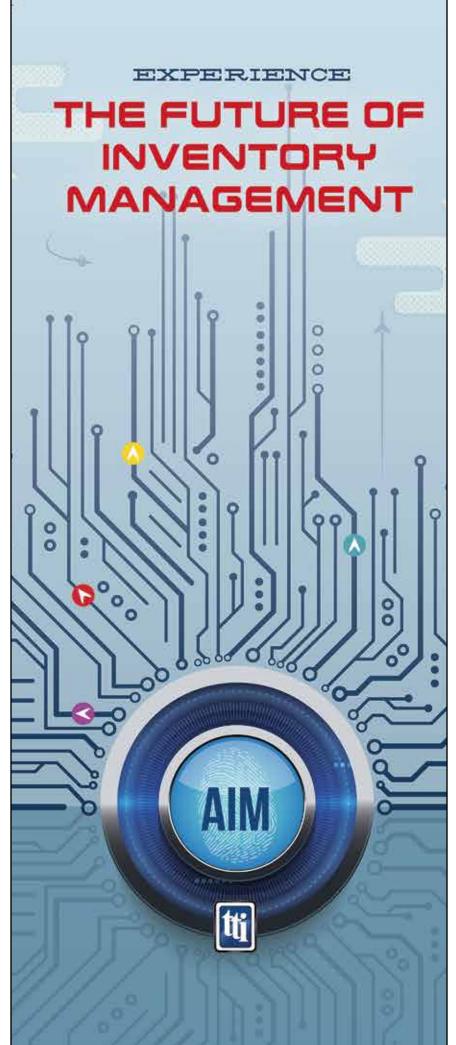
The Women in Electronics reception, sponsored by Indium Corporation, invites women in the electronics industry to join their colleagues across the supply chain to network, share ideas, and discuss career experiences.

"We are thrilled to welcome Dr. Cortney Baker to IPC APEX EXPO 2019," said Alicia Balonek, senior director, trade shows and events. "We are eager to learn her insights on expanding women's leadership roles and to share our experiences navigating a career in a male-dominated industry."

The Women in Electronics reception and other special events as well as access to the exhibit hall are free to those who register in advance, a savings of \$40 on-site.Attendees who register by December 21 will save 20 percent off registration fees. In addition, attendees who register for the All-Access Package will receive a significant percentage off a la carte options. Details, including dates, time and complete registration options, are available at www.IPCAPEXEXPO. org.



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## THE **POWER WOMEN** OF THE WIRE HARNESS INDUSTRY \_\_\_\_

### Spotlight on Rebecca Schenk

By Melissa Femia

ebecca Schenk is a Power Woman at Allison Transmission, Inc. in Indianapolis, Indiana currently working in Product Engineering. She has worked at Allison Transmission for about 20 years in various positions including Product/ Project Engineering, Test Engineering, and Application Engineering. In Product Engineering, she spent most of her time in the Electronic Components Hardware Group where she worked with suppliers on designing, testing, and releasing products. As an Application Engineer, she worked at the other end of the spectrum with the Original Equipment Manufacturers (OEMs) to design Allison Transmission products into their vehicles and applications. While in Test Engineering, she was responsible for transmission hardware testing. She was also involved in the calibrations group during her application years and warranty and service activities during her early product engineering years. Rebecca is definitely a woman who knows her transmission components from design through implementation and service.

Rebecca was not exposed to textbook engineering during her middle school classes as there were no STEM programs available. Attending a private Catholic high school, she graduated 3rd in her class and enjoyed traditional math classes such as Algebra, Geometry, and Calculus. The



Melissa Femia

school had no STEM-specific programs in which she was able to participate. However and while uneducated collegiately, Rebecca's parents exposed her to many projects at a young age. Her father, an

automotive and marine mechanic, involved her and her brother in designing and building a go-kart. She also was exposed to work on her grandfather's farm and helped work on building houses, fixing cars, doing woodworking projects, and building concession booths, among other projects. As a homemaker and administrative assistant, her mother also included Rebecca in activities like cross-stitching, cake decorating, painting, and gardening. While she may not have realized it at the time, she developed a strong understanding of how objects fit together and a keen mechanical aptitude.

Because of their mathematical interest and applied mechanical knowledge, both Rebecca and her brother chose to pursue mechanical engineer-She attended the ing. Rose-Hulman Institute of Technology (RHIT) in the first class that allowed female participation for full-time courses. Previously, RHIT was an all-male school though there were females in attendance some prior years for parttime studies. In fact, one of Rebecca's most interesting memories includes her first day of Freshmen studies when there was national media attention covering the first day for females (as full-time students). During that year at RHIT, there was a 13-1 male to female ratio at the school. She recalls having only 1-2 females in her classes.







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When I asked her how she felt about being so outnumbered by the boys in her classes, she added that she actually felt welcomed and enjoyed the male attention. She believes that the guys were happy to have females around campus. She thinks that the professors were also glad to have the males cleaned-up for class now due to the female presence. Because the school was previously all-male, there was more mention of the females at the school rather than the females in engineering.

In terms of obstacles during college, Rebecca mentioned that there was a lot of time spent creating female organizations on campus. During her Freshmen year, she and some other girls joined the male tennis team because there was no female team. Fortunately, the situation was rectified during her Sophomore year when a female tennis team was initiated.

In the workforce, Rebecca believes that there were and are many opportunities for advancement. She admits that it is tough to gauge whether she received the same respect as her male counterparts. Her personal work ethic required her to put forth extra effort to gain respect, though she may have also been criticized for that additional time spent in some areas. She believes that one needs to realize her own accomplishments and be one's own cheerleader to gain the respect of others.

She encourages other females to pursue engineering in college as it is a versatile degree. She recommends that they take advanced math and science classes in middle and high school and also that they become involved in groups and activities that expose youth to engineering. She also advises that students really learn the material as they will build on all of the basic concepts during their lifetime rather than just learning enough to pass the tests.

In the past, Rebecca acted as a mentor for summer interns at Allison Transmission. She also led workshops at a career conference entitled 'Curiosity, Confidence, Challenge!' at a local school to promote math, science, and technology for 6th, 7th, &



**Rebecca Schenk** 

8th grade females. She has also participated in the Women & Hi Tech organization which is focused on promoting equal inclusion in STEM professions by providing a support system and networking opportunities for female professionals and girls seeking out STEM careers.

Thank you, Rebecca, for sharing your story and Allison Transmission, Inc., for your support of females in engineering.

Spotlight story written by Melissa A. Femia, President of Jana Diversity Solutions (J-Di). J-Di is a female-owned small business that manufactures wire barnesses and supplies warehousing & logistics as well as engineering services. If you would like to be spotlighted in a future edition of WHN or if you would like to recommend someone to be highlighted for the benefit of advancing females in engineering, please send the contact information to melissa.femia@janadiversity.com. Inspiring individuals working in or around the wire harness industry are encouraged to participate, but the requirement is that the female must possess an undergraduate degree in an engineering discipline since the premise of the series is to encourage females to pursue and persist in engineering along with work in a wire-barness related industry.



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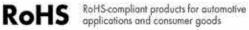
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# When in Need, Make It Yourself!

Continued from page 15 \_

tory count. That makes Gary very happy.

#### Automatic Taping Tool -H & L Manufacturing

Leader: Russ Richardson, President Innovators: Mark Dornbus

and Andy Knaut, Engineering

The Problem: As Mark pointed out, most of H & L's harnesses are wrapped in some kind of tape. With a part that is three inches long, the application process is not such a big deal. When, however, the part is longer, two problems are created. First, the operator

has to roll the tape manually, hand over hand, all the way down the part. This same action, all day long, can cause a repetitive motion injury for the operator.

Second, the whole process is incredibly monotonous, so it's easy for mistakes to go unnoticed. There is little control of the amount of tape being used due to varying amounts of overlap in the hand operation.

The team experimented with some semi-automated tape dispensers, and even used several on the production floor. They put them to use on a part that was running at 11,000 per



Automatic Taping Tool finished product

week, and within 30 days, the bearings fell apart. They had to come up with a fix.

The Solution: Mark discovered an old prototype taping concept laying around in the back from days gone by. It looked like a concept that wasn't quite taken to fruition. Mark tweaked the concept considerably, and his new design was on the on the shop floor making parts within three weeks. There were limitations to the first design in that the operator had to hold the part as they were traversing it with the tape. With subsequent designs, the operator simply loads the part into a fixture, feeds the tape, hits a button and the machine does the entire process by itself.

It was a tricky process to say the least. There are tension differences with differing materials. Also, the tape pulls much easier at the beginning of the roll than it does towards the smallest portion of the roll. Accounting for the tension and angle differences took quite a bit of trial and error.

The initial tool was built to do a specific part.A second design can be altered within 20 minutes to run three parts. The team is now on their third iteration of the tool and described the latest version as a "tank". It



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can be modified to to run anything from two inches long up to three feet just by changing out some of the tooling and resetting the limit switches. They also added safety stops and guarding to make the tool even safer.

Not only does the new tool produce a consistent product that their customers love, there is also a substantial labor savings. What used to take a group of eight operators, now takes three. That freed up five additional people to work on other much needed tasks, so no employees were displaced through automation.

Since the team and I started talking about this tool, they decided to explore the possibility of seeking patent protection on the design. So for now, pictures were not possible. They were able to give me some great pictures of the finished product, and I'll keep you posted on how things progress.

#### Universal Applicator with Changeable Dies -SureTech Assembly *Leader*: Jack Hayes *Innovator:* Wes Garner, Director of Sales and Marketing

*The Problem*: SureTech Assembly is a typical contract manufacturer of wire and cable assemblies with about 60 employees. They fight the common fight of competitiveness and profitability. One of their greatest expenses is in applicator tooling. Every single terminal requires its own applicator and at \$1500 to \$4000 per applicator, the company has well over \$100,000 worth of tooling sitting on the shelf at any given time. As Wes put it, 90% of their applicators are on coffee break 100% of the time. Also, mechanical applicators have a lot of moving parts that need lubrication and maintenance.

*The Solution*: Wes and his team set out to analyze their applicators to see if there was a radically different way to reduce the cost and improve performance. They identified the feeding mechanism as their main bone of contention. Because the mechanism is tied to the movement of the ram, it became the obstacle for innovation.

That's when they made the profound discovery dealing with the carrier strip. The applicator chops the strip during normal operation. But they experimented with leaving the carrier strip in place, and found it becomes the perfect component to draw the next terminal into position. As Wes likes to say, what everyone else throws away they put to work with their design.

Once they zeroed in on using the carrier strip in this fashion, they introduced stepper motors and electronics to drive the tool. Wes said their new design makes for a dramatically different applicator that does two things. First, they no longer need an entire applicator body including the ram and all of the housing. Their new applicator accommodates relatively inexpensive tool packs or dies (\$100s, not \$1000s) for the individual terminals. These tool packs slide in and out in a matter of seconds.

The other thing they like about their design is that the tool is now

Continued on page 27



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# When in Need, Make It Yourself!

Continued from page 25 \_

controlled by stepper motors and electronics, giving them a much greater level of control. They like the fact that they can control the operation electronically instead of using set screws and hand tools. The team designed and built everything inhouse and even wrote the software that runs it. They are on the shop floor and run every day.

There is one thing that sets SureTech's tool apart from the others. Convinced that the way they utilize the carrier strip was truly unique, SureTech sought for, and obtained a patent on the design. They were able to use their financial resources to bring the tool to first production run levels for use on their shop floor, but that's about as far as they wish

to take it. They are actually looking to sell or license the technology to a qualified tool maker or manufacturer. Wes indicated that it's a turn-key concept that could be turned into a product line very quickly. They have even given it a name - the Crimptronix Accudrive. Along those lines, you may contact Wes directly at wes.garner@suretechassembly.com. Follow this case-sensitive link to see a great video of the tool in action: http://bit. ly/2UeiGgR.

I thoroughly enjoyed seeing these concepts in action and bringing them to you in this article. If you have an in-house design you have used to improve productivity, and you would like to share it with the readers, contact me at joe@wiringharnessnews. com. When I get a group of them, I'll create another article.



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- KENCO 3T Presses, 1.5", 1.25", 1.125" Strokes
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- 1 LEIBINIGER Inkjet2 Ink Jet Printer, 2001
- LOCTITE Model 10-50 Posi-Link Volumetric Dual Cartridge Dispensing System
- LOEPFE Thermal Transfer Printer, Model TTP4000 (Schleuniger TTP4000)
- 1 METRONIC Alpha Jet C Inkjet Printer, 2006/07
- 1 NEW ENGLAND BUTT 32-Carrier Harness Braider
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- NEWBURY 100T 5oz Injection Molder, Model H5-100RS 1 inear TaperS 2016 RAMATECH Prefeed, Model ABW 800/300, 2005
   SCHAEFER EPS2001 Eccentric Press - SCHLEUNIGER CC64 CrimpCenter, 2007, w/PF2200 Prefeed, InkJet Printer 1 - SCHLEUNIGER CC2000 Cable Coiler, 2006 1 - SCHLEUNIGER CC1400 Cable coiler, 2012 1 - SCHLEUNIGER CP1250 Coiler Pans, 2000 1 - SCHLEUNIGER CP1500 Heavy Duty Coiler 1 - SCHLEUNIGER CS9050, CS9100 Cut/Strip Machine w/PF2000 Prefeed SCHLEUNIGER ES9300 Ecostrip, 1998
   SCHLEUNIGER MP 8015 Coax Wire Stripper 1 - SCHLEUNIGER MS9600 MegaStrip 1 - SCHLEUNIGER OS9400 OmniStrip 3 - SCHLEUNIGER PF2200, PF2000 Prefeeds 1 - SCHLEUNIGER PS9500 PowerStripper, 2000 4 - SCHLEUNIGER WS1000 Wire Stackers 2 - SCHLEUNIGER Uni-A Applicators 1 - SONOBOND Model WS2026 Ultrasonic Welder, 2015 1 - SPECTRUM 'Sienna 210S' Radial & Axis Laser Wire Stripper (modified to Model 210D) - TRI-STAR TECHNOLOGY Table Top Laser Marker, M100L FG-TT 1 - Harness Board Frame

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WHMA UPDATE

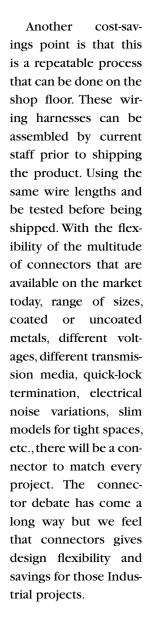
#### By Christine Siebert

s many Wire and Cable Harness Manufacturers know, no matter which market segment you are currently in, each company faces many of the same challenges. They need to provide their customers and OEM's high-quality, low-cost wire harnesses to meet today's demand while also maximizing efficiency. This a very tall order in an industry that has incredibly low margins. To be able to meet these demands, it becomes crucial for their Suppliers to deliver high-quality products that are not only affordable but contain cuttingedge, innovative solutions to increase productivity, quality, and functionality. In this edition of Wired In, we will discuss three areas to take into consideration when building your next wire harness.

1.Connectors vs. Hard-<br/>wiring - This is an ongoing<br/>debate when designing in-

dustrial machines but there are many advantages to using connectors over hardwiring in these machines. Connectors have come a long way and can be designed with many different options and are easily configurable. They can resist vibrations and extreme temperatures, withstand harsh weather, prevent ingress, etc. Using connectors gives the machines added flexibility to be pre-built and modular with a plug and play approach which makes it more appeal-

> ing from a price point. It also eliminates the risk of wiring errors on site by the local electrician.



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There are many challenges to crimping wires for your harnesses and if you have the right frame of reference when choosing your tools, they can lead to cost savings for your company.

So, how do you choose the right tools? This is not a one answer fits all question but some areas to review are volume, wire gauge and crimp profile. First, determine what is the volume of your operation. Are you high-volume? Then you most likely, will

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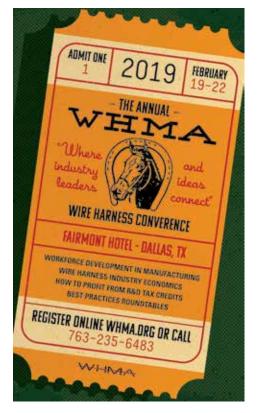
need automatic tooling such as a crimping press. Does your company handle lower-volume crimping? Then you will have simpler needs such as hand crimping tools. Also, top factors are wire gauge and terminal profile. Each tool will be specific with a data sheet according to the American Wire Gauge (AWG) and recommended terminal crimp size. Knowing the answers to these questions will assist you in choosing the right crimping tools for your organization and help choose the right supplier.

3. Harness Design Software - When designing your harnesses, there are many areas to think about such as wire length, bending, radius and routing. Wiring harnesses have become more complex and there has become more of a need to be custom made. The engineers designing these harnesses need to reduce design time while improving their designs and reducing costs and turnaround time. It's very easy to make mistakes ranging from mismatching wire capabilities such as bend radius, length calculations, wiring data, and bundle sizes, to name a few.

With today's Harness Design Software, automation has been able to solve many of these issues for engineers by rapidly creating drawings, calculations, automate documentation and even able to quote. By automating your designs, you can meet the challenges of the industry and stay ahead of the market while keeping your costs low.

There are many challenges in the Wire Harness Industry and many suppliers to choose from and WHMA has partnered with the best in the Industry! If you have questions, please join us in Dallas, TX at our upcoming 2019 WHMA Annual Wire Harness Conference on February 19th-22nd and you'll meet many of these Suppliers! Many of them will be showcasing their automation wire processing technology products for you to see, in person, so be sure to register today at http://annualconference.whma. org/.

If you can't make the conference, visit our website at https://whma. org/members/supplier-profiles/ to find the right WHMA Supplier Member that can be your partner with our market's ever-changing challenges.







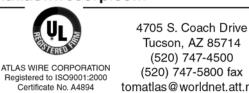
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# **Update from Reshoring Initiative**

he efforts of the Reshoring Initiative are of particular interest to the wire harness industry. Our industry presents some comparatively low lying fruit for the reshoring efforts of US manufacturing. The Reshoring Initiative is a nonprofit organization dedicated to bringing manufacturing jobs back to the United States by helping companies assess the total cost of offshoring. Their goal is to shift the collective thinking of 'offshoring is cheaper' to 'local reduces the total cost of ownership.' Harry Moser, the organization's Founder and

President, recently spoke with WHN to update his efforts.

Harry started by pointing out some facts that make our trade deficit particularly menacing.

*Harry*: Typically, when a country has a trade deficit like we have, their currency gradually declines. They get more competitive, and pretty soon the trade deficit goes away. But that has not happened for the US because we are also the reserve currency, which holds up the dollar. So, we are a great place to be a bank, but a horrible place to be a manufacturing company.

Another way of looking at this is our self-sufficiency, or the percentage of goods we make versus those we import. We currently produce less than 50% of what we consume. So, if there's ever a crisis; if there is ever the inability to import, if our dollar does collapse and things from offshore get crazy expensive; we don't have the ability to produce even 50% of what we consume. It's just not a long-term viable solution.

*WHN*: Aside from the obvious, what are the advantages of balancing the trade deficit?

*Harry*: The benefits of balancing the trade deficit are huge. I've seen studies that the budget deficit would be cut in half if we eliminate the trade

> deficit. We would also restore the middleclass. Everybody complains about income inequality, which is largely due to the loss of manufacturing jobs. Balanced trade would bring back the small to medium size corporation - the family owned job shops that should be the core of our manufacturing but have been weakened so much.

We would also reduce global pollution. When you make things in China, the electricity is dirty, the factories pollute more and then you have to drag this stuff half way across the world.

What we would see is a virtuous cycle where, as we reshore, companies increase their capital utilization. As that happens, they have the money and need to invest, and when they invest their productivity goes up. When that happens, they become more competitive and





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are therefore able to reshore more. So, by starting that cycle and continuing that cycle, the US will win or, at least, stop losing. (Figure 1).

A lot of pundits will say, "forget all this, few jobs can be brought back." In 2017, reshoring plus FDI (foreign direct investment) brought back 171,000 manufacturing jobs.

*WHN*: Wouldn't the necessary increase in automation wipe out any increase in jobs?

*Harry*: No. We can have both productivity

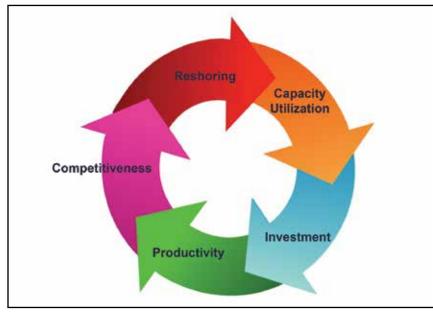


Figure 1: Reshoring/Productivity Cycle

and growth in manufacturing jobs. You don't have to choose between those two. Often, I read that robots are going to take all of our jobs and that we should tax them. Bill Gates says that. They reason that everybody will be sitting around with nothing to do, so we need money to give to them. In reality, we will lose more jobs to Chinese automation if we do not automate, then we will lose to US automation if we do automate. So, it's essential to automate. We will be better off, with more jobs.

WHN: It sounds like a herculean effort. How can the US do it?

*Harry*: The reality is that the US is on a tilted playing field proven by our year after year roughly seven hundred-billion-dollar goods trade deficit. The Reshoring Initiative did a recent research project with Plante Moran, one of the largest consulting and auditing firms in the country. It turns out you only have to bring back about 20-25% of what's being produced offshore to completely balance the trade deficit! This is where the Reshoring Initiative comes in. We can help bring jobs back today and level the playing field for tomorrow.

To do this, we have the TCO Estimator Tool (see full description at the end of this article). It's free online for harness producers to use, and it's available on our website (reshorenow.org). If you're in purchasing, you

can use it when buying. If you're in sales, you can use it for selling. If you work in a job shop, you can use the TCO Estimator for selling against imports by helping your customer understand the math.And assuming Chinese wages continue to go up at the rate they have, within two or three years, the total cost of bringing goods in from China will be even higher.

A gleaming example of where we did this is a with a company called Morey Corporation in Woodridge IL. They are supplying printed circuit boards (PCBs) for heavy equipment [OEM's]. They came to me about a year and a half ago as they were about to lose an order from their best US customer to China over piece price. The CEO and I did the TCO analysis. He took it to his customer and showed them that even though Morey's price was higher, the total cost of ownership was lower. The company reports this was key to saving a \$60M dollar order by helping the customer see the math correctly. We are here to help you do that.

The Reshoring Initiative has also developed a program to help facilitate reshoring, and it's called The Import Substitution Program. Let's say you're making harnesses, and you're losing orders to imports. We can tell you which companies (importers) are bringing in the largest quantities of the kind of harnesses you make.

Continued on page 38



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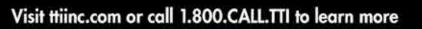
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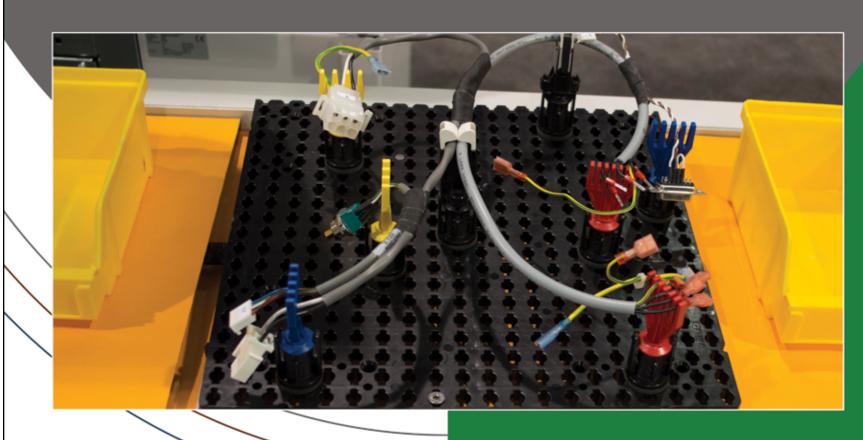
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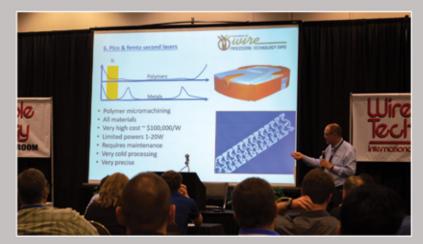
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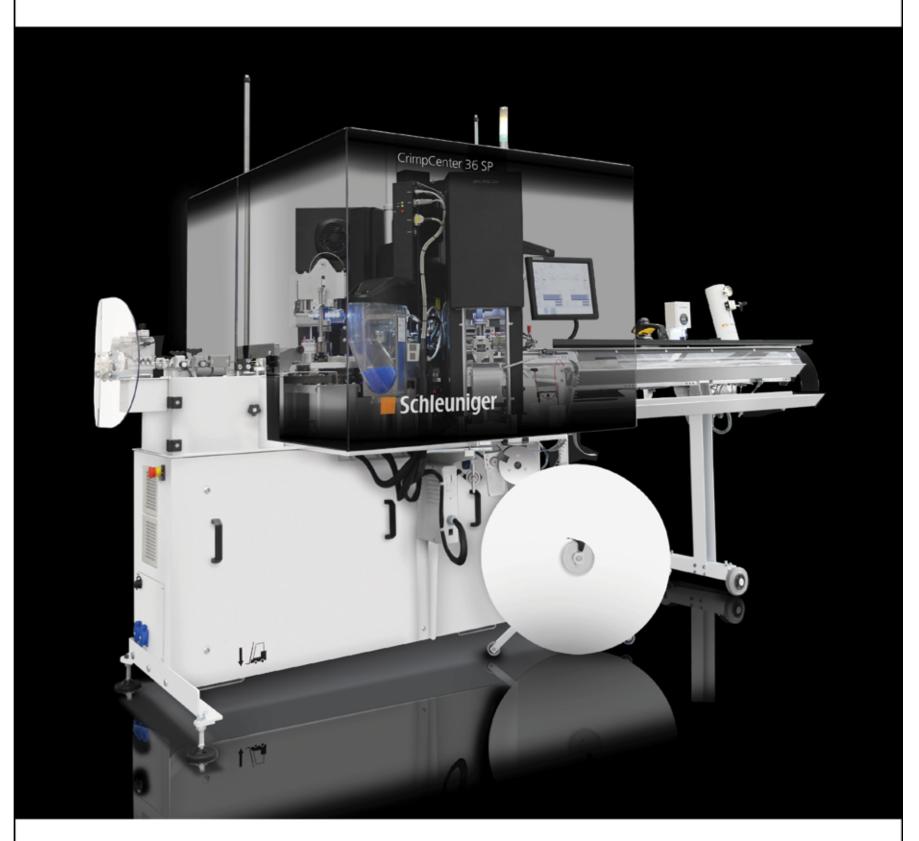
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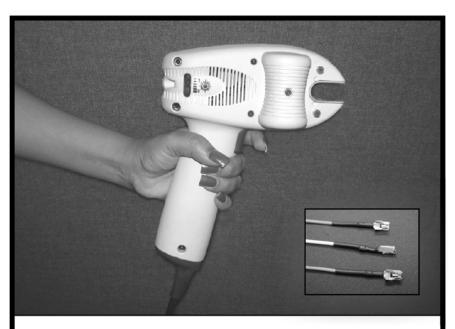
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\*polyolefin, 5" length

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Focus-Lite<sup>™</sup> technology uses radiant energy to shrink heat-shrink tubing in a fraction of the time of traditional methods.

Here's why it works: Dual Quartz Halogen bulbs are focused to direct all of the usable radiant energy to the cable/wire diameter covered by shrink tube. This allows for 10 times the average energy expended by the bulbs to be delivered to

the target zone. What you will see is an amazing difference in shrink time!

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

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#### **Update from Reshoring Initiative**

#### Continued from page 31

We can tell you how much they are bringing in and the approximate unit price, and then train you to go after this business. You can pick the ones that you can make for maybe 10-15% above the offshore price, then use the TCO tool to show them they are better off buying from you. Once again, we are here to help you do that.

WHN: What else can we as an industry do to help in the reshoring effort?

Harry: Support a policy tide that lifts all US industries. One that gets the US price competitive with offshore. Right now, Trump's tariffs have helped the steel and aluminum industries, but its hurt the people who use steel and aluminum. So, its arguable whether its helped the country at all. We want a policy that uniformly lifts all industries - the steel industry and steel users, for example. We have put together and sent to the administration the Competitiveness Tool Kit. We have identified a series of policies, for example, getting our skilled workforce to be as good as those in Germany and Switzerland.We believe that alone is worth about 5% on price advantage.

Next, get the corporate tax rate down to 15%. We are already about 2/3 of the way there from the previous 35%. Also, we need to have a value-added tax (VAT). The rest of the world has a VAT and we don't. When we ship our product to them, they put a 15% tax on us. When they ship their product to us, they get a 15% credit. We are thus fighting with our arms behind our back. We also need to get the dollar down by 20%.

If you put all those things together, it would reduce our pricing by about 50%, but we don't even need to come down by 50%. If we wanted to cut the goods deficit by 60% for example, which would be about 3 million manufacturing jobs, we would only need to reduce our price by about 5% to 20%, depending on the product. Within that range, using the TCO model, we can easily show we are a more profitable manufacturing option.

#### The Total Cost of Ownership (TCO) Estimator

Most companies make sourcing decisions based solely on price, oftentimes resulting in a 20 to 30 percent miscalculation of actual offshoring costs.TheTotal Cost of Ownership Estimator® (TCO) is a free online tool that helps companies account for all relevant factors - overhead, balance sheet, risks, corporate strategy and other external and internal business considerations - to determine the true total cost of ownership. Using this information, companies can better evaluate sourcing, identify alternatives and even make a case when selling against offshore competitors.

FT-802

0

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- Enhanced heat resistance on ergonomic
- handpiece
- FT-8004 provides better alignment accuracy
- FT-8002/FT-8003/FT-8004 are cross-compatible with FT-801/FT-802
- Compact for workbench



## **Optimizing the Supply Chain**

Continued from page 1

with a minimum of \$26.22 and a maximum of \$508.70 per shipment. The Harbor Maintenance Fee (HMF) is paid for imports through US ports and harbors in the US. The HMF is based on the value of the shipment (0.125%).

The fees that aren't paid much attention to are those fees that fall into the category of "just part of the cost of doing business". These are low duties, or a complex business model where the fees are not apparent. The hidden costs are those that are in the piece price of the raw material. There are great opportunities for companies to take a look at this area, as there are many benefits that can be gained.

#### **Hidden Costs**

Companies are encouraged to review the value stream of their raw material supply. What is the country of origin of the raw material being purchased for manufacturing? If it is a foreign country, then there is most likely a customs duty or tariff built into the piece price. Many manufacturers are buying product from a US supplier, but the product is really a foreign sourced component. Or, the supplier is a foreign based company with the manufacturer taking possession in the United States. The manufacturer is not involved in clearing the raw material through customs or paying the associated fees and duties. However, they really are paying the fees and duties, as these costs are built into the piece price.

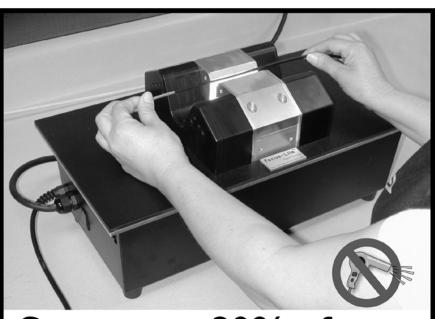
#### Proliferation of foreign content

In the decades preceding the 1980's most manufacturing companies made their own parts from start to finish. They were vertically integrated and employed many different types of industry in their plants. Starting in the 1990's, there were two changes that started to happen.

We started to see modularization of subassemblies and a proliferation of purchased parts. In order to push labor from high cost factories, the finished products were designed to become more modular in their assembly. Suppliers would build the module and ship it to the final assembly factory where these modules were built into the final product. This moved labor from the high dollar factories into the suppliers where the labor and overhead costs were lower.

The second change is many manufacturers started looking at their core competencies and determining they could lower their total cost. They moved some of the vertical integration production to companies that specialized in the specific manufac-

Continued on page 40



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Focus-Lite  ${}^{\rm \scriptscriptstyle M}$  technology uses radiant energy to shrink heat-shrink tubing in a fraction of the time of traditional methods.

**Here's why it works:** Dual Quartz Halogen bulbs are focused to direct all of the usable radiant energy to the cable/wire diameter covered by shrink tube. This allows for 10 times the average energy expended by the bulbs to be delivered to the target zone. What you will see is an amazing difference in shrink time!

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

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### **Optimizing the Supply Chain**

Continued from page 39 \_

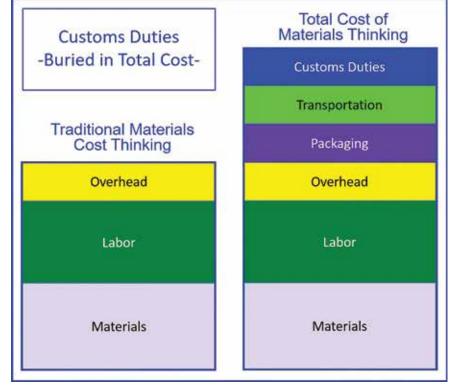
turing and produce. This moved the expertise required and the associated engineering, research and design to companies that were the experts. This helped to create lower total cost for many of the raw materials and components. This started the increase in purchased components in the supply chains.

Another change that started to occur in the 1990's is the customer base for many suppliers started to become foreign based. This became more prevalent in the 2000's, where many diverse and foreign customers started requiring their own customer specified components. Suppliers from Asian and Europe entered the supply chain as their materials were required by the Tier 1 customer in the final assemblies. These started the increase in global suppliers in Value streams the supply chain. changed from getting a component from across the aisle, or across town, to getting a component from across the continent or across the ocean.

Over this timeframe, some companies grew from 5% purchased components to over 50% purchased components. With the growth of European and Asian car manufacturers bringing the car plants to the US, the growth of foreign purchased components grew exponentially.

#### Total Cost and Hidden Cost

Let's break down the piece price of raw material. The obvious costs are the material and labor. These are the costs that most of us think about when we look at what makes up a piece-price. Buried in the piece price are many more cost items included in the piece price. These are the expendable packaging or returnable containers used to ship the part from the supplier to the manufacturing customer. The transportation and logistics costs are included in the piece price. The logistics includes all the activities used to get the part to the customer; shipping companies, warehousing, distribution, brokers, and clerical. There is also an overhead cost built into the piece price. This includes cost running



the factory that makes the raw material, and includes a host of administrative services that are performed to make the part, sell the part, ship the part, and deliver the part. Many of these specific costs in the piece price cannot be changed, as they really are costs of doing business with the supplier. However, there is one item that can be easily overlooked. This is the customs duties and tariffs included in the piece price.

#### **Supply Chain Review**

Many companies have raw material shipped to their warehouses and distribution centers in the US. Some of these suppliers have US addresses and some of these suppliers are shipping directly from a foreign country. Many of these components ship to a US address where the customs

#### **APPLICATORS / CRIMPING PRESSES / TOOLING**



duties are paid at the port of entry (ie. Long Beach, CA), making these products domestic material with a foreign country of origin. These customs duties are paid either by the supplier or by the customer, depending on the INCO terms. These products are then warehoused or crossdocked for shipment to Mexico (or other foreign destinations). If the customer is paying these customs duties, then it is easy to identify this cost and create a method to eliminate or reduce this cost. If the supplier is paying these customs duties, then this cost is buried into the piece price. The method to eliminate or reduce this cost still exists, but requires a little more effort to attain this savings. There are hundreds of thousands of dollars being paid for customs duties that are included in the piece price of the product. This hidden cost can be a real game changer for many companies who make the effort to reduce or eliminate this from their supply chain. When a foreign product is entered into the US commerce, someone pays the customs duty and tariff. If the supplier clears the product at the port of entry and pays the duty,



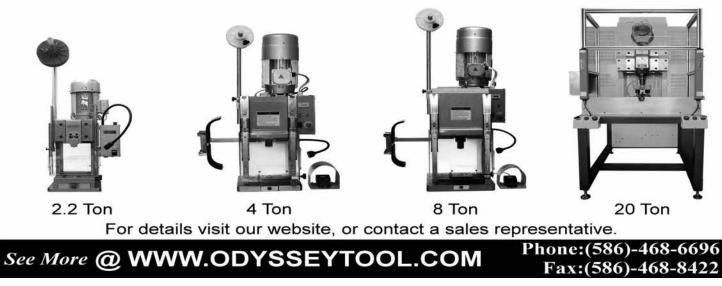
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#### **ODYSSEY CRIMPING PRESSES**



it is passed on to the customer in the piece price. By knowing the country of origin and the HTS number (Harmonized Tariff Schedule), a company can determine how many dollars they are paying per year in these hidden customs costs. If the customer is paying the customs duties directly, then capturing this cost is easier. Most companies will find that they have both these cost situations in existence. By collecting and reviewing these costs, the feasibility of eliminating and reducing this cost is essential. If this total cost is a substantial number, then the FTZ (Foreign Trade Zone) program should be considered as a feasible option.

The manufacturing company can set up the FTZ program in their facility to receive these foreign products directly from the port of entry duty free. This is easiest to accomplish when the customer is paying the customs duties directly. This change can also happen for suppliers that ship parts into the US and the customs duty cost is included in the piece price. These both change the value stream and cause changes in the supply chain. In the first instance, where the customer is paying the customs duty, the savings is immediate. In the second instance where the supplier is paying the customs duty, a negotiation with the supplier is in order. A price reduction for the product to remove the customs duty is a great benefit for the manufacturing plant. As an incentive. this savings could be shared with both the supplier and the customer.

FTZ Costs and Benefits and direct these savings to the bottom line profits. There are companies that have excellent finance and tax staffs who can perform these types of analysis. There are also FTZ and Supply Chain consultants that specialize in identifying what and where the numbers are to build the business case. Many of these consultants offer the initial review for no cost. In addition to saving the customs duties and tariff fees, there are MPF and brokerage fees that can be reduced that only a Foreign Trade Zone program can offer.

Now is the time for companies to make this review.

David Panko is the FTZ Manager for Foreign Trade Zone 68 for the City of El Paso. He is the Grantee representative and liaison with many federal agencies that have a regulatory role with El Paso's Foreign-Trade Zone. He works with industry and organization leaders in El Paso and Juarez to develop and utilize the Foreign Trade Zone program, creating significant cost savings to their manufacturing operations and supply chains.

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There are costs involved in setting up and running the FTZ program. The benefits of the Customs duties and tariffs can be substantial and make the FTZ program very appealing and essential for a company's success and growth. Each company should review their value streams and supply chains to determine which benefits are realizable through reducing customs duties and tariffs. Identifying the hidden costs and building the business case can save many dollars



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## **Cesar-Scott**

The size of this facility has enabled the company to fulfill another one of Gustavo's visions, and that is the establishment of a Foreign Trade Zone (FTZ). FTZ's are secure areas under U.S. Customs and Border Protection and are usually located at or near ports of entry. They act as a stop off point for goods that can be stored or processed without being subject to import duties. This process is planned to be complete by the end of April 2019. "We will now be able to eliminate, reduce or defer customs duties on products that come into the United States that may not be staying in the United States," he advised. He gave an example describing a metal terminal coming into the US where duties would normally apply. Because they come into the FTZ, no duties apply. The product is then shipped to their

#### Continued from page 1

Mexico facility and is transformed into a wire harness. When it comes back into the US under a different classification, the duties on the individual components are eliminated or deferred, if the overall product qualifies for zero or reduced duties under the proposed new USMCA rules.

They also plan to use the FTZ as a revenue stream by providing consignment services to other companies. One such arrangement that will begin when the US Customs approvals are obtained, is with a company building instrumentation clusters for the truck market in neighboring Cd. Juarez. Currently, this company takes large deliveries of Chinese made LCD displays and modules in the El Paso/ Cesar-Scott warehouse facility. Under

Continued on page 45



Harness assembly at the Cesar-Scott Juárez facility.

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## **Cesar-Scott**

the new tariff rules, they would pay duty on the entire shipment as it hits US soil.At this time, they have to ship them to their Mexico facility for integration into the final product. The new arrangement will allow them to ship LCD displays and modules to Cesar-Scott's FTZ and transfer them into Mexico only as needed. The duty will only be paid when the completed clusters come back into the US.As Gustavo described, this is a way for companies to legally eliminate or defer customs tariffs. it also minimizes inventory carrying costs and additional space requirements.

Cesar-Scott has also been busy developing their own product lines

outside their traditional contract manufacturing realm. "Since the contract manufacturing business is so competitive, we've developed some of our own electronic gas igniters (spark modules) and switch harness assemblies for gas stoves." He described the development of this saying, "We had a customer designing, manufacturing, marketing and selling these while we were building the wiring harness portion of their products. They decided to pull out of this business and said if we wanted to stay in this space, we would have to come up with our own designs to stand a chance of remaining in the game." Even though it's a small part of what they currently do in their Mexico facility, Gustavo feels it will change the overall business model for the company in years to come. "We have some competitors in Asia, so the tariffs have helped us, and by using the FTZ will help even

#### Continued from page 42

molding machines. "These are components and equipment we have been successful with in our own facility, and we know we have a very good chain of supply," he said.

One final effort that Gustavo wished to discuss was his personal involvement as the founder of the M-EXPO Wire Processing Technology trade event (www.mexpowire. com). M-EXPO showcases wire processing equipment technology and its suppliers to harness manufacturers in and around the State of Chihuahua and Northern Mexico. He began with some background and

\_\_\_ Continued on page 46



Gustavo Farell, President of Cesar-Scott at the remodled El Paso facility.



more. There are not too many products like ours coming directly in and out of Mexico."

Another relatively recent business unit under the Cesar-Scott umbrella is the creation of HST Cable Management Products. With HST, Cesar-Scott distributes cable management products such as heat shrink tubing, expandable sleeving, convoluted tubing, cable, ties, connectors, terminals, cutters, foam/gaskets/ die-cut material, tooling, hear shrink equipment, heat guns, and

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WWW.EICWIPERS.COM Tel: 619-303-7924 Fax: 619-303-7925 Same Day Shipping Ask for Chuck spoke about The Borderland Trade Show which was held in El Paso back in the 1990s. That show also showcased products for harness manufacturers, and drew attendees from around this same area. After 9/11, it

became difficult for engineers, operations and decision-making personnel from the Mexico "Maquiladora" plants to cross the border. The show eventually withered away.

Continued from page 45

Two years ago, Gustavo set



Shipments staged at El Paso facility

up an arrangement with a general manufacturing expo in Juárez called EXPO-MRO. He designated an area dedicated solely to wire processing technology equipment. Albeit small, the 2017 show was a good start as shows go, and a lot more interest was generated for M-EX-PO 2018. The 2018 show was a huge success, and M-EXPO 2019 plans will more than double the 2018 exhibit space.

Gustavo discussed the logistics of moving equipment and displays across borders for the show. "You're talking about a foreign country, and it's difficult to temporarily take equipment across the border, and then bring it back. My team and I will move the equipment back and forth from El Paso to Cd. Juarez through our Logistics arm - Everything Postal,

transparent to the exhibitor." There is a cost associated with this service, but it is available for the exhibitors who need it. A no cost shuttle service for participating exhibitors and attendees to/from El Paso-Cd. Juarez is available the week of the event from a designated central El Paso hotel. Gustavo finished by saying "Just make sure you bring your passport/visa or they may not let you back into the US. You may even experience the pleasure of walking across the Rio Grande to save some time!"

Gustavo is certainly a busy man with a hand in all of these activities, but there is definitely a central theme. "It all ties back to our experience and knowledge working on both sides of the border. We will continue to grow in the contract manufacturing of wire harnesses, which is our bread and butter, but we are expanding into these other products and services.

#### Wardwell Harness Braiding Machine



The Wardwell Harness Braider is the ideal machine for over braiding on harnesses. It works equally well with wire materials or with textile and synthetic threads. The improvements to this type of standard machine include: a motor driven capstan take-up for accurate coverage of the harness, a new tubular frame, a self lubricating horn gear, a new operator station and sound reduction, among many others.

#### Technical Features

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#### Siemens Acquires COMSA to Further Extend Lead in Automotive Electrical Systems design

Siemens announced it has acquired COMSA Computer und Software GmbH, a Munichbased company which develops software for electrical systems design and wire harness engineering. Its LDorado suite is the leader in automotive harness design and engineering software in Germany, reflecting deep local expertise and market presence with a well-

established product portfolio and strong emphasis on standards. The COMSA team and technology will join the Mentor business, part of Siemens PLM Software, where it will add key harness engineering and design data analytics capabilities to the Siemens product range.

"The acquisition of COMSA is part of Siemens' continued investment in technology for the automotive industry," said Tony Hemmelgarn, president and CEO of Siemens PLM Software. "The combination of Siemens and COMSA solutions and specialist staff is unrivaled in the industry. Together, we will take electrical systems and harness engineering to the new levels needed to meet the demands of electric and autonomous vehicle development, and provide deeply integrated technical capabilities that will benefit COMSA and Siemens customers worldwide."

Bishop and Associates estimate that in 2017 the worldwide revenue for the cable assembly market was \$155 billion with applans to extend worldwide the delivery of new technology offerings that address disruption in the automotive harness industry caused by megatrends such as autonomous driving and electric vehicles.

Siemens' Capital<sup>™</sup> software, part of the portfolio of recently acquired Mentor Graphics, extends from electrical/electronic architecture development through electrical systems design and service into wire harness design and manufacture. The addition of COMSA adds key harness engineering and design data analytics technologies, with strong support for new data standards emerging especially in Europe.

"With Siemens' acquisition of COMSA, we will be able to par-

ticipate and contribute to this growing market in ways and locations that we could not have reached alone. The strength of COMSA's LDorado software in wire harness engineering and analytics is a perfect complement to the Capital portfolio developed by Mentor, and we are excited to be a part of the forthcoming journey together," said Josef Biermeier, CEO of COMSA. "This combination is a win-win for both our companies, for our customers and the entire automotive industry."

"We have long admired the COMSA team and their products, and through this acquisition we are bringing together the complementary skills of two

Continued on page 48





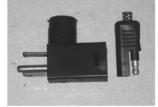
proximately 30% of the market from automotive. According to Cowen Research (Oct.19, 2018), "The wiring harness today is the third highest cost component in a car (behind the engine and chassis). Harnesses are built one at a time and can comprise about 50 percent of the cost of labor for the entire car. The wiring harness is also the third heaviest component (behind the chassis and engine). Any technology that reduces this weight directly contributes to fuel economy." Through this acquisition, Siemens

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#### **NEWS PLUGS** continued

Continued from page 47

of the strongest players in the industry for the benefit of our customers," said Martin O'Brien, senior vice president, Integrated Electrical Systems at Mentor, a Siemens business. "The combination of Capital and LDorado technology with Siemens expertise in adjacent design domains and factory automation will enable us to better assist our customers in transforming their operations' competitiveness and increase profitability." The transaction closed on Dec 3, 2018. The terms of the transaction were not disclosed.

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of software solutions to drive the digital transformation of industry, creating new opportunities for manufacturers to realize innovation. With headquarters in Plano, Texas, and over 140,000 customers worldwide, Siemens PLM Software works with companies of all sizes to transform the way ideas come to life, the way products are realized, and the way products and assets in operation are used and understood. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

#### Dynalab Test Systems Offers LED Guided Connector Pinning Solution

Dynalab Test Systems has developed a solution for LED guided connector pinning. This provides improved quality for wire harness manufacturers who employ a "push-click-pull" method of wire insertion.



NX Wire Harness Tester

The "push-click-pull" method requires the operator to select a wire from a parts bin and push

the wire into the proper connector cavity until it clicks into place. Then the operator is expected to pull or tug on the wire to ensure that the terminal is properly seated. A lot can go wrong:

• The operator may select the wire from the wrong parts bin resulting in the wrong color or gauge wire being assembled to the connector.

• The operator may terminate the wire in the wrong connector cavity resulting in an improperly wired assembly.

• The operator may neglect to pull on the wire to verify that it is properly seated resulting in intermittent connectivity.

To overcome these potential quality problems, Dynalab Test Systems offers NX Wire Harness Testers that support a guided assembly method for pinning connectors using LED illumination:

• The NX Wire Harness Tester illuminates an LED mounted on the parts bin so that the operator can clearly identify and select the proper wire. The NX Wire Harness Tester illuminates the target cavity so that the operator can clearly identify where the wire should be terminated. • The NX Wire Harness Tester verifies that the terminal is properly seated by monitoring a fixture block detection switch that is activated when the operator pulls on the wire with sufficient force. • The NX Wire Harness Tester performs testing to verify electrical continuity of the connection.





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Continued on page 50

## New DMC Tools for 2019!

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Multiple Grips Are Available

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## NEWS PLUGS continued

Continued from page 47

Dynalab Test Systems continues to strive for quality-improving technologies for the wire harness manufacturing industry. For more information about the LED Guided Connector Pinning Solution, or about other wire harness testing solutions, visit their website at www.dynalabtesters.com or contact Dynalab Test Systems directly via email: sales@dynalab-inc.com or by phone: +614-729-6550.

#### Heilind Electronics Now Offering Hirose CX Series USB Type-C Connectors

Heilind Electronics, a leading global distributor of electronic components and authorized distributor for Hirose, is now stocking the manufacturer's CX Series USB Type-C connectors. The next-generation CX Series conforms to USB Type-C (3.1 Gen 2) -- the new protocol for data connectivity in the consumer, industrial machinery and automobile markets.

Featuring quick charging and a 10 Gbps high-speed transmission, USB Type-C connectors can transfer data twice as fast as conventional USB 3.0 (5 Gbps) connectors. Furthermore, alternate modes enable the accommodation of video transmission standards such as MHL and DisplayPort.

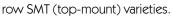


Hirose CX Series USB Type-C Connectors

Another key feature of the new connectors is simplified mating. The reversible form factor eliminates the possibility of backward insertion, while a clear tactile click prevents incomplete mating. The slim overmold design of the plugs further enhances usability.

RoHS-compliant and halogen-free, CX Series connectors are available in both hybrid (mid-mount) and double-

978-368-0131 / 800-316-8877



Visit Heilind's website at www.heilind.com for more information about Hirose CX Series USB Type-C connectors.

#### IEWC Announces Online Ordering on IEWC.com

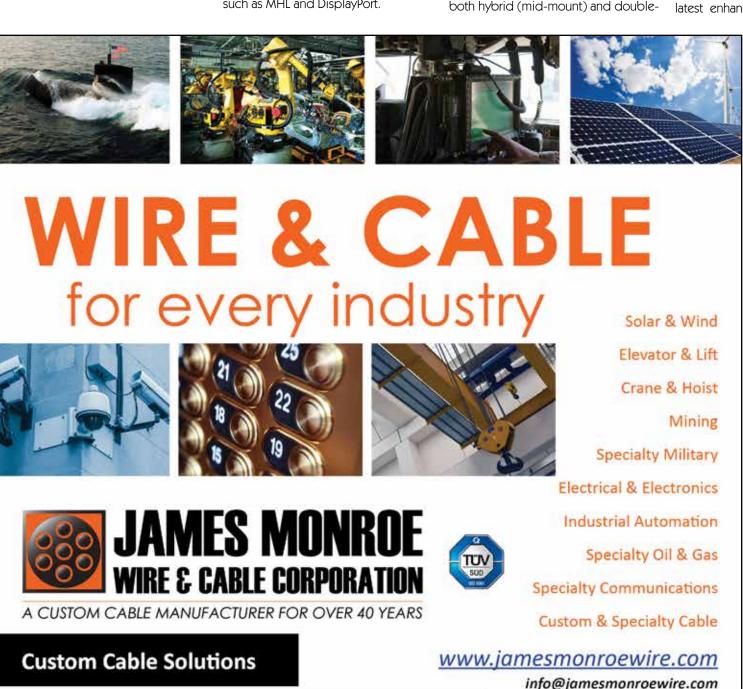
IEWC is excited to announce the launch of its online ordering platform on IEWC.com, providing 24/7, online ordering and other self-service tools to U.S.-based customers. This latest evolution of IEWC.com provides a robust digital experience for customers that bridges the divide between traditional and digital channels.

In 2017, IEWC unveiled a new IEWC. com featuring enhanced product data, an extensive online catalog, and improved product searchability. With this latest enhancement, site functionality

> now includes: online purchasing, access to customized pricing, product availability, order and transaction history, live chat, and more.

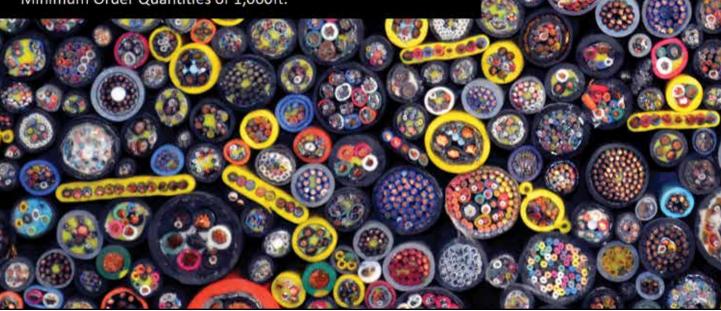
> "This launch of our e-commerce portal is part of our effort to be our customers' and suppliers' most entrusted partner, accelerating and simplifying their business by deploying leading technologies," says Joe Crum, Chief Technology Officer at IEWC. "We look forward to providing a superior online experience for our customers in the United States, and we'll continue to innovate to support their needs and expectations."

> IEWC.com e-commerce features include a customized account dashboard that centralizes key information, providing ease-of-use, 24/7 convenience, as well as customer-specific pricing and part numbers. This means registered users will be able to re-order products from IEWC using their own part numbers. Additionally, the site is responsive and built for use with mobile devices, allowing customers to easily access the website from anywhere at any time. "We are pleased to provide our US customers with a world-class online platform that provides customized account information to best meet their business needs," said David Burleton, IEWC Vice President of Marketing. "IEWC.com streamlines the ordering process and provides additional resources that empowers our customers to conveniently access their account history with us anytime, anywhere."



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### **M-EXPO Wire Processing Event is Big Success in Mexico**

Right over the Southern US border in Juárez, Mexico, in the State of Chihuahua, aka "the Wiring Harness Capital of the World!", THE 2nd Annual M-EXPO's Wire Processing Technology's Event was being held and was a huge SUC-CESS! If you want to do business in Mexico "Maquiladora" region, this is the event to showcase your latest wire and cable processing equipment, tools, materials and technologies.

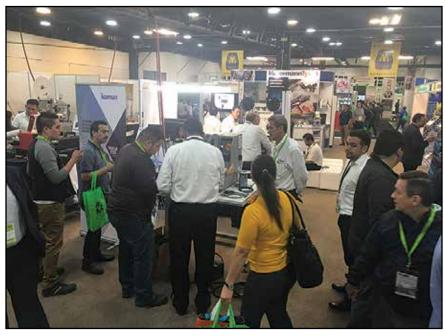
The M-EXPO 2018 was co-located with the EXPO-MRO at the Cuatro Siglos Convention Center on October 10-12, 2018. This three-day event was high energy, booths were buzzing with conversations and connections were being made. In addition to a packed exhibit hall, M-EXPO highlighted four speakers to discuss topics that were relevant to the Wire Harness Industry. Dr. Tom Fullerton, Professor of Economics at the University of Texas at El Paso, "Border Prospects for 2019: An economic regional outlook for the border manufacturing industries"

Winn Wise, President Southwire's of OEM and Industrial businesses, "Emerging Trends in the Wire and Cable Industry"

David Panko, FTZ Manager, "Legally Avoiding Tariffs and Customs Duties"

Constantino González, Chairman - IPC Acceptability Standards Committee & IPC Chairman - IPC-A-610 Committee, "Eliminate Supply Chain Confusion"

By the expressed interest from this year's participating M-EXPO's exhibitors, there is already an agreement in place to more than double the 2019 event space to accommodate approximately 50 exhibitors. (Some of the exhibitors who participated in



M-Expo 2018 Attendees

M-EXPO 2018 were Artos, BiTech, Cami, Cirris, Dunbar, HellermannTyton, HST, Identco, Immsa, Komax, Lakes Precision, Lone Star Industrial,

Mechtrix, Newark, Panduit, Schaefer Megomat USA, Schleuniger, Stapla, WHMA and *Wiring Harness News*.) If all goes as plans, M-EXPO will

gain enough momentum and support



#### We'll prove it with *free sample welds*.

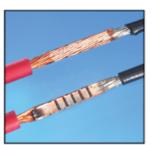
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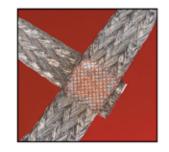
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to exist on its own without co-locating with EXPO-MRO for 2020. The M-EXPO team is setting the stage for an independent M-EXPO event to take place September 2020 at the Cuatro Siglos Convention Center in Cd. Juárez. Speaking with the M-EXPO team they stated, "We're trying to make sure the M-EXPO doesn't compete with other related industry activities and September seems to be a good month. If the M-EXPO is in September and with the Milwaukee show (EWPT Expo) in May, that seems to be a good time period between the two." They stressed that the M-EXPO is not trying to compete with EWPT, rather it seeks to



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#### **Enhancing Fire Safety with an Advanced Zero-Halogen Polymer Composition for Heat-shrink Tubing**

By Sreeni Kurup **Principal Polymer Engineer TE Connectivity, Swindon, UK** 

The development of an improved high-temperature, halogen-free polymer composition for wire and cable harness sleeving is critical for fire safety

Halogenated polymers have traditionally been used to make heatshrink tubing that provides electrical and physical protection for wiring and cable harnesses. However, these polymeric materials are inadequate to meet fire safety requirements specifying "limited fire hazard" or for complying with environmental directives banning or limiting the use of halogen compounds that could produce toxic smoke if combustion occurs. Consequently, today's major electronic and electrical product manufacturers desire halogen-free materials for cable jackets and tubing.

TE Connectivity (TE) has developed an advanced zero-halogen polymer technology for halogen-free heat-shrink tubing products that address weight, electrical, and fire-safety concerns. Branded as INSTALITE ZH-150, this advanced cross-linked polymer composition offers a hightemperature rating, fluid resistance, and mechanical performance similar to our market-leading DR-25 elastomer products, but with improved

fire-safety characteristics. As a result, halogen-free ZH-150 products provide a compliant, high-performance alternative to using halogenated and non-halogenated flame retardants employed in conventional cable jackets and tubing materials.

There are two types of fire retardants used in tubing materials, both of which have different characteristics.

Polymeric materials are used extensively in everyday life due to their outstanding combination of physical properties and their ability to be processed into a wide variety of forms. However, most polymeric materials are composed of flammable organic material. This is unacceptable for many applications that require a flame-retarded product.

Traditionally, polymer flame retardancy is achieved by two principal methods.

a) Using Halogenated Flame Retar-<u>dants</u>

Bromine-based compounds are commonly used as flame retardant because they are very efficient. Brominated materials actively interfere with reactions in the gaseous phase of a fire via two processes:

Continued on page 54



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#### **Enhancing Fire Safety with an** Advanced Zero-Halogen Polymer **Composition for Heat-shrink Tubing**

Continued from page 53

• They chemically interfere and inhibit the exothermic oxidation reaction in the flame, which reduces energy generation that would feed the fire.

• They produce heavy brominecontaining gases that protect the polymer surface and hinder the flow of oxygen to the fire, thereby starving the fire.

The high efficiency of brominated flame retardants means that only a small amount of additive is needed to produce acceptable flame retardancy. As a result, the material can be flame retarded, but still maintain suitable physical characteristics with little reduction in mechanical performance and fluid resistance. Moreover, the high flame retardancy of brominated additives enables the polymer to be self-extinguishing, which inhibits flame propagation.

However, when polymers with brominated flame retardant additives burn, they produce large volumes of thick, toxic smoke. This is not suitable in applications where people must escape from a confined space.

Fluorine is a halogen found in polymers known as fluoropolymers. This type of material exhibits intrinsic flame retardancy and self extinguishes when removed from the heat source. However, in a combustion situation, fluoropolymers can produce large amounts of highly toxic smoke and corrosive gases, which is unacceptable in occupied spaces. b) Using Non-Halogenated Flame Retardants

Metal hydroxides are halogenfree flame retardants that are widely used to meet fire-safety requirements in applications where people must escape from a confined space.

Metal hydroxides are non-toxic, readily available, and environmentally friendly.

The additive acts as a flame retardant by decomposing in a fire to produce metal oxides and water, both of which inhibit flame propagation. Metal hydroxide retardants help suppress a fire in several ways:

• They undergo a decomposition process in an endothermic reaction that removes energy from the fire.

• They produce water vapor that cools the surface of the polymer and dilutes the combustible gas concentration in the fire.

• They produce metal oxides that form a protective barrier on the surface of the polymer to protect the substrate from the flame.

Unfortunately, these mechanisms are not as efficient as brominated flame retardants. Therefore, non-halogenated flame retardants must be used in much higher concentrations. High additive concentrations have a detrimental effect on the performance of the polymer system, leading to reduced resistance to high





**Object Diameter:** 

1/8" - 1"

1/2"

(Oz)

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temperature and reduced flexibility at low temperatures.

Nevertheless, in the critical area of fire safety, metal hydroxide additives can be used to formulate flameretarded polymer systems. Products using this system can slow the spread of fire and generate low toxicity byproducts with minimal smoke, giving people time to escape.

In application, metal hydroxide systems allow electrical designers to meet fire-safety requirements for applications where people have limited routes of escape, but with the tradeoff of reduced product performance.

An advanced zero-halogen cross-linked polymer tubing-INSTALITE ZH-150--overcomes the fire safety and performance issues of conventional polymer conventional used for heatshrink tubing.

Based on the latest developments in material science, TE has formulated a proprietary, cross-linked polymer composition that exhibits excellent physical and fire-safety properties for a variety of heat-shrink tubing applications (Figure 1). Branded as INSTALITE ZH-150, this material provides mechanical and electrical protection similar to existing hightemperature tubing (Table 1). ZH-150 offers fluid resistance, low- and high-



Figure 1: Various applications of INSTALITE ZH-150 heat-shrink tubing and sleeving.

temperature performance (-75C to 150°C) and low smoke output in a fire. It is also lightweight, easy to install, and available in a wide range of dimensions (Table 2) to reduce installation time and cost. The critical advantage is that ZH-150 is a zero-halogen protection system that is suitable for use across multiple environments. Typical market applications include aerospace, military, marine, rail and mass transit wherever fire safety cannot be compromised.

#### Summary: ZH-150 tubing provides enhanced fire-safety and application advantages.

Because using halogenated additives has become less acceptable, many industry specifications now require zero-halogen systems. This makes ZH-150 tubing a practical alternative to conventional products. Moreover, ZH-150 tubing can meet the demands of applications that must withstand temperature extremes (-75°C to 150°C/-103°F to 302°F), while remaining flexible and fluid resistant.

By design, the best properties of ZHTM zero-halogen polyolefin and DR-25 elastomer are combined in the cross-linked polymer formulation used in ZH-150 tubing.

Designers find ZH-150 tubing offers valuable advantages that include:

- Flame retarded, zero-halogen material
- Operates to 150°C (302°F) continuous exposure
- Flexible at low temperature down to -75°C (-103°F)
- Resistant to many aerospace and military fluids

- Lightweight and very flexible
- Mechanically tough, rugged, and abrasion resistant

eters: Shrink ratio: 2 to 1; minimum shrink temperature: 150°C (302°F); minimum full recovery temperature: 175°C (347°F)

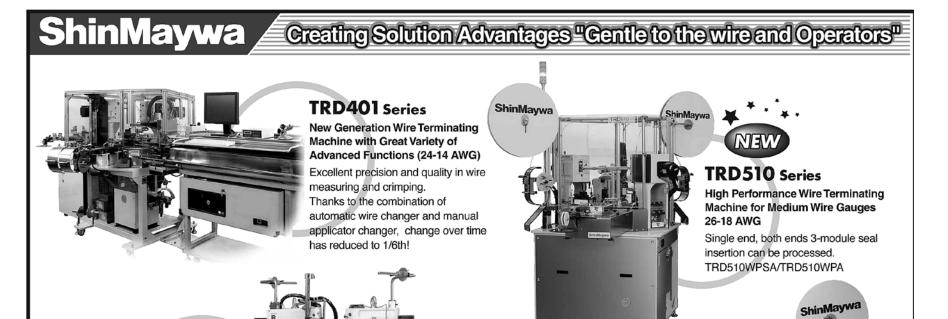
Workable heat-shrink param-

Product Type	Temperature Range	Smoke	Flexibility	Toxcity	Light Weight	Fluid Resistance
ZH-150 zero Halogen cross-linked polymer	Excellent	Very Good	Excellent	Very Good	Excellent	Excellent
ZHTM zero- halogen polyolefin	Good	Excellent	Good	Excellent	Good	Good
DR-25 elastomer	Excellent		Excellent		Very Good	Excellent

Table 1: A comparison showing how ZH-150 incorporates the best features of two existing TE Connectivity products: ZHTM (zero-halo-gen) and DR-25 (high temperature, fluid resistant.

		Inside Diameter		Diameter	Wall Thickness After	
Description	Part No.	Size	As Supplied (min.)	After Recover (max.)	Recovery (nom.) mm (inch)	Mass Grams/m (±10%
ZH150-3/1.5-0-SP	EH326 1-000	3.0/1.5	3.0 (0.118)	1.5 (0.059)	0.70 (0.028)	4.2
ZH150-5/2.5-0-SP	EH326 3-000	5.0/2.5	5.0 (0.197)	2.5 (0.098)	0.75 (0.030)	8.92
ZH150-8/4-0-SP	EH326 4-000	8.0/4.0	8.0 (0.315)	4.0 (0.157)	0.80 (0.031)	13.00
ZH150-12/6-0-SP	EH326 5-000	12.0/6.0	12.0 (0.472)	6.0 (0.236)	0.90 (0.035)	20.94
ZH150-18/9-0-SP	EH326 7-000	18.0/9.0	18.0 (0.709)	9.0 (0.354)	1.00 (0.039)	31.96
ZH150-24/12-0-SP	EH326 8-000	24.0/12.0	24.0 (0.945)	12.0 (0.472)	1.10 (0.043)	50.69
ZH150-40/20-0-SP	EH326 9-000	40.0/20.0	40.0 (1.575)	20.0 (0.789)	1.30 (0.051)	94.1
ZH150-50/30-0-SP	EH327 0-000	50.0/30.0	50.0 (1.969)	30.0 (1.181)	1.50 (0.059)	160

Table 2: Available dimensions of INSTALITE ZH-150 tubing.



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## NEWS PLUGS continued

#### Telsonic's Telso®Flex links ERP data to the welding process

With its headquarters in Frauenfeld, Switzerland, and operations all over the world, Baumer Electric AG has total confidence in Telsonic's new control software. A specialist in sensors, Baumer is using an ultrasonic welding system from Telsonic featuring the brand new Telso®Flex control software to manufacture a new range of optical sensors that has been designed specifically to meet the needs of Industry 4.0.

All of the sensors in the new range can be welded with the same sonotrode. "All of the parameters for the various workpieces are stored in our ERP as welding jobs and loaded automatically for each workpiece. Detection sensors in the ultrasonic welding press ensure that the parameter set matches the workpiece or, in other words, that the correct workpiece is in the holder. This rules out the possibility of incorrect welding," says Stephan Kröller of Baumer.

The process data (including welding results) is stored automatically and centrally. For quality control, the welding results can be evaluated at any time, which also ensures traceability. There are plans to add more welding systems to the network so that the status of the individual systems can be queried from a central location. Telsonic's Telso®Flex control software already has an integrated function to support this option.





Telsonic's new control software for increased process reliability.



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#### **Case Study:** Schleuniger provides support and flexibility to Goodman Manufacturing's wire harness assembly process.

oodman Manufacturing rent suppliers still offered the best what made Schleuniger standout was Company LP., located in Waller, Texas, is a leading manufacturer of HVAC (heating, ventilation and air conditioning) products. It is a subsidiary of Daikin Industries Ltd., a global Fortune 1000 company. In 2016, the company broke ground on a new 4.2 million square foot facility in Waller, TX.

Goodman had owned and operated a variety of wire processing equipment at two of their four facilities.As they prepared to consolidate all four facilities into the new Waller location, a decision had to be made whether or not they would keep the existing mix of equipment or pursue plans to upgrade the department with new wire processing equipment. When they decided on the latter, they needed to determine what options were now available and whether their cursolution to meet their needs.

The company colors, cuts, strips, and terminates wires to assemble harnesses for Daikin, Goodman and Amana HVAC units. They are continually challenged to incorporate more advanced applications such as wire printing, doubling, barcode labeling and more while maintaining the current value added processes. This must be accomplished without lengthening process times, or affecting the overall production volumes. They needed equipment that would provide them with that flexibility now and in the future.

After looking at several companies, Goodman purchased their first piece of Schleuniger equipment, a Crimp-Center 36 S, fully automatic crimping machine. According to their Production Engineer, Meredith LaBarge,

not only the machine capabilities, but the level of technical support she received. "Knowing that the support was there when I needed it was huge," says LaBarge. "Plus, Schleuniger's approach was more informative about the process and industry as a whole, rather than just trying to sell us a machine. The interest and flexibility that Schleuniger demonstrated told me they were genuinely interested in Goodman's needs."

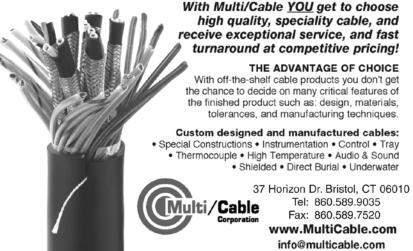
Another major factor in their decision was how simple Schleuniger's EASY platform was. "I learned it in just three days," said LaBarge. "It was perfect for our situation." Goodman also opted to include quality monitoring systems, which resulted in a vast improvement over what they previously had in place. To build onto the EASY program platform, they have recently added the EASY Production-Server software to better optimize all processing orders across the department.

In the last year, Goodman Manu-

facturing has purchased a total of five Schleuniger CrimpCenter 36 S machines, a UniCrimp 200 Crimping Machine, and a CT 36 Pneumatic Crimping Machine, with plans for additional equipment in the future.

LaBarge is also very excited about incorporating Schleuniger University, Schleuniger's new online eLearning platform, into Goodman's production process. "I can see a time when each employee will be certified in basic wire knowledge and in the latest wire processing advances, just as I was prior to launching production on our first CrimpCenter 36 S. Each employee could be certified based on his/her position and interest in certain processes," explains LaBarge. "This added training and certification process will be a true benefit to the company."

For more information, contact Schleuniger, Inc. at (603) 668-8117. Toll Free Technical Support is at (877) 902-1470. Email them at Sales@ schleuniger.com or visit them on the web at www.schleuniger.com.



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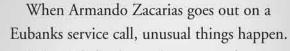
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George Price, vice president of J&M Products, for example, writes how Mando takes time to answer questions, explain machine operation and even gave "tips on stripping some shielded cable that others said could not be done."

"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

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#### **NEWS PLUGS** continued

#### Weidmüller Group Announces New Leadership for Weidmuller North America

The Weidmüller Group is pleased to announce that Terry Hodgson has been promoted to the position of President of Weidmuller Inc., USA and Executive Vice President of Weidmuller North America, which includes operations in the US, Canada and Mexico. Mr. Hodgson reports directly to Mr. José Carlos Álvarez Tobar, Weidmüller Executive Board member and Chief Marketing and Sales Officer.

As Executive VP of Weidmuller North America, Mr. Hodgson has full responsibility of Weidmuller operations in the US, Canada and Mexico. His primary focus is the Weidmuller USA market and organizational areas of Sales, Marketing, Engineering, Manufacturing, P&L and Operations, and supporting Managing Directors Stefan Schreiber in Mexico and Javi Richmond in Canada.

"I'm here to help our organization grow by adding resources, solutions and a support network for both our customers and our employees, and I believe 'the best way to predict the future...is to create it'. – Abraham Lincoln. This is why we are working as a team to create the solutions and provide value to our customers. Let's Connect," says Mr. Hodgson.

Mr. Hodgson has been a part of the Weidmuller team for



Terry Hodgson

more than 17 years, beginning his career with Weidmuller as a Sales Representative in the Alberta market. He served most recently as the Managing Director of Weidmuller's Canada operations in Markham, Ontario for ten years. While serving as Managing Director, he also had the Canadian responsibilities for Sprecher+Schuh, a division of Rockwell Automation. Prior to his role as Managing Director, Mr. Hodgson was the Regional Sales Manager for Weidmuller Canada, Alberta and Mid-West.

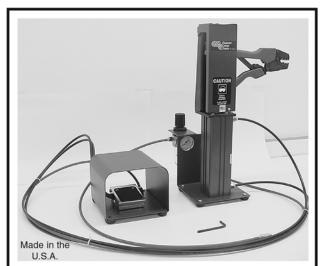
#### TPC Wire & Cable Corp. Acquires Canadian-Based Specialty Supplier Milrail, Inc.

TPC Wire & Cable Corp. (TPC) announced today that on November 30, 2018, it has completed the acquisition of Milrail, Inc. located in Point-Claire, Quebec to strengthen its position as a high-performance supplier of wire and cable solutions. Milrail is a North American specialty supplier of wire, cable, interconnect devices and grounding systems to the Rail, Transit and Military markets.

In making the announcement, TPC President & CEO Jeff Crane explained, "We continue to execute our strategy of building on what is already one of North America's leading wire and cable suppliers. TPC and Milrail share an approach of using high quality, innovative solutions to solve complex customer problems. We are excited and committed to expand Milrail's product and service reach, delivering their great tradition of quality to even more customers throughout North America."

Of the transaction, Milrail's Vice President and Co-founder, Donald Laplante stated, "Milrail will conduct business with the same passion and pride that has become its trademark and we are excited to find new partners in TPC that share these values. The new team gives us the opportunity to further increase our presence in the US and Mexico as a leading supplier of electrical interconnect transit products to the Americas." Milrail President and Co-founder, Allan Laplante adds, "After 28 years of serving the Rail, Transit and Military markets in Canada, we've seen a shift in our customer's thinking: a desire to work with larger companies with an extended reach. Combining Milrail's exceptional customer service and technical support with TPC's broader commercial capabilities, allows our two companies to carry this torch into the future and throughout North America in the wire, cable and connectivity market."

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#### The CT4 Coastelmatic Pneumatic Tool Holder

The CT4 Coastelmatic hand tool holder is a device that uses air to activate spring retracted hand tools. The CT4 Coastelmatic is a great low cost alternative to automatic crimping, stripping, and cutting machines. The CT4 Coastelmatic can be set up to work crimpers, strippers and cutters. The patent pending tool holder in the applicator securely holds all tools in place, allowing the operator to use his hands freely. This new and improved cylinder delivers 10% more power through dual activation for tough jobs. Each unit is pre-assembled, tested and ready for use.

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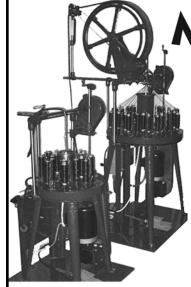
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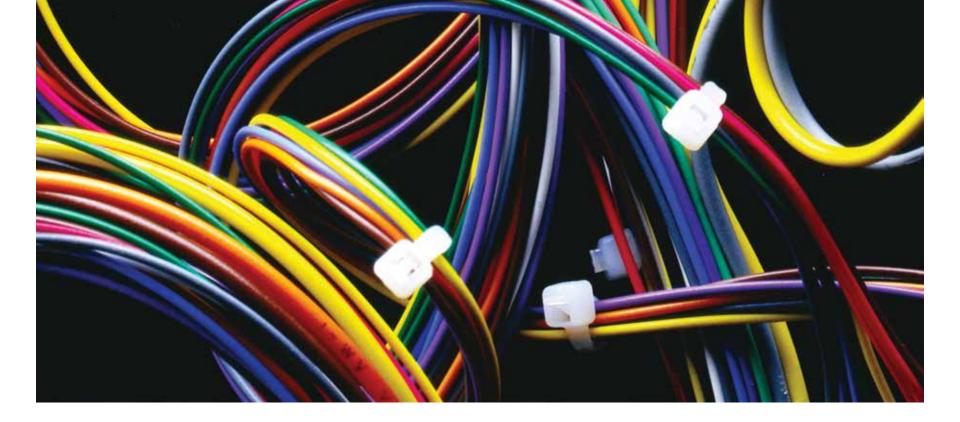
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