

This Issue Features:

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NRI Electronics

By Fred Noer

During his latest visit to NRI Electronics an ISO auditor was astounded to find the company had 30 continuous improvement projects under way. He expected NRI to have just a few projects in the works, similar to other companies he has audited.

The comparatively high number of projects is typical at NRI and reflective of its employees' attention to detail and their drive to improve all aspects of NRI operations. Everyone's effort at NRI

coincides with its quality policy: "Through company-wide empowerment, we are committed to continuous improvement in order to satisfy the expectations of our customers."

NRI has 40 customers, all OEMs that are supplied with wiring harnesses, printed circuit boards and electromechanical assemblies. Twelve customers provide 80 percent of company revenue, and the other 28 account for 20 percent of sales. Several customers have been with NRI for 10, 12 and even 25-plus years.

Sixty-six percent of the customers are in the agriculture and industrial markets,



The NRI Data Cell assembling the less complex harnesses. All harnesses are tested using the Cirris Easy Tester on the cart.

with 22 percent in defense and 12 percent in aviation. Most of the customers are located in Minnesota, Wisconsin, Iowa, South Dakota and Nebraska, and some are in the southeastern United States. One customer in Japan is provided with harnesses and PCBs.

Company operations are in two Minnesota cities - Anoka and Rochester. Anoka is a far northwestern suburb of Minneapolis-St. Paul, and Rochester is approximately 85 miles southeast of the Twin Cities.

Production at the Rochester facility is 95 percent wiring harnesses and five percent electromechanical assemblies. The building covers 30,000 square feet.

Harness orders range from a simple six-inch jumper wire to a complex harness containing up to 500 circuits. They may have 512 conductors, BNCs and biaxial and triaxial Tyco connectors. Length can be up to 70 feet for applications in cranes and agricultural sprayers.

Quantities typically are 10-25 but may be as few as one and as many as 3,000. Cost is between \$2 and \$3,200.

Conversely, Anoka, whose building measures 12,000 square feet, does mostly PCBs, both surface mount and through hole, and electromechanical assemblies. Manufacturing of harnesses, simple ones that are short and contain

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The Preventive Maintenance Advantage

By Michael Hallman
TE Application Tooling
Field Service Manager

What is preventive maintenance and why is it important? The basic description of preventive maintenance is planned maintenance activity that is designed to improve the life of machines or equipment and avoid any unplanned maintenance activity. In the wire harness industry, machines and tooling are the key components that are vital to an organization's ability to produce the final product. From the smallest hand tool to the largest automatic wire processing machine, when equipment malfunctions, production is affected in a negative way. Quality OEM equipment suppliers provide preventive main-



Michael Hallman
TE Application Tooling
Field Service Manager

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2013 Annual WHMA Conference

The 2013 Wiring Harness Manufacturers Association (WHMA) Annual Wire Harness Conference will be held February 20-22 in Las Vegas. The Renaissance Hotel will serve a conference headquarters.

This will be the 20th Annual WHMA Conference - a fact not overlooked by WHMA Program chairman Paul Nelson of Data Cable in Orangeville, Ontario. "Every WHMA Conference is filled with good information and networking opportunities - but this year's agenda is really special. We will have a variety of sessions touching on quality improvement, marketing, re-shoring and strategy deployment just to name a few," said Nelson.

The keynote presenter will be Greg



Paul Nelson
WHMA Program Chairman

Lane of Low Volume Lean. His two topics are: "Don't Limit Your Improvement to Manufacturing" and "Without a Clearly Deployed Strategy, You Will Never Reach Breakthrough Objectives".

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WHMA Conference

Continued from page 1

Mr. Lane says his approach is very pragmatic and he ensures, "everyone will walk away with a few thoughts of improvement for their respective organizations." He is finalizing a new book on his experiences during the past few years of realigning failed cultural/lean transformations.

Another topic that WHMA members have clamored for more help with is marketing. David Donlan of HubSpot will present, "Marketing by ROI".

HubSpot all-in-one marketing software helps more than 7,500 companies in 46 countries attract leads and convert them into customers. A pioneer in inbound marketing, HubSpot aims to help its customers make marketing that people actually love.

Mr. Donlan will focus his presentation on three areas:

- Deconstruct your Marketing Funnel
- Understand your Customer's Journey
- Establish Leverage

We all know that the pace of business has accelerated unbelievably so - that is why a representative from Mentor Graphics will cover the topic of, "Winning More Harness Business from Fast, Accurate and Quick Turnaround".

Accurate quoting for harness business is an essential requirement for profitability - harness engineering design

tools allow companies to create accurate quotes in a fraction of the time usually taken to create them. This session will examine the various approaches to quoting for harness manufacture and look at the challenges and issues. It will examine the elements of an improved design process and show how harness engineering software can cut time and effort dramatically, while providing better accuracy.

A good sign for American manufacturers is the growing trend toward re-shoring - bringing operations back from overseas into North America. A session on, "Re-Shoring: Regaining North American Domination in Manufacturing", will be offered by Ken Fleck of Fleck Research.

Fleck Research has provided the common ground in which the electronic connector industry has taken root. As the core of industry knowledge, Fleck has provided an information bridge between industry leaders whose collaborations have profoundly affected the technology of worldwide business today.

Of course, any WHMA Conference is also full of peer to peer networking time and sitting down with the major suppliers to our industry in the WHMA expo area.

For full program and registration information go to www.WHMA.org.

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FEBRUARY
2013

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1 The Preventive Maintenance Advantage

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1 2013 Annual WHMA Conference

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Why Wire Harness Companies Fail

Loren M. Smith, CEO
Blue Valley Capital



Loren M. Smith, CEO
Blue Valley Capital

Wire harness companies, like any business, can fail for many reasons. However, with several decades in wire harness manufacturing, I've observed specific failure patterns, which seem to repeat themselves in our industry. This article will attempt to describe these common failure modes.

First off, failure doesn't always have to mean bankruptcy. A wire harness company can go into a slow painful decline leading to lower revenue with only marginal profitability, which in turn result in an unhappy day-to-day struggle for the owner; which can in turn results in a forced sale to a stronger competitor if only to ensure survival. I have observed and even experienced some of the root causes that can thrust a harness company into the abyss.

On occasion, a downward spiral can be reversed by quickly correcting a basic root cause of failure. Unfortunately, this seems to be rare. The three touchstones most likely to trip up a harness business are; growth; organization, and

culture. Examples of all three follow.

Rapid growth can certainly kill a Wire Harness company. This is a common failure issue because it's hard for most CEO's to say no. It's always tempting to take on new business. Turning down business goes against the temperaments of most CEO's, who instinctively know tuning down new business opportunities can send a negative signal to customers. A proactive approach to several

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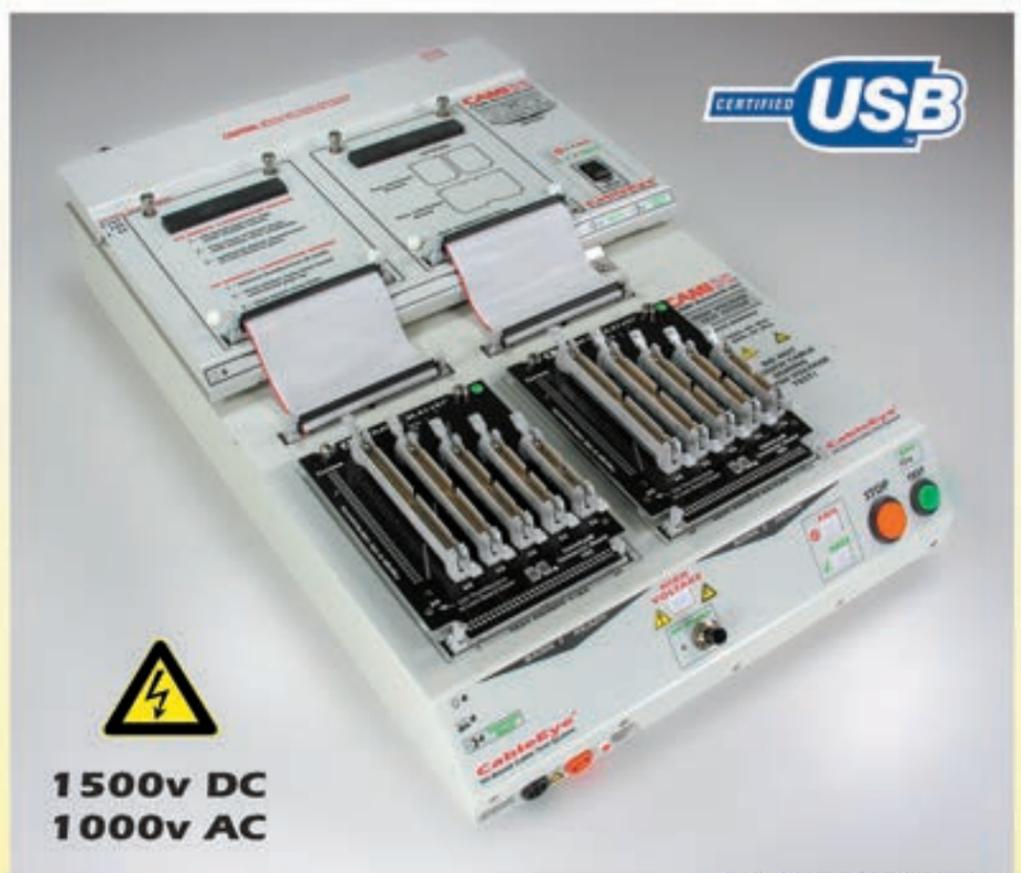
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2	2	66	→ 0.3 Ω	✓	< 1 µA	1200V	> 1 GΩ	0.067 mA	818V	12 MΩ
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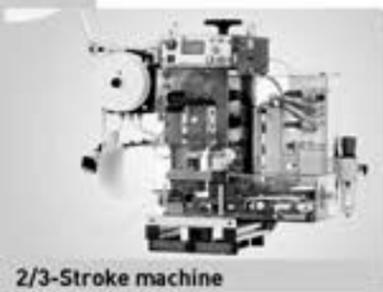
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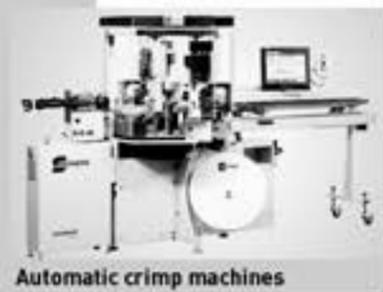
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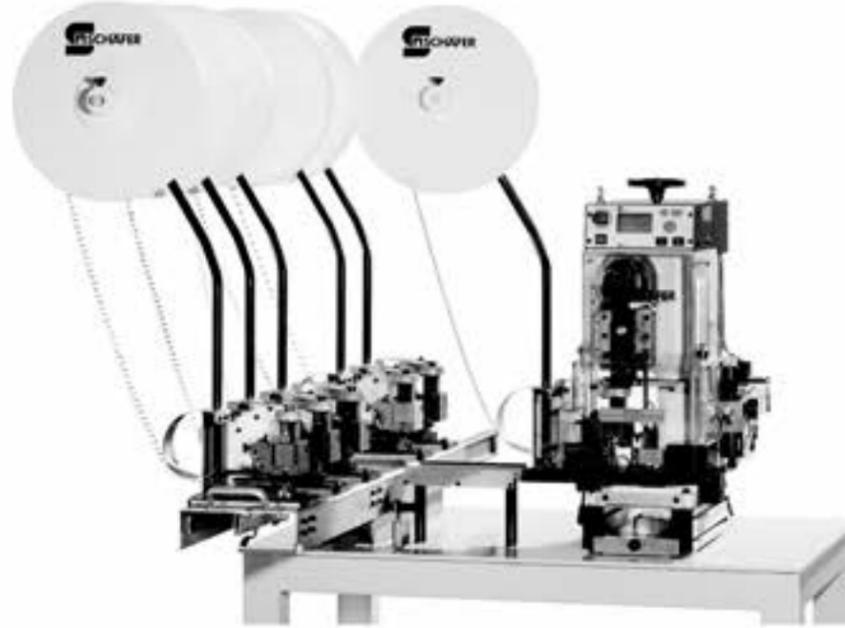
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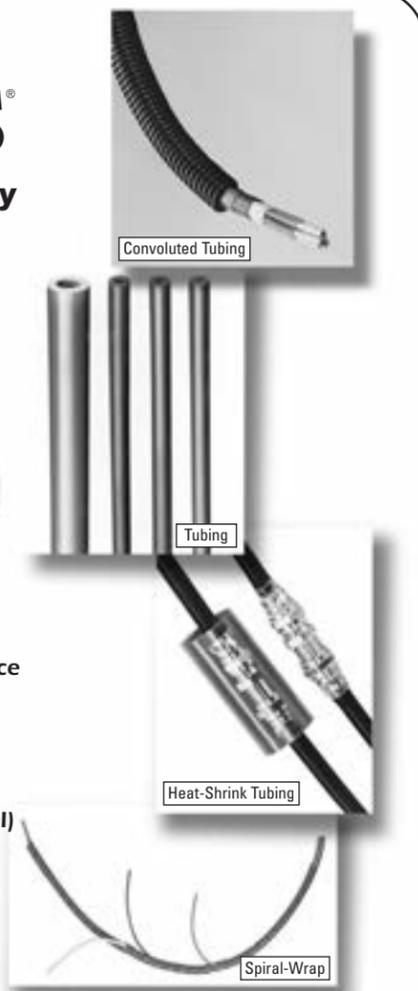
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Why Wire Harness Companies Fail

Continued from page 4

management control issues can help a wire harness company to effectively manage growth, as well as avoid the negative repercussions which unmanaged growth can cause.

Unless a harness company has a system in place that can view backlog (unfilled orders) by labor hours per operation (i.e. cutting, terminating, and assembly), process bottlenecks can be created overnight and lead to delinquency. Delinquency (missing delivery dates), if not corrected quickly, will spin a company out of control. Knowing when and how to upgrade a production control system to provide this visibility is the key to eliminating this "failure by growth" risk factor.

Given the labor-intensive nature of the wire harness business, CEO's absolutely must know the rate at which workers can be added with a training program in place to facilitate growth. I've seen (and experienced) situations where bringing on too many inexperienced people too quickly created serious negative labor variances. It's essential to understand the maximum number of new hires that can be added within a given time frame in order to avoid this pitfall.

Another growth pitfall to avoid is the inventory investment, which can stretch a harness company's cash flow to the breaking point. The only way to avoid surprises in a growth cycle is to have a real time system to forecast cash receipts and disbursements, and to use this math before committing to new business. These issues might seem pretty basic, but it's a fact that many wire harness companies grow beyond the ability of their management control systems to "see" (or predict) the "real time" effect of growth on their business and cause a calamitous result.

A wire harness company's management team is the single biggest factor that contributes to success. Conversely, not understanding how and when this team might need to change can be the root cause of failure. The management team that brings a wire harness company from start up to \$3M may not be the same team that can run a \$15M wire harness company. Wire harness company owners are usually very loyal men and women. When this loyalty keeps team members in positions that are beyond their capability, the result can be a company that goes into a stall, or even fails. I'm not suggesting that when a company outgrows a manager, the manager should be fired, but artful management should find another role

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When it becomes necessary to go outside your company to recruit management talent, where do you go? Unfortunately, I can't tell you how many times I've sat with the owner of a wire harness company and heard about the highly credentialed corporate manager recruited to run his company who didn't work out. This, then, is a common reason why wire harness company's fail; either keeping employees in positions long after the scope of the position has grown beyond their capability, or, when it becomes necessary to recruit talent, calling on large corporate experience which rarely translates to the trenches of a small or medium size wire harness company. There is no magic solution here; getting the right team in place at any point in time is a bit of an art. If you can develop talent internally so that you never have to go outside, that's clearly the best approach. When it is necessary to go outside, the risk and failure rate is quite high. The fact that this is so difficult is why it shows up so frequently as the root cause of a failure.

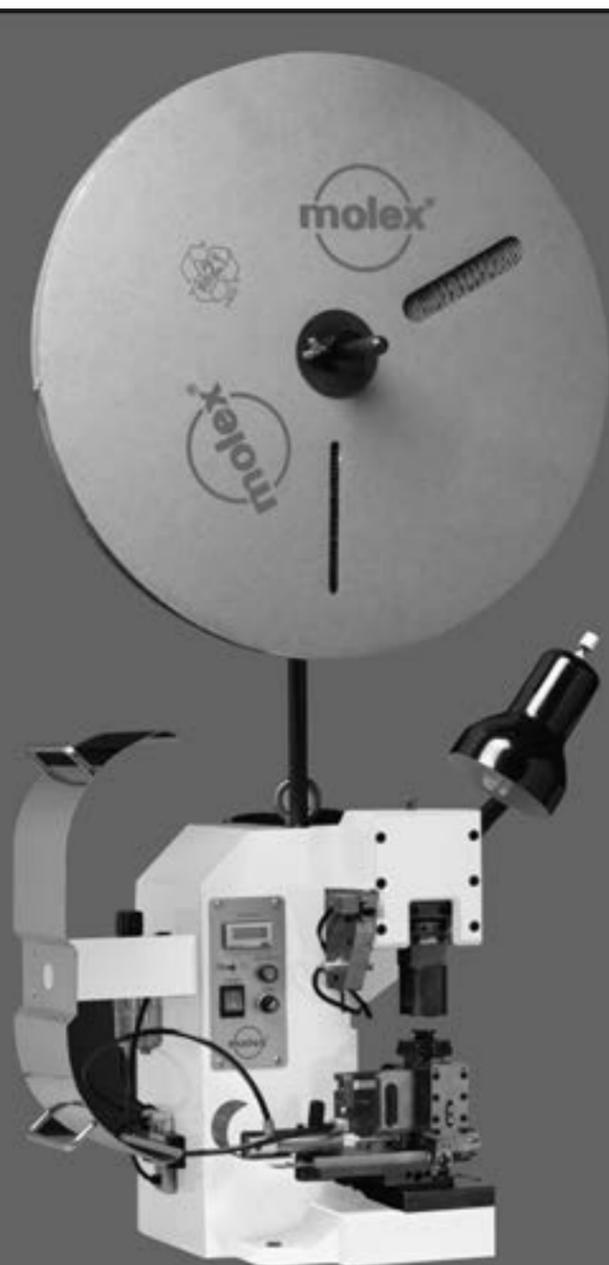
This takes me to the next root cause of failure; company culture. As an up close observer I have absolutely no doubt that a culture of arrogance, in particular, can kill any company. When I first got into the wire harness business, I made the trip to a customer, a heavy equipment manufacturer, to hear about the terminal/connector supplier this customer had decided to use on all of their future designs. I sat in a conference room with at least 12 harness suppliers. I was by far the smallest company in the room, with a minuscule share of this off highway equipment manufacturers harness volume. The largest harness company in attendance was at the time a leader in the overall wire harness business with approximately \$80M revenue, a dozen plants, in house wire manufacturing capability, and their own connector and terminal designs. They were the leading supplier to the off highway equipment, and truck markets. Their behavior at this meeting was both rude and arrogant. After this meeting we all saw many other examples that this

company possessed a culture of arrogance. Because my own focus was off highway heavy equipment, this company was by far my biggest competitor. I am very proud that my own company was able to earn eventual leadership in the off highway heavy equipment market, and I will forever be grateful to the great employees who helped me build my company with constant focus on cost, quality, and service. However I also realize we were helped by the arrogance of our largest competitor. Later, the owners of this competitor were forced to sell to a bargain hunter and ceased to exist. This company had everything going for it. They were many times larger than any of their direct competitors, a single advantage which

should have led to only continued growth and industry leadership, but sadly for their employees their know it all culture killed the business.

My second example is a wire harness company that was acquired by a private equity firm. Private equity firms buy companies solely to create value with growth. The private equity management teams were highly educated finance guys, and the wire harness management team they acquired was a homegrown one. Despite the fact that the private equity firm lacked any knowledge of the wire harness industry, they were convinced they had all the answers and refused to listen to the experi-

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Growing Your Business: Part 2: Seeding

By Paul Hogendoorn

It's Sunday afternoon, cold and rainy, and as I wait for the first football game to start, I look through my "seeding list", a little list that I keep in a notebook that is always with me. My "seeding list" is comprised of names of people, companies, or opportunities that I encounter over the course of the working week that I think are worth further investigation. In my previous column, I mentioned that growing a business is a lot like farming; it requires seeding, cultivating and harvesting. This column is specifically on seeding.

For many companies, "seeding" is a responsibility of the marketing department, and the activities of choice are tradeshow, websites, advertising, and email campaigns. Some very motivated salespeople sometimes get involved by making cold calls, but this is increasingly rare. Relegating seeding activity to a select few people involved in marketing roles is one of the three common mistakes I see in many companies. Believing that marketing has to be a "big budget" undertaking in order to be effective is the second.

Companies that wish to grow need to be strategic with their seeding activities - even those that already have their order books full. When business starts to slow down, big



Paul Hogendoorn

deals are lost, or expected deals fail to materialize, that's the time when new opportunities will need to be cultivated and harvested. The best way to keep the hopper full of opportunities is to consistently and intentionally spend time seeding, and the best way to do it cost effectively is to make sure you measure the pertinent results. Failing to measure effectively is the third common mistake.

The default measurement for many companies is often the total sales figure, but it's important to measure with greater granularity if you want to improve the return on your specific marketing and seeding

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efforts. For instance, a contract email marketer that I once employed found that "person to person" emails yielded far more replies than bulk email campaigns did, and that there were specific times of the day and days of the week that yielded the best results. She observed that she often got instant replies to direct emails that she sent out on Saturday or Sunday evenings between the hours of 8 and 11 PM, but never got replies to bulk emails sent out during the business day. In her role as a "seeder", she didn't measure sales - she measured "replies", "replies converted to phone conversations", and "phone conversations converted to appointments". Converting opportunities to sales is a measurement for the cultivators and harvesters, not for the seeders.

The same is true for tradeshow. Many companies measure total sales attributed to the show, or total leads generated by the event, or perhaps only the cost of participating. But as any good accountant will tell you, to get better results requires better measurements. How many connections were made in advance of the show? How many connections were made at the show? How many opportunities were qualified from those connections? How many of the qualified opportunities were for what specific products? How many of those opportunities were followed up promptly and personally? How many resulted in products being quoted? Many companies have concluded that they have to be in certain tradeshow,

and that those events are very expensive. But by being more intentional with their pre-show, at-show, and post-show activities, and by measuring those activities more granularly, they can derive far greater yields from this expensive seeding activity.

When I was invited to write a column for this publication, it was easy for me to accept. Over the years, when visiting my customers, I noticed which magazines I saw in their lobbies, in their lunch rooms, and on the corner of their engineers' and managers' desks. These turned out to be pretty much the same publications that made it to the credenza in my office, instead of going straight from my in box to my recycle bin. Advertising is expensive, but advertising where you know your customers are looking is still a good bet.

But as I said, not all seeding activity has to be expensive. Before the first kick off, I sent out a few specific emails following up on some items on my seeding list. By half time, I had received 2 interesting responses. By noon tomorrow, I'll make two phone calls, and hopefully make at least one new appointment for the week. Every face to face appointment represents a new opportunity that can be cultivated - but that's a topic for the next column.

Paul Hogendoorn founded TPI Associates, an organization dedicated to helping entrepreneurs define and achieve their vision. For more ideas on these topics, please visit www.tpi-3.com or contact Paul directly at paul@tpi-3.com

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Why Wire Harness Companies Fail

Continued from page 7

enced management team. Growth vanished as a possibility along with a chunk of earnings.

These two examples show that culture and attitude are not just buzzwords. Best selling management "how to" books make the case for what for most wire harness entrepreneurs who've endured market up's and downs intuitively understand; always put the customer first and respect your employees. It's just common sense, but in my experience, lose sight of these two, and you'll lose your business

Finally, the root cause of a catastrophic failure can simply be cost accounting. When quoting a new part number, the material and labor required to produce a wire harness is always an estimate. Once a wire harness goes into production, it's possible that the actual labor and material required to produce the harness is more than the quoted numbers. Wire harness companies that cannot compare actual to quoted costs by part number risk serious profitability issues.

While the wire harness process is well known, and the hours by operation

should be in line with a quote, the possibility exists that for many reasons actual labor over time vs. quoted labor, will be two different numbers. Material costs are also well known, but over time a quoted number and actual cost can differ substantially. It's never easy to go back to a customer and ask for a higher price, but there are times when this option is much better than shipping dollar bills with each wire harness. I've observed many situations where the root cause of marginal profitability or even losing money is the absence of an adequate cost control system. The fix here is ongoing proactive upgrading of cost control systems so that the end result is real time knowledge of wire harness cost of goods sold, by part number, compared to the original quote.

In my next article "From Start Up To \$23M, Surviving My Own Mistakes Was My Greatest Achievement", I will describe how over a 20-year period in the wire harness business I hit a number of "land mines" that should have killed my business; learning the hard way. I hope sharing this narrative will help some of you navigate the treacherous wire harness

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The Preventive Maintenance Advantage

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tenance documentation outlining both the areas to be addressed and a schedule for maintaining production-ready equipment. A comparison could be made to the maintenance recommended for automobiles. The vehicle manufacturer specifies certain preventive maintenance activities that must be followed in order to allow the vehicle to continue to function properly, such as changing the oil every 5,000 miles, lubricating the chassis, flushing the engine coolant, or changing the engine timing belt at 60,000 miles. Fail to perform these routine maintenance tasks, and the life of the vehicle will be shortened while the possibility of an unexpected breakdown will be increased. However, if the maintenance recommendations are followed, the life of the vehicle is extended and the risk of vehicle breakdown is reduced. Similarly, an effective program of regularly scheduled preventive maintenance for production machinery will help to keep the equipment operating properly and producing quality product.

The benefits of having a preventive maintenance program include:

- Reduced production down time due to fewer unexpected equipment breakdowns.
- Equipment shut down can be

anticipated and service events worked into production planning to minimize impact on production schedules.

- Purchases of replacement parts can be planned and budgeted.
- Properly maintained equipment will last longer which helps to minimize the costs associated with replacement of worn out machines.
- Part replacement costs are reduced as repairs are made on a scheduled basis rather than as part of a damage control response to a part failure.
- Product rejects, scrap, and rework are reduced due to equipment being maintained in good operating condition.
- Less time spent on additional equipment setup and adjustments that become necessary to compensate for wearing components.
- Identification of equipment with higher maintenance costs that may show the need for corrective actions such as training or even replacement of the equipment.

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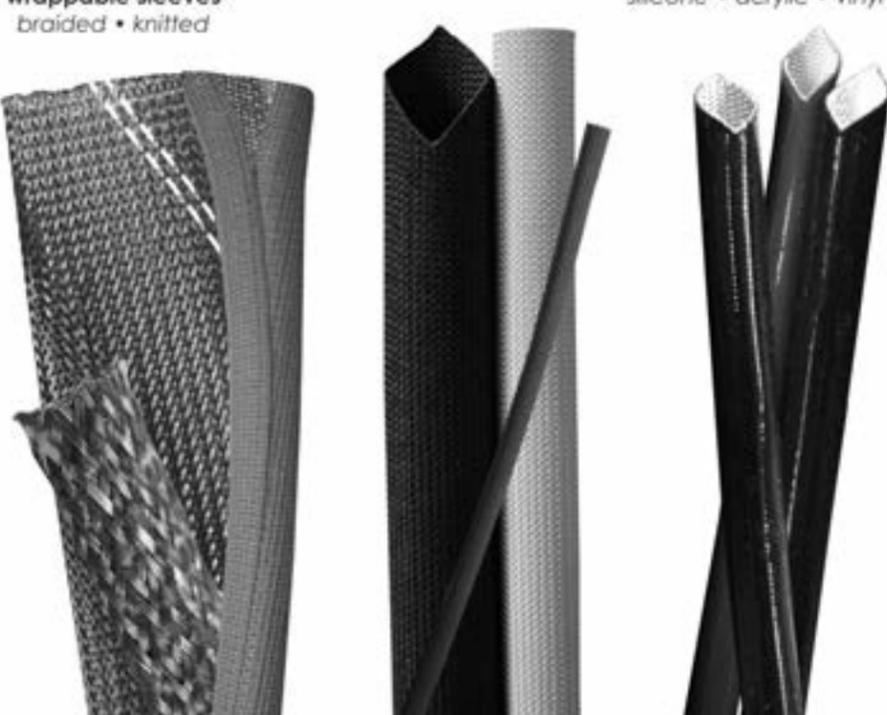
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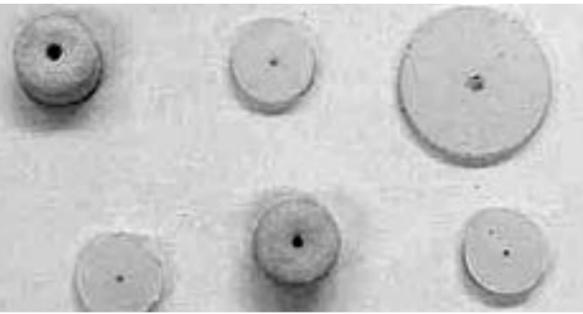
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The Preventive Maintenance Advantage

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Reactive Maintenance

With the constant demand to maintain a high production output, some companies do not place a high priority on preventive maintenance. The reasoning behind this type of thinking is that there is not enough time to take the machine out of service to perform the required maintenance activities. Often the decision is made to just keep the machine in production and not perform any maintenance work in order to achieve maximum output. In this scenario, the company has chosen to practice a reactive maintenance strategy. Essentially,

the equipment is run until something breaks. This takes a short term view and fails to consider the true cost as the equipment wears and then eventually fails. Maximum "up time" is achieved because the equipment is always producing product and is never taken off line for servicing. Initially, this does result in higher output for the equipment in the minimum amount of time. However, over time, the quality of the material produced could be affected as the improperly maintained equipment falls out of adjustment, potentially resulting in inaccurate operation

that could produce higher levels of rejected or scrap product. Moving parts will wear at an accelerated rate due to lack of lubrication. Debris, which may be a normal by-product of the equipment operation, can accumulate and work its way into moving mechanisms accelerating wear and leading to premature failure if it is not collected and removed. As the equipment continues to wear, it may also be necessary to make more frequent setup adjustments in order to compensate for the effects of the worn parts. Over time, more effort will be required to keep the equipment adjusted properly, which results in lower output. The risk of producing non-conforming product grows as the equipment continues to degrade.

The larger disadvantage to a reactive maintenance program is what happens when the equipment finally breaks down. Improperly maintained equipment will eventually fail, sometimes catastrophically. Collateral damage could occur resulting in damage to additional parts that would not have otherwise been affected had the part suffering the initial problem been replaced prior to total failure. Often the failure happens at an inopportune time. Production schedules require that final product be ready on the promised date. With no time allotted for machine down time, a shut down for any reason can result in delays and missed delivery dates. Once the failure has occurred, the race is on to get the equipment back up and running as soon as possible. The maintenance staff is now under pressure to diagnose the problem quickly and to get the equipment back on line. If replacement parts are required, they must be obtained as fast as possible to minimize equipment down time, which can result in expedited shipping costs.

At this point the true cost of a reactive maintenance program becomes apparent. Other work may be put on hold while maximum effort, and possibly additional manpower, is put into action to identify the problem, find a resolution, and return the equipment to service in the shortest amount of time.



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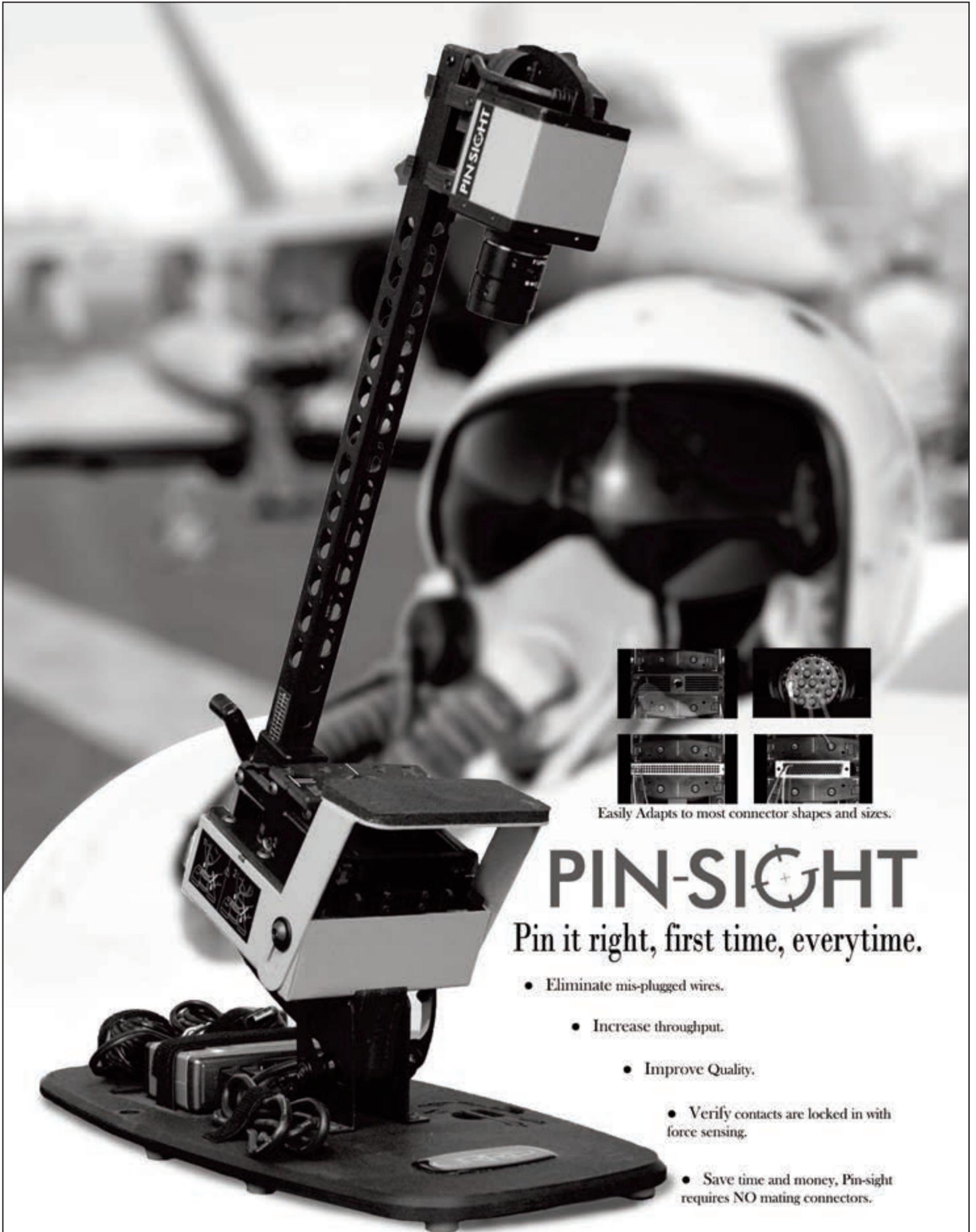
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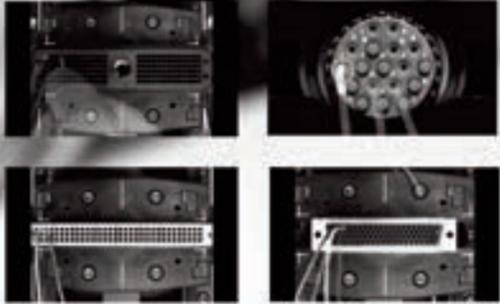
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The Preventive Maintenance Advantage

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Overtime may be necessary to get the machine repaired and back in service with a minimum amount of down time. Even so, the equipment may remain out of service for an extended period of time depending on the severity of the failure and the availability of replacement parts. If the failure resulted in collateral damage to other parts, additional parts may need replaced, resulting in extra man-hours and expedited shipping, thus increasing overall costs. Ultimately the cost of an unexpected failure is comprised of not only the price of the parts themselves, but also in expediting costs, labor costs, lost production time and possibly missed delivery dates.

Predictive Maintenance

The predictive maintenance model takes a different approach to keeping equipment running at peak efficiency. This method consists of scheduling maintenance work only when operating conditions indicate that servicing is required. This is achieved by monitoring equipment for vibration, noise, temperature, lubrication, visible indicators or any other trends that suggest that a potential problem is in the making. When one of

the monitored conditions reaches a previously determined level, the machine is taken out of service and repaired in order to prevent a more costly failure from occurring. An example of predictive maintenance is a test that automobile owners can perform to check for vehicle tire wear. Owners insert a penny into the tire tread with Lincoln's head pointed toward the tire. If any tread is covering Lincoln's head, sufficient tread remains. When all of Lincoln's head is exposed, the remaining tread is at or below the minimum allowable limit, and it is time to replace the tire. As with automobiles, there are tests that can be performed on production machinery to check for wear and to identify parts that should be replaced. In some cases, special testing equipment (which can be expensive) may be required to properly monitor the desired areas. This approach can result in lower down time as the machine is only taken out of service when the testing indicates that action is required. The effectiveness of this method is dependent on how thoroughly the equipment is monitored. Any unmonitored areas could still experience a failure.

Continued on page 16

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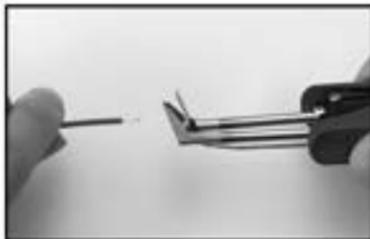
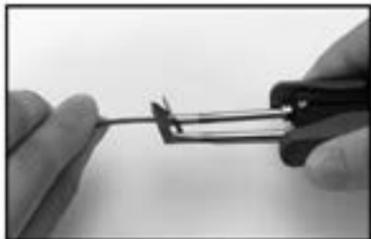
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The Preventive Maintenance Advantage

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Preventive Maintenance

The preventive maintenance model is a proactive approach. An effective preventive maintenance program is comprised of formal procedures and tasks designed to prevent unexpected breakdowns and failures. These tasks are performed on a planned schedule. The specific tasks and service intervals are determined by reviewing equipment documentation, such as user manuals or other service documents provided by the equipment manufacturer, as well as industry standards and environmental conditions. Equipment settings are then checked and readjusted as needed and moving parts are lubricated. The equip-

ment is cleaned and inspected, and wearable parts are replaced as needed. The goal of all of this activity is to ensure that the reliability and accuracy of the equipment are maintained at the highest level possible.

Utilizing a scheduled preventive maintenance program allows production facilities to schedule production requirements around the planned maintenance activities. The down time required to complete the maintenance tasks is reserved and included in the production planning. This minimizes the impact to production when the machine is taken out of service. Replacing components showing signs of excessive wear averts failures that may have occurred. These replacement compo-

nents along with any wearable parts are purchased in advance to be available at the time of scheduled servicing. By performing the recommended preventive maintenance activities, the life of the equipment is extended and the quality of production is maintained.

A preventive maintenance program can be implemented either through internal resources that are utilized to manage and perform all maintenance activities, or through contracting with an external company to provide the needed services.

Internal Maintenance

An internal program requires that the organization accept responsibility for all aspects of the maintenance program.

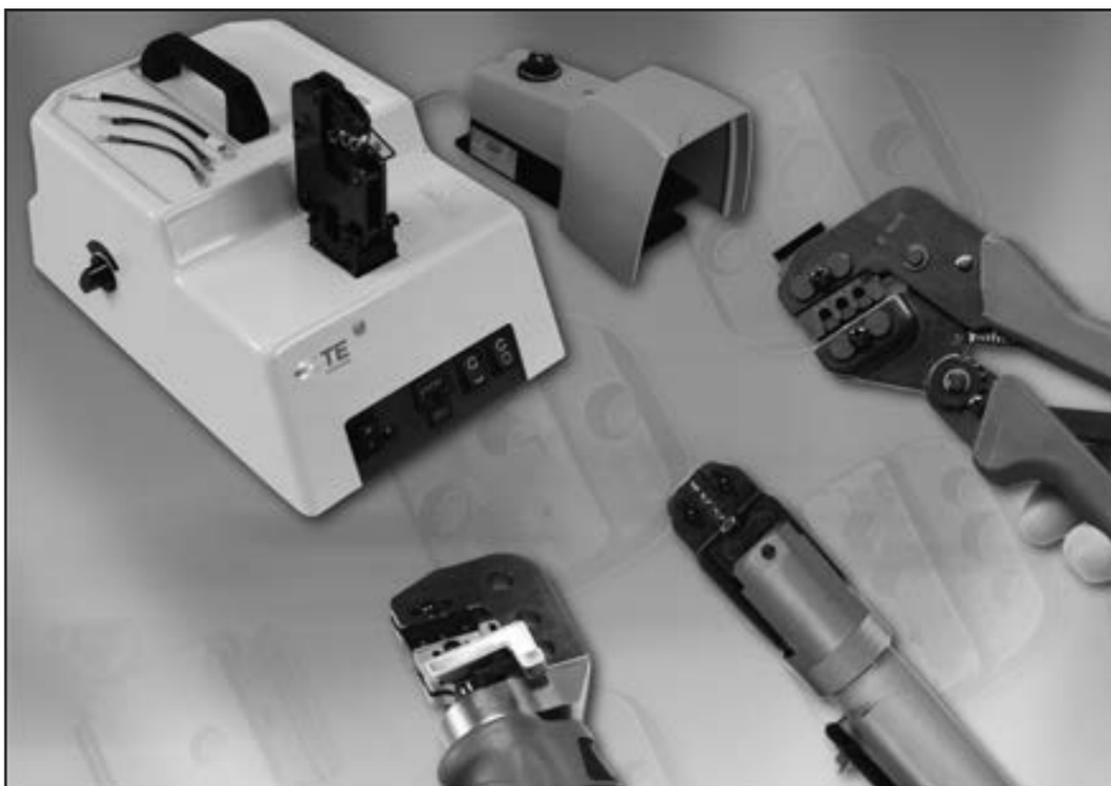
This includes ensuring that maintenance technicians are properly trained on the equipment they are servicing and all required documentation is available. The technicians performing the services should be well versed on the equipment and fully understand its functions to effectively maintain the equipment and inspect for problems and negative trends. Training provided by the equipment manufacturer is typically required in order to gain this level of knowledge. The maintenance program should also include management of replacement parts. Wearable items should be identified and replacements purchased in advance to be available for installation during the scheduled equipment servicing.

Contract Maintenance

If sufficient internal resources are not available to support a preventive maintenance program, the alternative is to contract with an external service provider/contractor to perform the maintenance work. The service provider could be the original equipment manufacturer (OEM) or a company that specializes in providing in these services. The OEM, as the manufacturer of the equipment, has the intimate knowledge of the equipment as well as access to all of the necessary documentation. The contractor can make recommendations as to how often the equipment should be serviced as well as what specific tasks should be performed. Skilled Field Engineers or Technicians who work with the equipment on a regular basis are generally able to perform these services efficiently and effectively.

A quality service provider may utilize Six Sigma methodology, such as the DMAIC process, to look for opportunities to eliminate waste and standardize or streamline maintenance program procedures. The DMAIC process uses five steps to identify areas for improvement: Define, Measure, Analyze, Improve and Control. These five steps can be applied to a preventive maintenance program as follows:

- **Define** the maintenance process for specific equipment based on best practices and OEM documentation.



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The contractor can manage the timing of the service visits and, working with the customer, arrange for time to be set aside to complete the maintenance activities. They may be able to offer other supplemental services or agreements to cover repairs in the event that equipment does experience a failure. Additional service offerings could include equipment training to help maximize efficient utilization of the equipment or consultation services that provide valuable information to the customer about their equipment and production areas. By utilizing the external service provider the company is able to tap into the larger knowledge and experience of the contracting organization to achieve maximum benefit from the preventive maintenance program.

Conclusion

Ultimately, a manufacturing company has choices regarding how to maintain their production equipment. They could choose to have no maintenance plan and operate in a purely reactive mode, which would allow for maximum production in the shortest amount of time, at least initially. The downside of a reactive strategy is when the machine eventually fails; the company must go into damage control mode to try to get the machine back up and running as soon as possible. The company could choose instead to have a predictive maintenance program; however, the value of such program is dependent on the monitoring scope and quality. The best choice is for a company to implement a preventive maintenance program to keep the equipment running smoothly and help limit the possibility of problems that could have a negative effect on production and revenue.

When a preventive maintenance program is administered properly, it can result

in bottom line improvements for the company. Productivity and efficiency of equipment is maintained while minimizing down time and interruptions/stoppages due to unexpected failures. The life of production equipment is maximized through routine servicing that helps limit the amount of overall wear and degradation. The cost of replacement parts is contained through a reduction in required parts and expedited shipping.

A company's internal maintenance department can administer a preventive maintenance program or it can be contracted out to an external service provider. Keeping the work internal gives the company full control over the process, but also full responsibility to manage all program details. Contracting out the preventive maintenance services takes advantage of

and external contractor's skills and resources to obtain the maximum benefit from the equipment and tooling. The contractor option can benefit the customer in other ways as well. There may be other services and products offered by the contractor that the company could take advantage of in order to realize additional improvements in their operations. Each company has to make its own choices regarding a preventive maintenance plan. Those that choose a proactive approach are likely to find their equipment to be more reliable and productive.

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RESISTANCE WELDED CONNECTIONS FROM 0.01 MM² UP TO 300 MM²

HOT CRIMPING



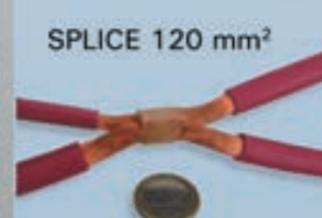
RESISTANCE BRAZING



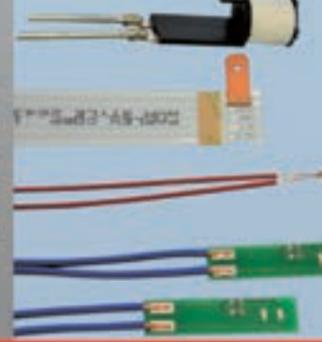
WIRE TERMINATION



WIRE SPLICING



MICRO SPOT WELDING





TURNKEY CELL for E-DRIVE production



MANUAL module / Hot crimping / wire termination

RESISTANCE WELDING FEATURES:

- ▶ **RELEASED** by automotive and medical industry
- ▶ welding **MAGNET WIRES** without stripping
- ▶ **NO AGING** of the connection / **TIME SAVING** process
- ▶ **LOWER RESISTANCE** than crimping plus soldering
- ▶ welding **COPPER, TIN** or different **COATINGS**
- ▶ welding **MIXED MATERIAL** combinations
- ▶ **WIRE SPLICING** 0,05 mm² to 120 mm²
- ▶ **WIRE TERMINATION** up to 150 mm²
- ▶ **HOT CRIMPING** up to 300 mm²
- ▶ manual, semi- and full automatic stations available
- ▶ **TURNKEY SOLUTIONS** with system integration
- ▶ **RELIABILITY** by process monitoring via PC controllers

APPLIATION RANGE:

<ul style="list-style-type: none"> ▶ E-DRIVES ▶ HF WIRES ▶ TRANSFORMERS ▶ WIRE HARNESS ▶ HV - CONNECTORS 	<ul style="list-style-type: none"> ▶ EV - CHARGING PLUGS ▶ LI BATTERY CELLS ▶ FLAT RIBBON CABLE ▶ BUS BAR WELDING ▶ INTEGRATED SYSTEMS
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beneficial easy welder KM 15 for compacting wires





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NEWS PLUGS

Wire Ties, Accessories Complement Cabinet and Tools

Phoenix Contact now offers wire ties and accessories to complement its Cabinet add-on and TOOL fox cable management product range. Cable ties are available in a wide variety of options, includ-

ing stainless steel, UV-resistant, heat-resistant and identifiable ties. Bases, rivets and loops round out the offering.

The ties have tapered edges to prevent damage to wires and protect the hands of the installer. A round tip provides faster initial threading and speeds installation, and also makes it easy to pick up the ties from flat surfaces.

The tensile strength ranges from 18 to 243 pounds, depending on the tie's width. Versions are available for harsh outdoor and high-temperature environments.

The WT-HF plastic cable binders for standard applications have UL Recognition.

Phoenix Contact develops and manufactures industrial electrical and electronic technology products that power, protect, connect and automate systems and equipment for a wide range of industries.

Phoenix Contact GmbH & Co. KG, Blomberg, Germany, operates 50 international subsidiaries, including Phoenix Contact USA in Middletown, Pa.

For more information about Phoenix Contact or its products, visit www.phoenixcontact.com, or call technical service at 800-322-3225, e-mail info@phoenixcon.com.



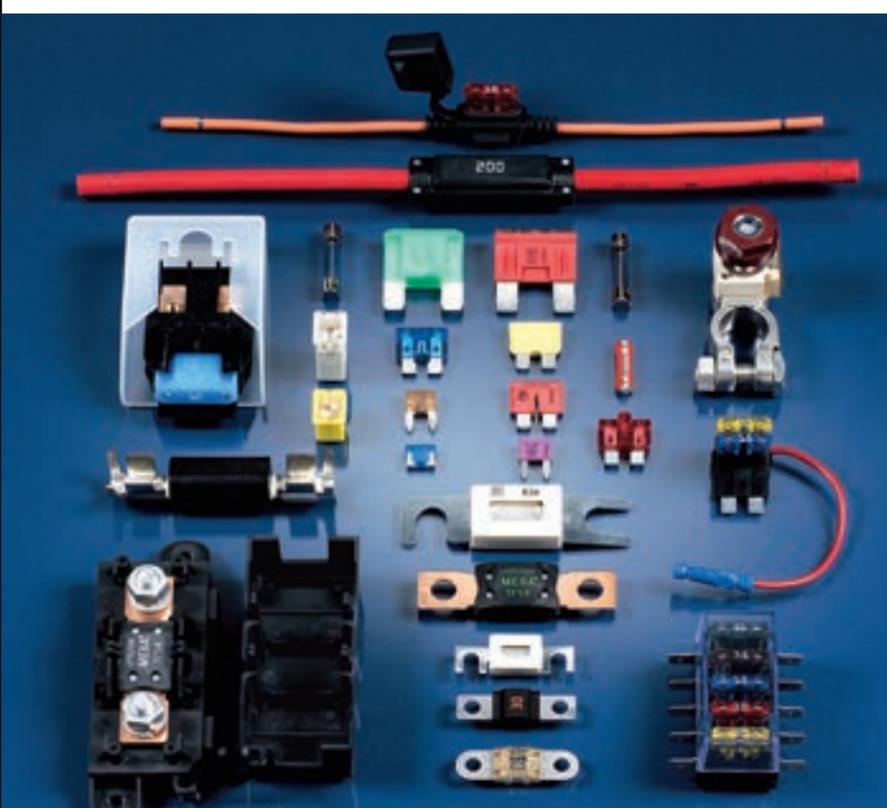
Wire Ties and Cable Management Accessories from Phoenix Contact

S&E Specialty Polymers Launches New Line of Resin Concentrates

S&E Specialty Polymers LLC, a leading producer of specialty plastic compounds, has expanded their custom compounding approach to include concentrates. This became possible after multiple high-tech upgrades to their plant, including the installation of new downstream feeders. S&E can now produce active master-



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- Crossed Linked Polyethylene 150C°
- Irrigation Cable
- Pet Wire
- Thermoset Insulated Wire
- Communication Cable
- Plenum Cables
- Our products meet or exceed RoHS requirements.



Industrial Wire and Cable Corp. has been manufacturing wire and cable products for over 40 years. We only produce the highest quality products at competitive prices. Our manufacturing process begins with 5/16 copper rod so we can control all tolerances to the highest standards in our state-of-the-art facility, located in Lake Zurich, IL.

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batches with up to 85% active ingredients.

Currently S&E is producing approximately 15 different flame retardant (FR), Ultraviolet (UV), Blown Agent and other concentrates.

By expanding its product line from custom compounds to include concentrates, S&E can now provide injection molding and extrusion customers with the ability to significantly improve their purchasing costs, reduce numbers of SKU's, and improve their production flexibility.

"Molders and extruders now have the option to buy straight resins in volume from their resin suppliers and meter in custom concentrates purchased from us to meet their desired requirement," said Jay Munsey, S&E's National Sales Director.

The company has calculated that by using the active masterbatch approach, customers can find a significant overall savings in their production costs. For example, Wire & Cable manufacturers will potentially see dramatic savings in their cost/ft, said Munsey.



S&E tech sifting through white pellets.

"So many plastic parts have stringent requirements, and our customers know we supply custom compounds that meet these requirements," he said. "That being said, others have found there is a savings to purchasing the base resins and base compounds in volume and adding the various concentrates themselves to meet their specifications."

An additional benefit for customers is that by purchasing these concentrates they can better plan what levels of virgin materials they need (typically PE and PP), thus reducing their raw material inventory.

S&E Specialty Polymers is a premier specialty plastic compounder serving the automotive, wire and cable, battery/stored energy, and footwear markets. The company's products are also used extensively in general purpose molding and extrusion applications.

S&E produces PVC, TPE, TPO & TPR compounds including flame retardant polyolefin, flame retardant/low smoke PVC Plenum and low smoke zero halogen compounds. The company is a producer of flame retardant concentrates and compounds requiring exact color matching of wire & cable materials used in the replacement and/or installation of new cable in nuclear facilities.

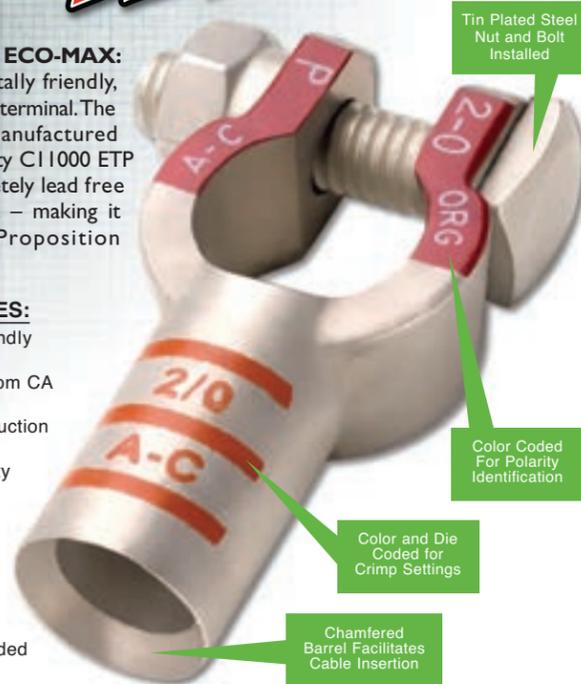
For more information please visit website at <http://www.sespoly.com>, or contact S&E Specialty Polymers, 140 Leominster-Shirley Rd, Lunenburg, MA 01462 Phone (978) 537-8261 or Fax (978) 840-8200.



FTZ introduces the ECO-MAX: the first environmentally friendly, 100% copper battery terminal. The post top design is manufactured with the highest quality C11000 ETP copper and is completely lead free and RoHS compliant – making it exempt from CA Proposition 65 requirements.

ECO-MAX FEATURES:

- Environmentally Friendly – RoHS Compliant
- Lead Free-Exempt from CA Proposition 65
- 100% Copper Construction – C11000 ETP
- Maximum Conductivity 101% IACS at 68F
- Tin Plated for Corrosion Resistance
- Provided with Nut and Bolt Installed
- Exceeds SAE Standard J-1811
- Color Coded, Die Coded



FTZ's C11000 ETP (Electrolytic Tough Pitch) Copper Battery Terminals Provide the Highest Conductivity Rating Compared to Any Competing Copper Design. Conductivity Performance Ratings for Typical Designs are Provided at right:

Common Battery Terminal Alloys	Electrical Conductivity
ECO-MAX C11000 (ETP)	101% IACS at 68 F
C83300 (131 Contact Cu)	32% IACS at 68 F
C85400 (Yellow Brass)	20% IACS at 68 F

FTZ INDUSTRIES 515 Palmetto Drive Simpsonville, SC



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NEWS PLUGS continued


Fifty Professional Development Courses at IPC APEX EXPO 2013

Comprehensive updates on pressing industry concerns, challenges and developments will be addressed in 50 IPC APEX EXPO® professional development courses, February 17–18 and February 21, 2013, at the San Diego Convention Center.

Covering issues in design, lead-free technology, materials, process improvement, solder joint reliability and more, the courses will go beyond theory to provide practical solutions to industry issues and challenges. Each course is led by a subject-matter expert, runs for three hours and will include an instruction handbook.

Industry experts such as Mike Carano of OMG, Happy Holden of Gentex, Cheryl Tulkoff of DfR, Bob Wetterman of BEST and Phil Zarrow of ITM will offer one or more courses. Course highlights include:

- Design for Manufacturing (DFM): Best Practices (PD08)
- Extreme HDI: Designing for Maximum Density (PD10)
- Best Practices in Electronics Assembly Processes (PD13 and 17)
- Tin Whiskers: Failure Risk and Mitigation Strategies (PD21)
- Ball Grid Array: Principle and Practice (PD30)
- Package on Package: Design, Assembly, Rework and Inspection (PD44)

“The courses at IPC APEX EXPO will enable engineering and management staff to work smarter in an era of increasing product sophistication,” says Susan Filz, IPC director of industry programs. “Atten-

dees will bring home new insights and solutions to boost their productivity.”

Engineers like Rigo Garcia, Sr. Quality Assurance Engineer, NASA Goddard Space Flight Center agree, “The conference and courses offer a great opportunity to increase my value as a professional ... and having the chance to talk to the technical experts and see equipment being used today is incredibly valuable.”

The complete list of professional development courses along with full descriptions and instructor biographies is available at www.IPCAPEXEXPO.org/courses.

Access to the exhibit hall is free to pre-registrants, a savings of \$25 on-site. Individuals who register by January 25 will save 20 percent off registration fees. A new registration option for 2013, the Maximum Value Package (MVP) includes a choice of up to six half-days of professional development, all technical confer-

ence sessions, standards development meetings, luncheons and more — all with a savings of more than 75 percent over individual item prices. For more information or to register for IPC APEX EXPO, visit www.IPCAPEXEXPO.org.

Marsh Electronics Proudly Celebrates 75 Years in Business

There have been many changes since 1937. But, the dedication, commitment and category expertise of everyone at Marsh Electronics have been unwavering since the company's founding. Proudly celebrating its 75th anniversary, Marsh Electronics remains focused on delivering the highest quality products, service, and best value to its customers. For more than seven decades, this philosophy has helped the company grow into a regional leader, distributing a wide range of electronic components and solutions throughout the North Central United States.

“It's really pretty humbling to look back on how far this company has come,” said Jim Banovich, vice president of sales and marketing for Marsh Electronics. “Of course, our evolution and continued growth wouldn't have been possible without the effort of our employees and the dedication and support of our loyal customers. We send heartfelt thanks out to everyone who has stood behind us over the years. All of us at Marsh are proud to have been around for 75 years and we're certainly excited as we look ahead to the next 75 years and beyond.”

Today, Marsh Electronics is a broad line stocking distributor offering electronic components from leading manufacturers of passive, electromechanical and power semi-conductor products. The company's willingness to stock inventory tailored to its customers' specific needs, as well as Marsh's unique ability to provide customized management programs, have helped position the company as a trusted, single source for a diverse array of electronic components.

“Through the years, we've certainly come to value the critical importance of having the right systems and procedures in place,” Banovich said. “But, we've been careful to also never lose sight of how important it is to have the right people here. At Marsh, we believe in developing long-term relationships and we work hard to be the most welcoming, convenient, and cost-effective partner.”

For further information visit www.MarshElectronics.com or call 800-236-8327.

Put the champion in your corner



Sonobond ultrasonic welders can handle even your toughest wire welding challenges.

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

Our ultrasonic welders are quality engineered to take on the most difficult metal welding applications. Consider these heavy-weight advantages that only Sonobond can offer...



- The ability to confidently handle the widest spectrum of welds — including *tin-coated wires and terminals*, as well as aluminum, copper, nickel alloys, precious metals, and dissimilar metals.

- *Fast, easy tooling changes* that take only a minute or less and require *no calibration*.

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Tests show that ultrasonic welding is less expensive and more reliable than resistance welding. And Sonobond technology helps you be RoHS-compliant, unlike conventional soldering.

Sonobond uses a unique, patented Wedge Reed bonding system that combines high vibratory force and low amplitude coupling to deliver precise results every time. Our units are made in the USA and require only minimal operator training. Sonobond also goes the distance by providing the very finest technical support and customer service—before, during, and after installation.

Put Us to the Test

We are so confident that our welders can deliver a quick one-two punch to your toughest application that we encourage you to put us to the test.

Just supply us with your metal components. We'll weld them in our Applications Lab, show you the results, and recommend the unit that's best for your specific product. There's no cost or obligation.

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



Model 1700



Model 2000

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

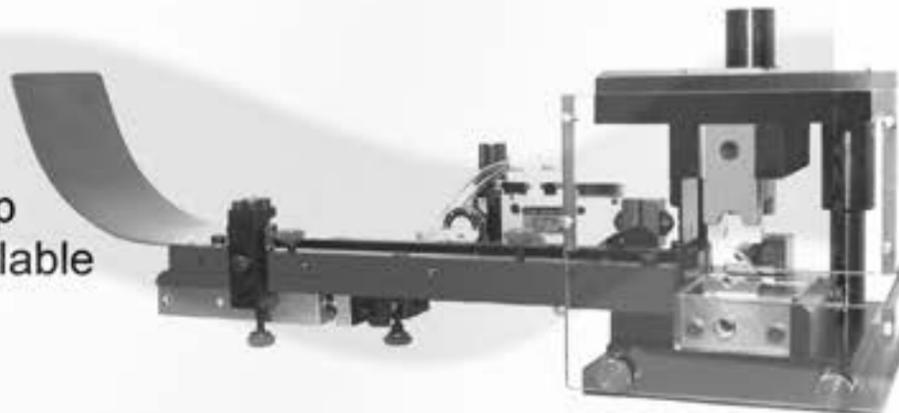


Model 1500



Model 2100

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



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NEWS PLUGS continued



Digital Torque Tool Testers

Mark-10 introduces their all new Series TT02 Torque Tool Testers, presenting a simple and accurate solution for testing manual and electric torque screwdrivers, wrenches, and other tools. These testers are compact and rugged, suitable for production environments in virtually every industry. A universal 3/8" square receptacle accepts common bits and attachments. The TT02 captures peak torque in both measurement directions, and also calculates 1st and 2nd peaks, useful for click-type tools.

A blazingly fast sampling rate of 7,000 Hz and accuracy of ±0.3% produce reliable and consistent test results. The TT02 includes a range of sophisticated productivity-enhancing features, including USB, RS-232, Mitutoyo, and analog outputs, automatic data output/zeroing/data storage upon tool slip or click, memory storage for 1,000 readings, pass/fail indicators and outputs, and more.

Password protection is provided to prevent unauthorized changes to settings and calibration.

Three torque capacities are available: 12 lbin (135 Ncm), 50 lbin (570 Ncm), and 100 lbin (1150 Ncm). Series TT01 testers include MESURTM Lite basic data acquisition software, USB cable, AC adapter, rechargeable battery, user's guide, and NIST-traceable certificate of calibration. Rundown fixtures are available for electric

tools.

The TT02 is designed and manufactured in the United States and is covered by a 3-year warranty.

For further information contact Mark-10 Corp., 11 Dixon Ave., Copiague, NY 11726. Phone (631) 842-9200 or Fax (631) 842-9201. Visit www.mark-10.com or email info@mark-10.com

WireMasters Expands With a West Coast Regional Location

WireMasters has recently expanded its operation to include a new warehouse facility located in Mesa, Arizona. Over the past several years, WireMasters has recognized strong customer demand and has experienced consistent growth within the Western United States, Western Canada and Mexico. The opening of the Mesa location will allow WireMasters to improve services provided to the West Coast Region, while raising their presence within the aerospace industry. For 25 years WireMasters has endeavored to exceed customer needs and enhance customer satisfaction for its over 6,000 customers worldwide.

"WireMasters focuses on exceeding customers expectations", said David Hill, President and CEO of WireMasters. "By establishing the Mesa location, we will be able to continue and accelerate our growth trend in the Western Region. In addition to the new Mesa facility, we have added Ryan Barnhart as the National Account Manager for the West Coast Region. With a degree in Electrical Engineering and his experience in the aero-

Continued on page 24

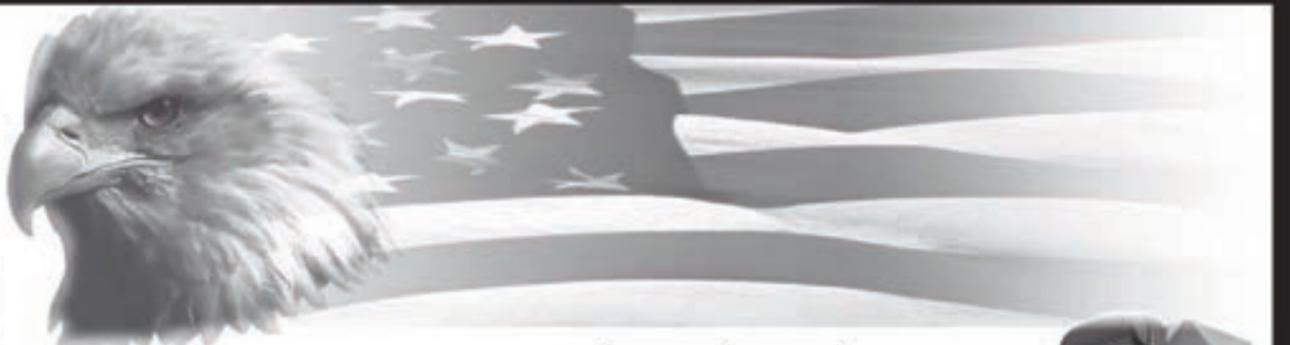


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CRIMPING HEIGHT:
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WEIGHT:
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DIMENSION (mm):
W 200 x H 580 x D 300

DIMENSION (")
W 7.9" x H 23" x D 11.8"

CONFIGURATION:
manual/automatic

POWER SUPPLY:
to see versions

VOLTAGE:
to see versions

SURFACE FINISHING:
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• Available either in semi-automatic (for bench-top use) configuration or in full automatic (integrated into a cut and strip machine) configuration.

• Very compact and light, its spheroidal cast iron, one-piece structure offers the highest rigidity.

• 40mm Standard stroke (others available upon request).

• Can be used with all mini-style applicators with standard T-coupling.

• CFA can be fixed as an option.

• 135.8mm ± .02mm crimping height.



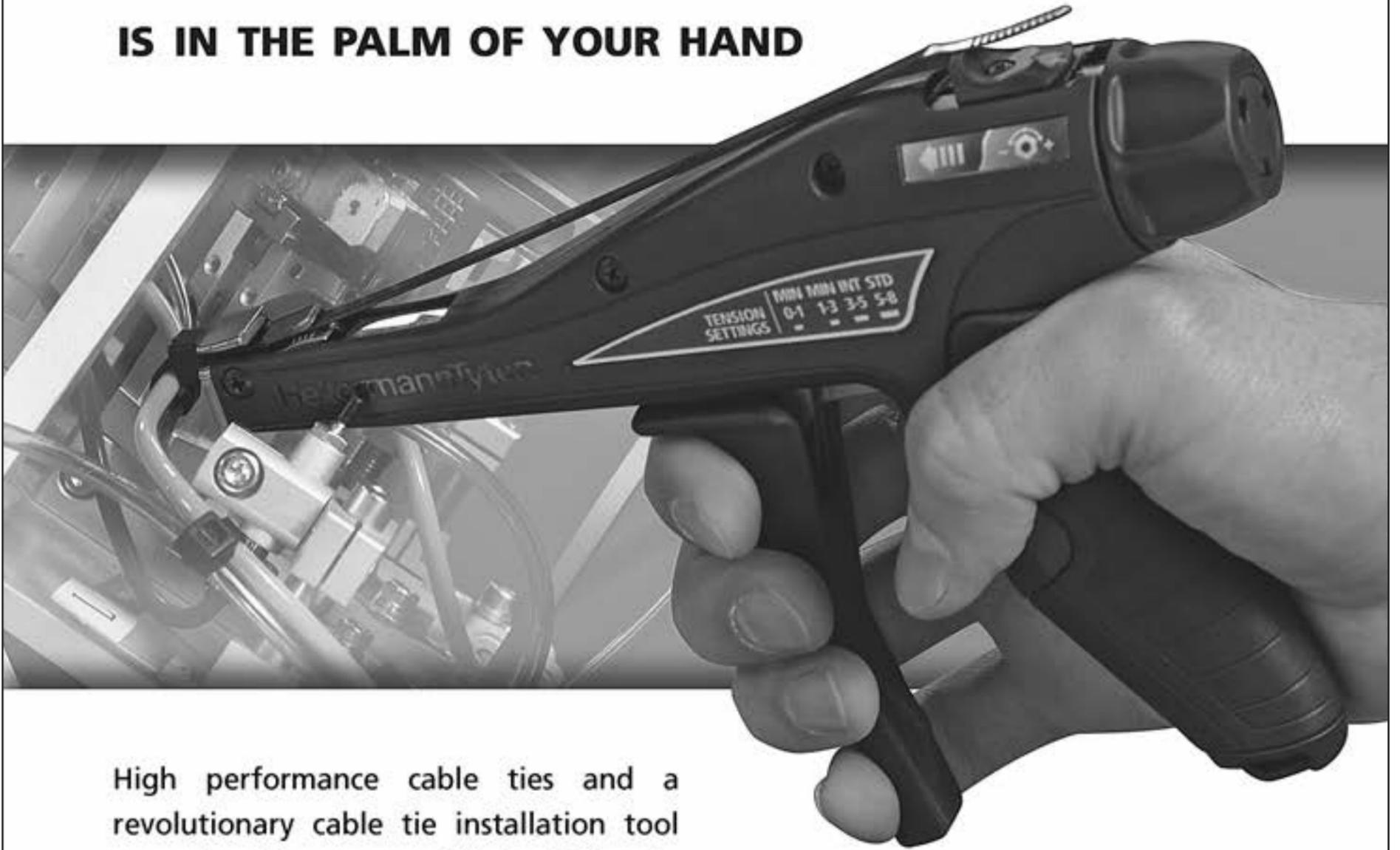
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EVO 7

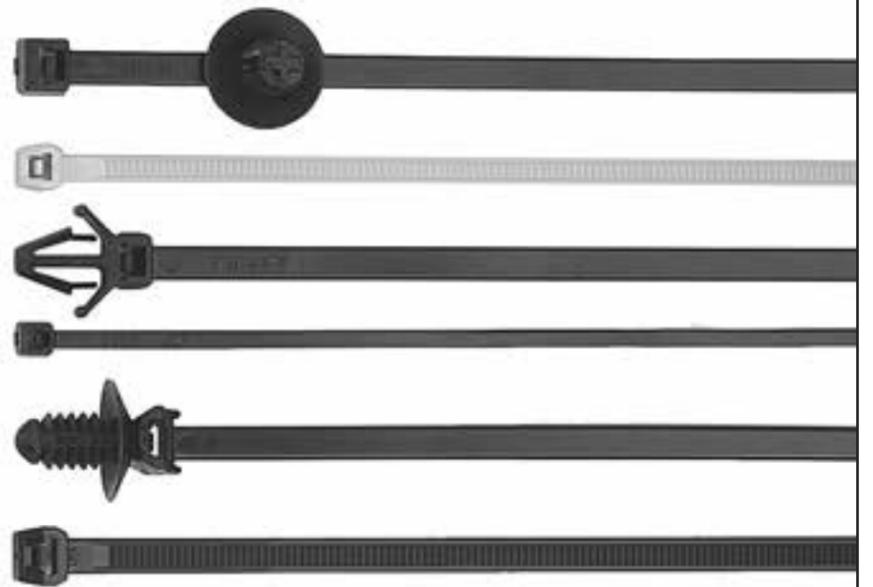
ERGONOMICS

HellermannTyton's EVO 7 offers the most ergonomic cable tie installation tool in the market. Period. Comfort and operability are combined in one revolutionary tool.

PERFORMANCE

At the heart of the EVO 7 lies patent-pending Tension/Lock/Cut (TLC) technology; the unbeatable ability to accurately and consistently cut a cable tie flush at the exact tension specified without any operator strain.

TENSION • LOCK • CUT



HellermannTyton is globally recognized for manufacturing a full line of high quality cable ties and fastening systems. Manufactured in the USA, the EVO 7 cable tie tool and HellermannTyton's cable ties together produce bundling and fastening systems of unparalleled quality. Learn more about HellermannTyton at:

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NEWS PLUGS continued



Continued from page 22

space industry we feel he will be a great asset to the WireMasters team and the Mesa location.”

November 2012 will mark the opening of the Mesa location. Located at 5456 E. McDowell Road, the 10,000 square foot warehouse will stock approximately \$1 Million dollars worth of Mil-Spec wire, cable, connectors, and tubing available for same day shipments.

Founded in 1988, WireMasters Inc. is a leading international distributor of high performance and high temperature military specification wire, cable and associated accessories. The company's headquarters in Columbia, Tenn. warehouses

millions of feet of wire and cable inventory. For more information visit www.wiremasters.net.

VIDEOJET® Introduces Next Generation 1550 and 1650 Ink Jet Printers

Videojet Technologies Inc., a manufacturer of coding, printing and laser marking products, fluids and accessories for the product identification industry, introduced two next generation printers to its reliable 1000 Line – the 1550 and 1650 ink jet printers. Designed with new features to promote productivity and profitability, the 1550 and 1650 ink jet printers provide metrics to measure availability as well as the tools to measure and improve uptime and Overall Equipment Effectiveness (OEE). Simple to operate, the 1550 and 1650 also include Code Assurance features to help reduce coding errors and ensure the right code is printed on the right products.

With an innovative design to provide customers with high Availability for production lines and the right metrics to track it, the Videojet 1550 and 1650 printers reduce unplanned downtime through features like the patented CleanFlow™ print-head and Dynamic Calibration™ ink flow system. Designed to resist ink build-up that can lead to a shutdown, both the 1550 and 1650 possess an auto-cleaning function, meaning there are less frequent printhead cleanings and positive flow of filtered air for more reliable, clear and consistent codes, even at the end of long production runs. The unique printhead design and long-lasting core minimizes planned downtime due to long intervals – up to 14,000 hours – between planned routine maintenance cycles.

The 1550 and 1650 ink jet printers also help customers measure Uptime by providing OEE Availability metrics. The Availability measure is also configurable to more closely reflect how customers oper-

ate production lines and measure Availability across their plant.

“Every company strives for 100 percent production line uptime. A recent survey by Videojet of customers representing over 400 1000 Line printers on active production lines showed an average 99.9 percent Availability in the previous month.1 Videojet's 1550 and 1650 ink jet printers allow customers to shrink downtime and expand Availability,” said Dennis Howe, vice president of business management for Videojet.

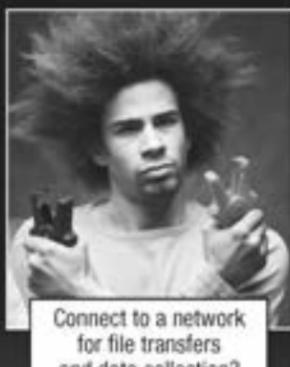
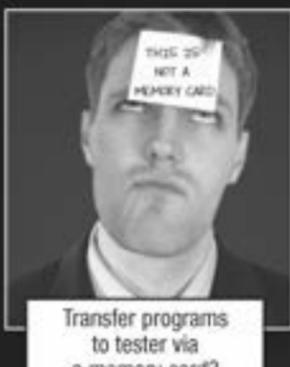
Beyond providing an Availability metric, users need to be able to identify and eliminate the major root causes of unplanned downtime to improve it. The Videojet 1550 and 1650 printers present downtime information in a logical way to support efficient and effective problem solving. The printer enables drilling into Availability data to help discover technical and operator causes of downtime. Understanding root cause is critical to implement and achieve sustainable process improvements.

Coding errors are common – codes that are one digit off, dates that don't exist, codes on wrong products, typing errors. These mistakes can mean waste, rework, regulatory fines and potential damage to a manufacturer's brand. Operator error is the most prevalent cause of coding mistakes. The Videojet 1550 and 1650 possess Code Assurance features to fool-proof and help prevent mistakes, keeping customer production lines productive and ensuring brand integrity.

The Videojet 1550 and 1650 are designed for limited and simple interaction so users can focus on production. Operators can access all common operations in five touches or less on a large, bright touch-screen interface. The 1550 and 1650 help provide improved control of job parameters and efficient, productive line management. In addition, the Videojet Smart Cartridge™ fluid system eliminates waste, mess and mistakes, and when it's time for planned maintenance, the 1550 and 1650 modular core system is easily replaceable – getting customers right back to production quickly and efficiently.

“We're dedicated to continuously work toward reducing the frequency and length of both planned and unplanned downtime so our printers are performing at maximum ability and readiness,” said Howe. “By designing our equipment to be more available, simplifying and minimizing equipment interaction and making information more actionable, we have created a coding and marking solu-

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Resistance: 1Ω-2MΩ
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Insulation Resistance: 5MΩ- 1GΩ
Test Points: 64 to 32,768

Dynalab
TEST SYSTEMS



tion that delivers the maximum level of uptime available on the market today.”

For more information about the Videojet 1550/1650 printers and Videojet 1000 Line, call 800-843-3610 or visit http://www.videojet.com/usa/Videojet_1000_line_ink_jet_printers.

IEWC Announces Changes to Sales and Marketing Leadership Positions

IEWC has restructured several areas of its sales and marketing leadership, including the expansion of its U.S. division from three operating regions to four, as the company continues to position the business for dynamic growth.

Mike O'Donnell has transitioned from Vice President of North American Sales to Senior Vice President of Global Sales. In this position, Mike will work collegially with IEWC's country leaders and sales representatives around the world to ensure the company continues to offer products and services into the OEM and Sub-Assembly markets in a highly focused and orderly manner. Mike will report to Paul Bryant, EVP & CCO and be based out of the Milwaukee head office location.

Mark Christie has transitioned from Vice President of Wire Management Products to Vice President of Sales, US Division. In this position, Mark will champion the sales initiatives for IEWC's four sales regions in the USA. Mark has done a nice job of working with both supplier contacts and customer contacts over the past 4 years to firmly establish IEWC's wire management products and services in the marketplace. Mark will continue to oversee the ongoing growth of that activity within the USA as part of his newly expanded responsibilities. Mark will report to U.S. Division President, Kyle Spader and be based out of the Milwaukee head office location.

JR Dubovick has transitioned from his leadership role in Aerospace & Defense to Regional Sales Director of the East Region of the USA that includes the geography bounded by New England, Maryland, Delaware, Pennsylvania, New Jersey, New York, Michigan, West Virginia, Kentucky and Ohio. Over the past six years JR has successfully transitioned the Aerospace and Defense Business into the mainstream activities of the company. JR will continue to provide insight and support internally as the aerospace and defense initiative becomes a market vertical activity housed within IEWC's Marketing Department. JR will be responsible for the sales responsibilities of both the Cleveland and Boston Sales Offices, report into Mark Christie and be based out of the Boston location.

Jim Clarke will redirect his primary focus as Regional Sales Director of the South Region which will include the sales activities of both the Greenville, SC and Dallas Sales Offices. Jim will also report to Mark Christie and operate out of his current Charlotte, NC location.

Joe Crum has recently joined IEWC as Marketing Director. Prior to joining IEWC, Joe held various positions during an 11 year period with Direct Supply including Senior Director of Product Management. Since joining IEWC, Joe has established several new Product Manager positions to maintain IEWC's current product portfolio and champion the growth and development of various market verticals, including Aerospace & Defense, Wire Management Products and Audio & Broadcast. Joe will report to Paul Bryant, EVP & CCO and be based out of the Milwaukee location.

Christie Vick has recently assumed the position of Product Manager, Aerospace & Defense and will report to IEWC's Market-

ing Director, Joe Crum. Christie joined IEWC in 2011 and has made several significant contributions within the marketing group that include product portfolio management, enhanced product introduction processes and functioning as a liaison between suppliers, sourcing, inventory management and sales. Christie is located at IEWC's head office facility in Milwaukee. IEWC is a global supplier of wire, cable and wire management products, with distribution centers strategically located throughout the world.

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NEWS PLUGS continued



Ty-Rap® Polyester-Coated Stainless Steel Ball-Lock Cable Ties

Ty-Rap® Polyester-Coated Stainless Steel Ball-Lock Cable Ties from Thomas & Betts provide greater safety than other stainless steel cable ties by featuring a low-smoke, halogen-free polyester coating, which releases fewer toxins if burned. Additional safety features include rolled edges on the strap, which eliminates the risk of damage to cables and injury to installers.

The polyester coating also provides the cable ties, constructed of marine-grade 316 stainless steel, with additional protection against corrosion, including corrosion from contact with dissimilar materials, as well as against impact, abrasion and cracking. Ty-Rap® Polyester-Coated Stainless Steel Ball-Lock Cable Ties also are resistant to extreme temperatures, with an operating range of minus 40 F to 302 F (minus 40 C to 150 C).

"These cable ties add an extra level of safety, while operating under continuous exposure to extremely harsh environments," said Chad Smith, director, product management at Thomas & Betts. "These products

are ideal for the demanding applications of offshore drilling rigs, petroleum refineries, shipyards and chemical processing plants. The unique design features and materials also reduce risks to personal safety and cable integrity."

As with all Ty-Rap® stainless steel ball-lock ties, Ty-Rap® Polyester-Coated Stainless Steel Ball-Lock Cable Ties feature a pointed tail to enable fast and easy insertion and a low-profile ball in a wedge-shaped head that locks the tie securely in place.

For more information about Ty-Rap® Polyester-Coated Stainless Steel Ball-Lock Cable Ties from Thomas & Betts, visit www.tnb.com and look for Ty-Rap® on the "Brands" tab, or call (800) 238-5000.

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

Allied Wire & Cable Charity Week 2012

Allied Wire & Cable Celebrated family with its 7th Annual Charity

Week, which ran December 17th – December 21, 2012. During that week, a percentage of all sales was donated to the American Cancer Society, the Make-A-Wish Foundation, and the ASPCA.

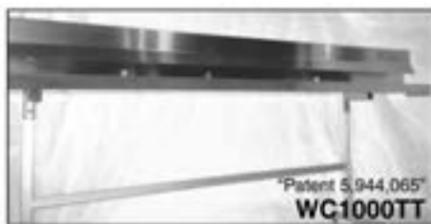
Charity Week is one of Allied Wire & Cable's best loved holiday traditions. In past years, Allied has asked its customers to help choose the charities, but this year, the company did it a little differently. In honor of all the brave people currently battling cancer, including one of Allied's own family members, Nikki Lucas, the main donation from Charity Week will go to the American Cancer Society.

Nikki, a sales assistant at Allied Wire & Cable's Florida location, hand-picked the American Cancer Society for its work in the fight against all types of cancer. The organization encourages a healthy lifestyle and early detection, funds cancer research, and offers a wide range of services and support to people battling all forms of the disease.

Nikki was diagnosed with Stage 3 breast cancer in March, and was told that it had spread to the lymph nodes on her left side. She has been undergoing treatment ever since, and says that sharing her experience, and encouraging others to take measures to protect themselves, including getting regular mammograms, is one of the things keeping her strong. She says, "That's what is getting me through – is helping others." It only



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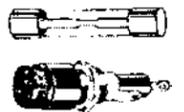
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makes sense that Nikki's mission to help others continues through Charity Week.

In keeping with the celebration of family, two additional charities will join the American Cancer Society as beneficiaries of Charity Week 2012. On behalf of all the younger members of our families, \$1,000 will go to the Make-A-Wish Foundation, which grants the wishes of children with life-threatening medical conditions. Allied will also donate \$1,000 to the American Society for the Prevention of Cruelty to Animals (ASPCA) for the four-legged members of our families.

Charity Week was an opportunity for the Allied family and its customers to work together in achieving something great.

Allied Wire & Cable is a family owned and operated wire and cable distributor and value-added manufacturer. Allied services many of the largest markets in the country, including the government, military, and the aerospace, automotive, and telecommunication industries. Dedicated to providing the best and most personalized service possible, Allied offers customization services, including cut and strip, printing, dyeing, striping, twisting, and more, so customers get their wire and cable exactly the way they need it. Allied also assigns individual sales reps to customers, providing a single point of contact to guide them through the cable buying process.

Headquartered in Collegeville, PA, Allied has offices in Florida, New Hampshire, South Carolina, Tennessee, Texas, Wisconsin, Nevada, and Florida, along with several warehouses across the country. For more information on Allied Wire & Cable, please visit www.awcwire.com.

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SumiMark SM-CM (Printable Marker Tags) are flat, irradiation cross-linked, polyolefin labels used for identification of large cables and harnesses. These environmentally resistant, flame-retarded polyolefin tags provide superior reliability with minimal waste and a low installed cost. SumiMark SM-CM tags are applied to cables or wire bundles with standard cable ties.

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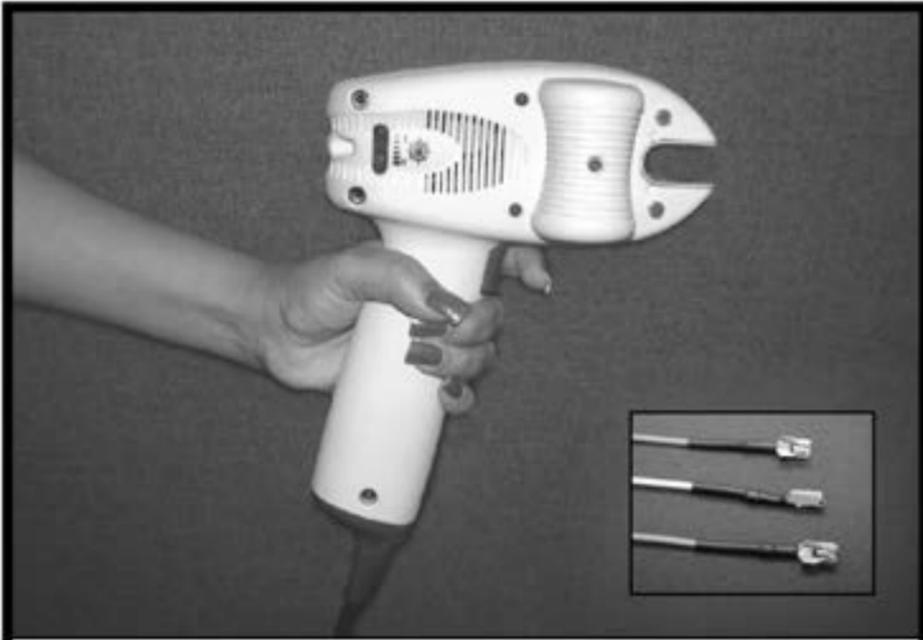
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Here's why it works: Dual Quartz Halogen bulbs are focused to direct all of the usable radiant energy to the cable/wire diameter covered by shrink tube. This allows for 10 times the average energy expended by the bulbs to be delivered to the target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

The Focus-Lite™ 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™ products.



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

Temperature Ratings

The temperature ratings of wire and cable products are key operating parameters. The use of wire and cable products outside their design temperature range can result in premature and often expensive failures in service. Some of the most common temperature ratings used in the wire and cable industry are discussed below.

Maximum Operating Temperature

This is the temperature rating that most cable users think of first. It is usually defined as the maximum continuous temperature that the wire can withstand during its lifetime. It is generally limited by the thermal aging characteristics of the polymers, i.e., the plastics used to insulate and/ or jacket the wire. The metallic components of the wire seldom limit the temperature rating except in high-temperature wire where oxidation of the metal begins to become a significant factor at approximately 250° C.

Most polymers age by gradually becoming brittle over time. One common measure of brittleness is referred to as elongation. This is a laboratory measurement of how much the material can

stretch before it breaks. Polymers used in the wire industry typically start life with an elongation in the 300 to 700 percent range depending on polymer type. That is, some polymers can be stretched up to seven times their original length before they break. The end-of-life for polymers is often defined as the point at which the elongation declines to 50 percent because at that point even minor bending of the wire or cable can cause cracking of the insulation, the jacket or both.

Every polymer has its own unique thermal aging characteristics. However, as a rule-of-thumb, for every 10° C the operating temperature of a polymer is increased, the life is decreased by a factor of two. For example, a wire that is designed to survive 40 years at 90° C would be expected to survive only 20 years at 100° C and 10 years at 110° C. The mathematical model used to calculate the relationship between temperature and cable life is called the Arrhenius relationship[1] after the Swedish chemist that developed it. The Arrhenius relationship coupled with field experience and laboratory aging tests are the basis for the operating temperature rating assigned to most wire and cable products.



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Minimum Cold Bend Temperature

Most polymers become increasingly brittle as their temperature is lowered. Depending on polymer type, they begin to crack when bent at temperatures ranging from -10°C down to approximately -80°C . The minimum cold bend rating for wire is usually defined as the lowest temperature at which it can be bent without cracking under specific laboratory conditions. There are several test methods in use by the industry to determine this temperature. They generally involve cooling the wire to a specified temperature (-25°C is typical) and then bending the wire around a mandrel whose diameter is in the range of 4 to 8 times the wire diameter. Details of one such test method are given in Section 7.5 of UL Standard 2556.[2]

Minimum Installation Temperature

This is the lowest installation temperature recommended by the cable manufacturer for a given wire or cable. This temperature is usually 10 to 20°C warmer than the laboratory cold bend temperature rating to compensate for the higher mechanical forces often encountered during installation.

Minimum Continuous Flexing Temperature

The minimum continuous flexing temperature is the lowest temperature at which a wire can withstand repeated flexing throughout its lifetime without damage. This rating is especially important for applications in which the wire

or cable will be flexed thousands or even millions of times while at very low temperatures. An example of such an application is the wiring for an automated material handling system located inside an ice cream storage warehouse where the ambient temperature is maintained at -30°C .

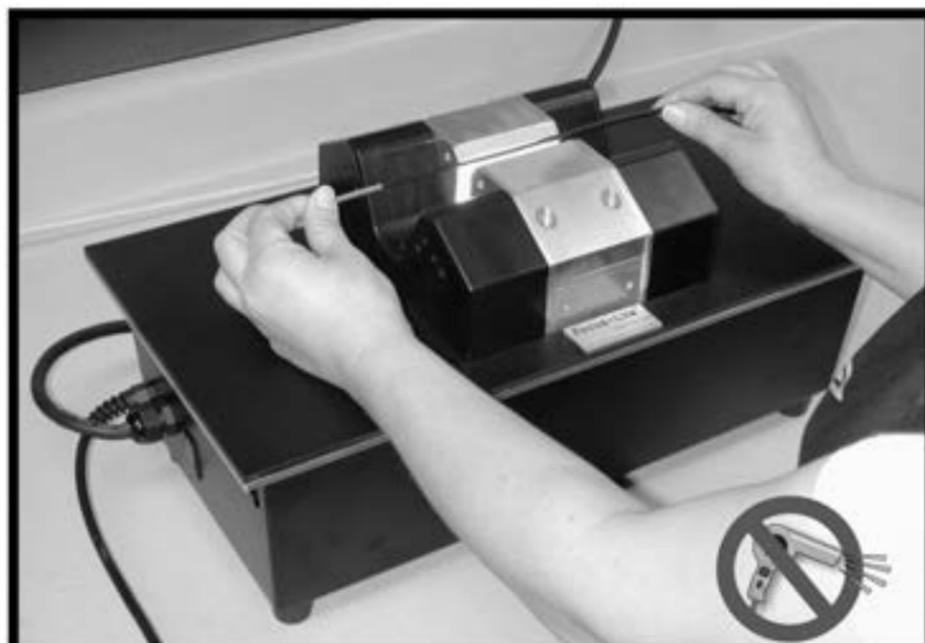
Emergency Overload and Short Circuit Temperatures

In certain situations, power cable users must operate a cable at a higher than normal electrical load (i.e., temperature) for a limited period of time. As a result, cables have been developed that can withstand such overloads. For example, many 90°C rated power cables have an emergency overload rating which permits their use at 130°C for a total of up to 500 hours during their lifetime. Generally, these cables also have a short circuit rating which is the highest temperature the cable can withstand during an electrical short circuit lasting up to about half a second. For 90°C rated power cables, the short circuit temperature rating is usually 250°C .[3]

[1] SAE Standard AS4851A, Relative Thermal Life and Temperature Index for Insulated Electric Wire, sae.org

[2] UL Standard 2556, Wire and Cable Test Methods, ul.com

[3] NE MA WC70 (ICEA S-95-658), Standard for Nonshielded Power Cables Rated 2000V or Less, icea.net



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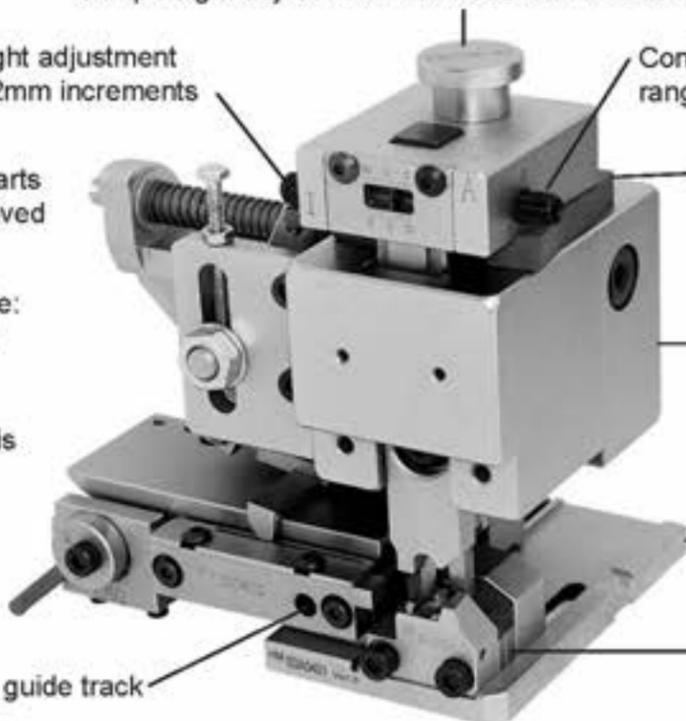
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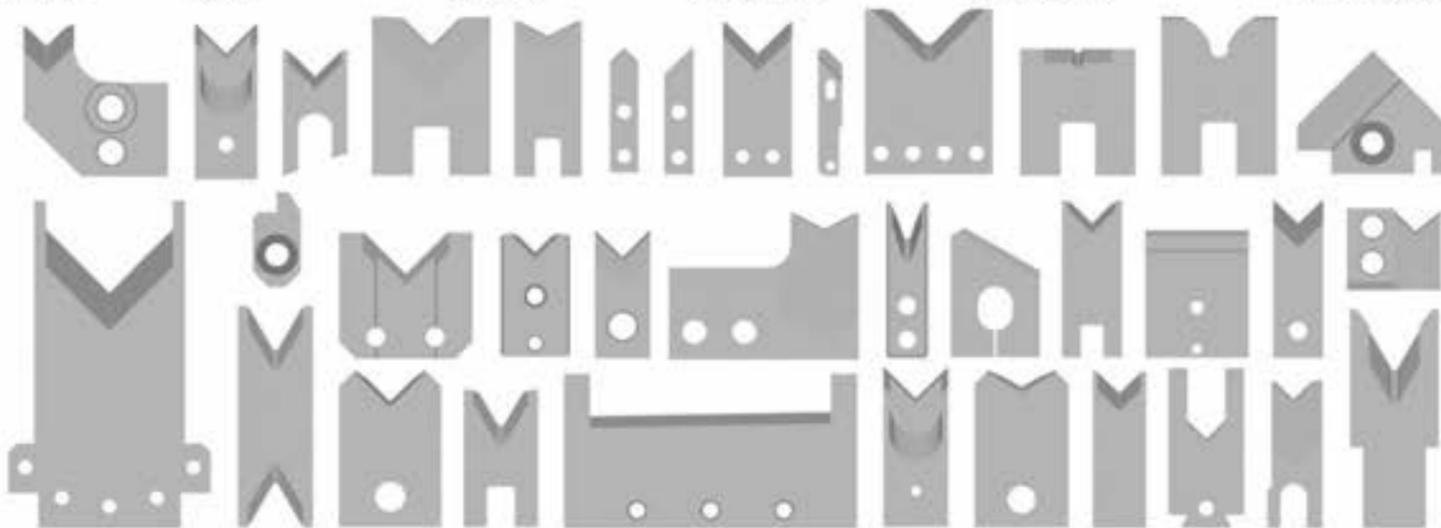
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NEWS PLUGS continued**SEA Wire and Cable, Inc. Announces Promotion**

SEA Wire and Cable, Inc., a leading Military/Aerospace Wire and Cable distributor, announced the promotion of Chase Layton to Operations Manager effective January 1, 2013. Chase will be responsible for warehouse and daily operations for SEA.

"Through his hard work and dedication, Chase has proven to be valuable asset to the SEA management team. We expect Chase's commitment and quantitative skills to prove to be a key component in SEA's future growth. Chase will provide that critical vision to help shape our tactical and strategic plans" said Marty Clark, President and COO of SEA.

Chase started with SEA working summers to help finance his college expenses. After graduating from University of Alabama in 2008, Chase joined the sales organization where he honed his skills and learned the basics of the business. Chase is currently graduating with his MBA from University of Alabama Huntsville with emphasis on operations management. In addition to providing support to the warehouse over the past several months leading to new programs, systems, and efficiencies - he has also been instrumental in technology updates with new ERP P21 system.

SEA specializes in supplying wire, cable, tubing, termination sleeves, cable ties, EMI/RFI backshells, and other cable assemblies for the most demanding electronic applications. To provide fast service and to meet a wide range of client needs, the company currently stocks over 11,000 items and 50 million feet of wire in its modern 88,000-square-foot facility.

Mecal by Starn Appoints New Sales Manager

Mecal by Starn is pleased to announce that Mr. Jim Smith has been promoted as company Sales Manager. "Jim has been an asset to our company in a wide variety of areas. He started working with Starn Tool in 1989 and moved to Mecal by Starn in 2011. In total, he has been with the Starn Family of companies for nearly 24 years." stated Bill Starn, President of Mecal by Starn.

Jim graduated in 1985

from Meadville Area High School. He joined the Marine Corp. Reserves in which he served a total of 6 years with honorable discharge. Jim joined Starn Tool in 1989 and has held a variety of positions over the years providing him with a vast amount of knowledge in all aspects of the company. Jim can be contacted at 814-724-1057, Ext. 114 or jsmith@starn.com

Mecal by Starn is the distributor and manufacturer of the entire Mecal product line in the United States and Canada. The partnership of Mecal and Starn Tool, creating Mecal by Starn, provides applicators and spare tooling for the wire harness industry. Mecal was established in 1976. Their products are extensively used by the

automotive, communication and IT industry, and wherever a high quality connection is called for. Situated in the middle of the most industrially developed part of Italy, Mecal operates out of its fully owned 54,000 sq. ft. plant, employing 100 skilled and motivated young people and has a very modern and rational production structure. Starn was established in 1945, and soon became a leader in supplying the automotive industry with progressive stamping dies and spare parts along with the building and assembly of applicator bodies for one of the world's largest terminal manufacturers. It was this experience that Mecal was looking for to form a partnership in the United States.

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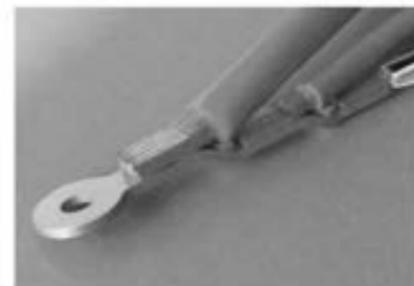
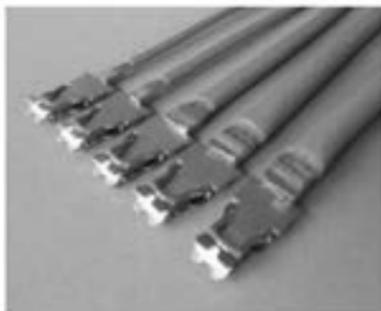
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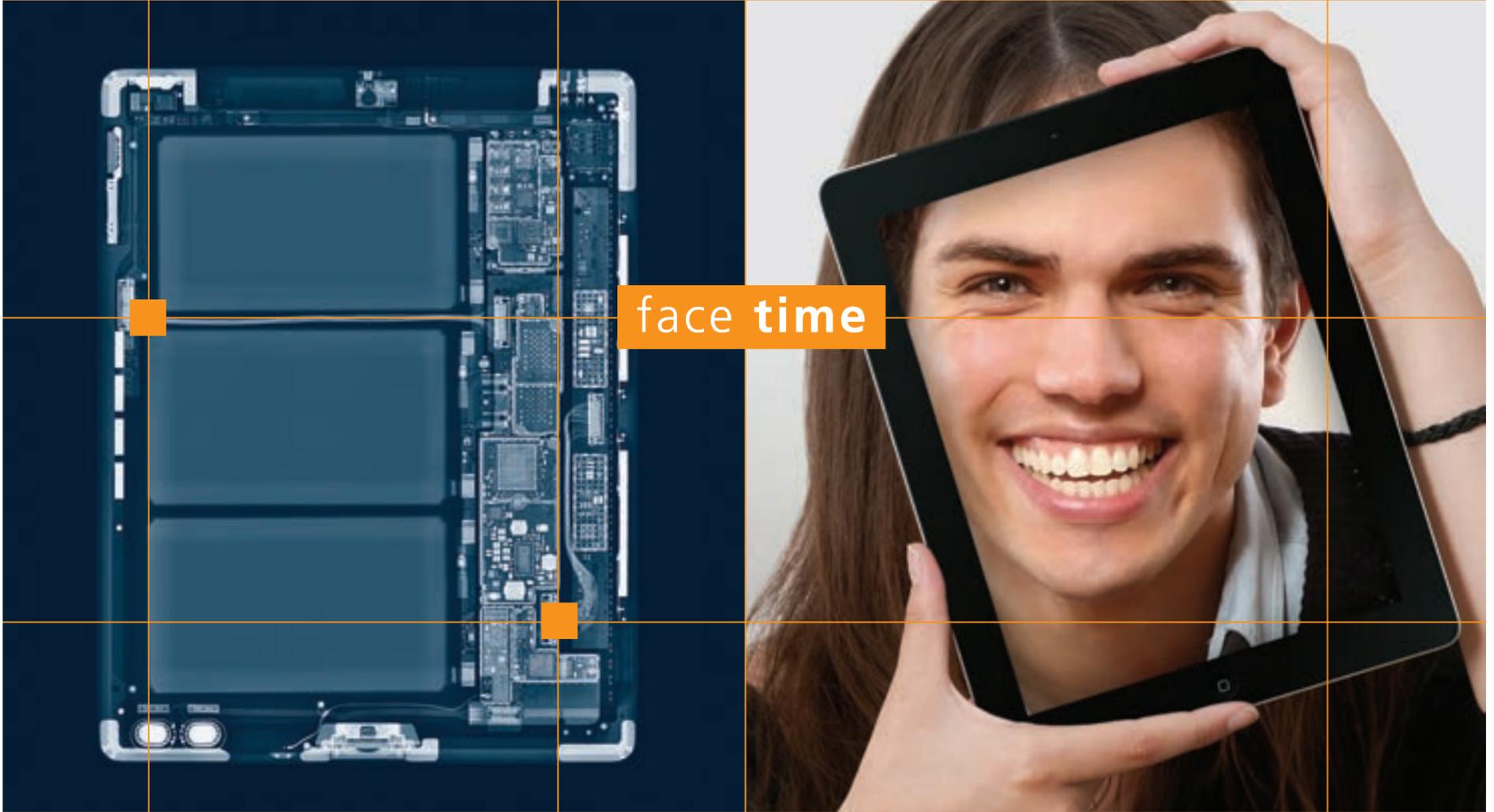
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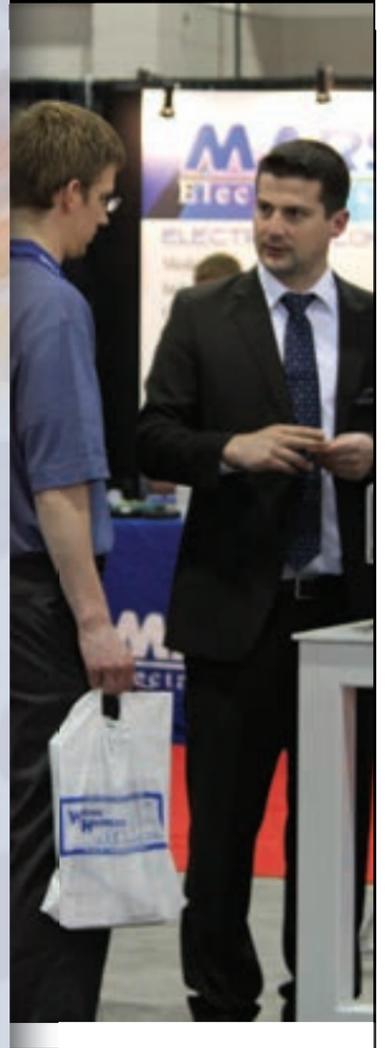
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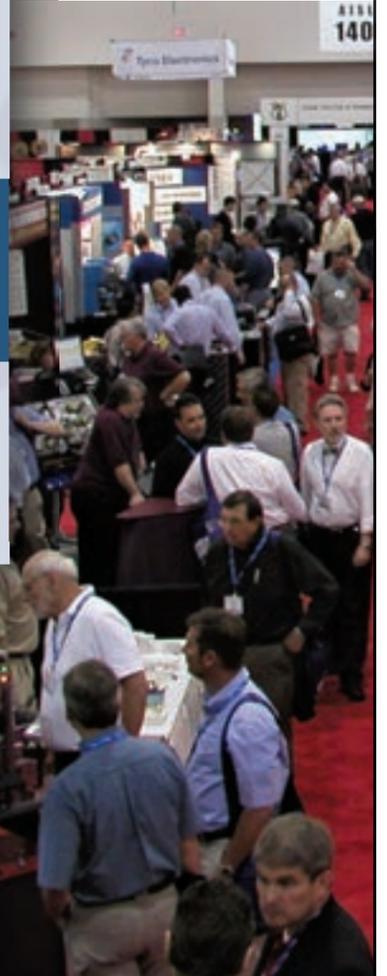
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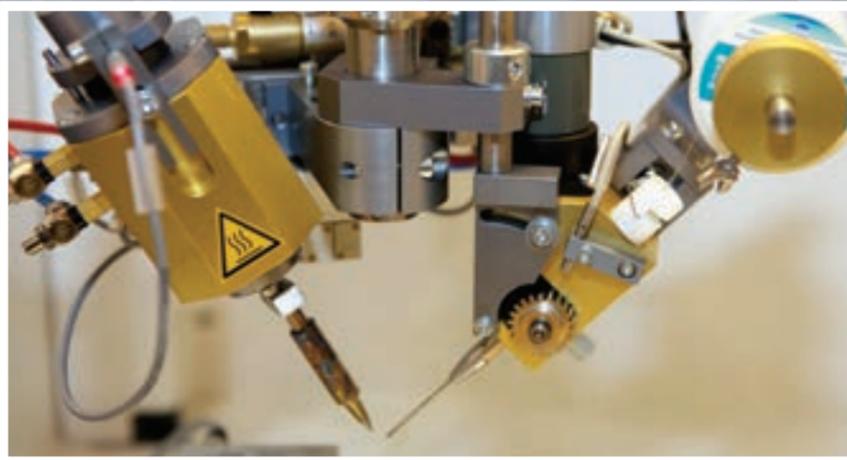
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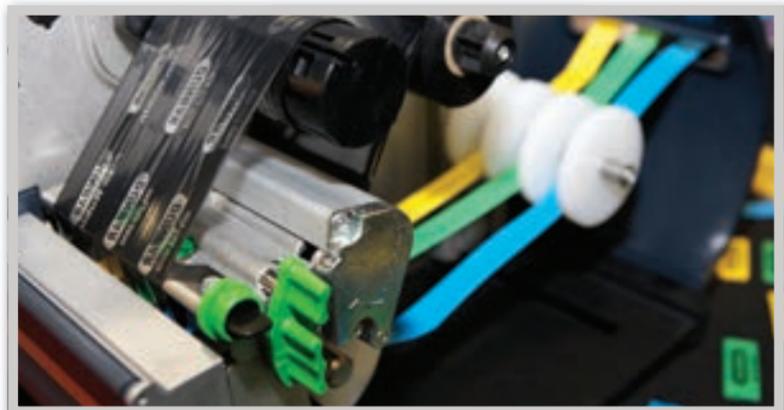
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NRI Electronics

Continued from page 1

up to three wires, started there last August.

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Ryan Anderson reviewing process documentation with Chris Braithwaite, Production Coordinator.

among the services.

With such a strong emphasis on continuous improvement, NRI has achieved near perfection in product quality. Only .04 percent of products have been rejected by customers, according to Brian Benda, corporate director of operations.

"We have maintained that percentage for a number of years," said Benda, who has been with NRI two years. "It's mainly because we do 100 percent testing." Harnesses are tested on a Cirris Easy-Wire system.

Continued on page 40

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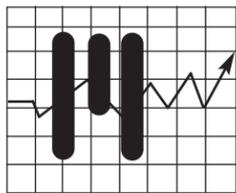
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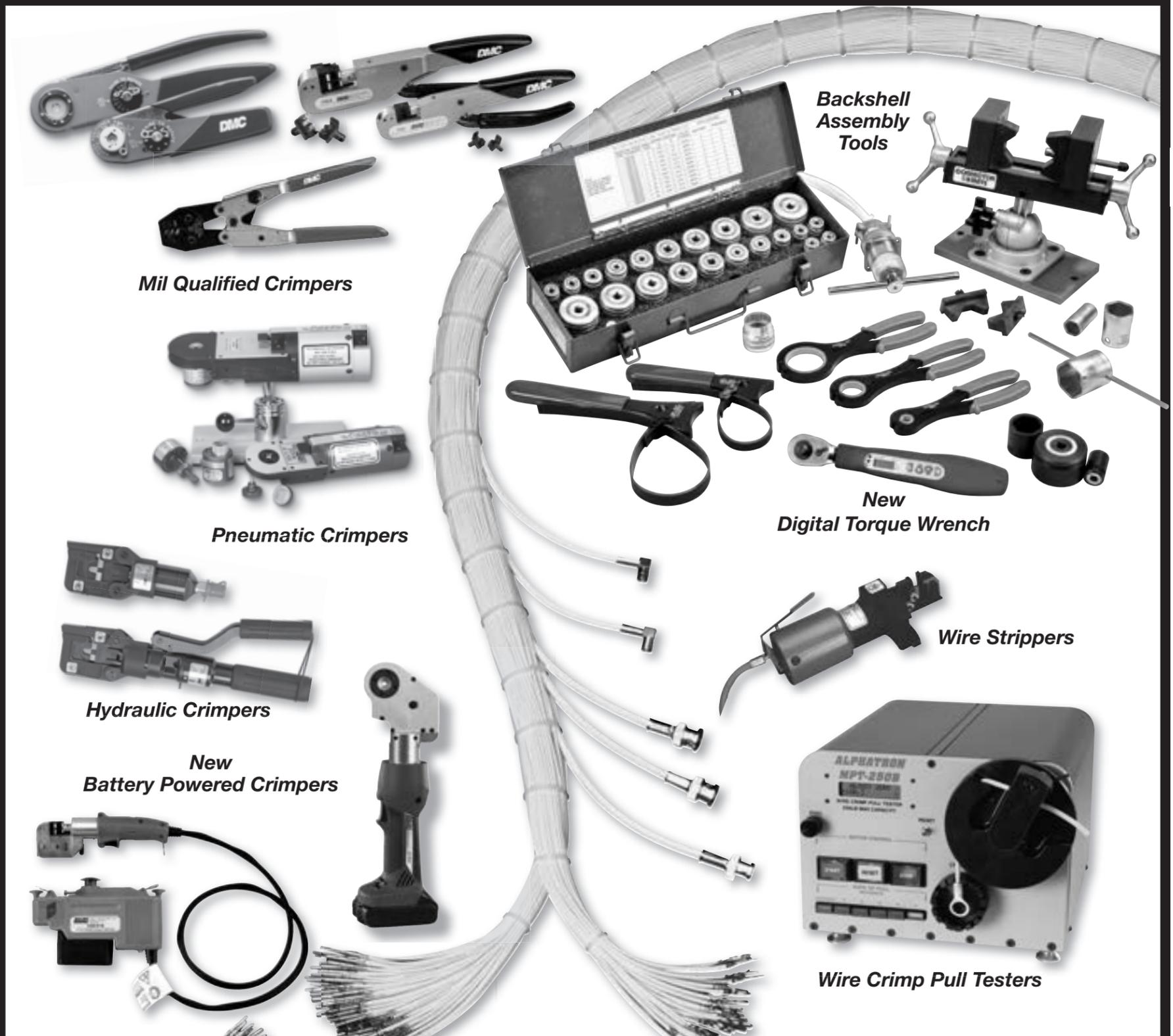
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NRI Electronics

Continued from page 38

Also figuring into the NRI quality spectrum are ISO 9001:2008 certification and adherence to A-610, A-620 and military standards. Benda pointed out NRI has in-process and first-pass quality checks in addition to key performance indicators for each department. Customer feedback in the form of scorecards is significant, too.

Should a product be returned, it is subjected to the Eight Disciplines (8D) system, which is consistent with continuous improvement. Mark Van Osedale, Rochester production manager the past

year, stated that following 8D involves several people in the company, including Jeff Martinson, customer program manager in Rochester.

As all aspects of 8D are addressed, quality assurance manager Annette Leger must oversee and audit them. She must approve the corrective measures, as must the person who initiated the 8D action. The final report is sent to the customer.

"We do quality very seriously," Van Osedale said. "We feel it gives us an edge. Our internal rework rate is very low, and we have solid processes we have developed and control very well."



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The Rochester management team consists of (left to right) Ryan Anderson, Engineering Manager, Jeff Martinson, Rochester Program Manager, Mark Van Osdale, Production Plant Manager, Lori Olson, New Business Account Manager and Sue Hannah, Rochester Senior Buyer (not pictured).

Two technological components integral to those processes are Microsoft Dynamics and HarnWare software. According to Martinson, Dynamics links all product documentation to part numbers, and HarnWare designs harnesses.

Equipment in the NRI line-up consists of various machines that cut, strip, terminate, hot stamp, seal and print from Schleuniger, Eubanks, Artos, Amp and Pico. Braiding is done on nine machines with carrier capacities of 16, 24, 32 and 36.

Benda said a new Juki KE-2080 in Anoka has proven especially valuable. The flexible, high-speed chip moulder "gives more capabilities for customers," he said. "Then they will be less likely to take their business elsewhere."

Serving the customers are 70 employees in Rochester and 30 in Anoka. All work first shift except 12 on second in Rochester. Production employees num-

ber 80 and administration 20. The total has stabilized the last three years after a 30-percent drop in 2009.

Besides Benda, Van Osdale and Martinson, key employees are Roger Toikka, CEO; Brad Henke, vice president of sales and finance; Jim Cox, Anoka production manager; Lee Gleason, Anoka customer program manager; Ryan Anderson, Rochester engineering manager; Rod Darsie, Anoka engineering manager; Garry Deacon, Anoka manufacturing process engineer; Sue Hannah and Tracy Peterson, senior buyers; Lori Olson, manager of new business introduction; and Leger, QA manager.

Of particular significance is Toikka. Before he started Neotech Research, which was NRI's predecessor, he specialized in product development, engi-

Continued on page 42

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NRI Electronics

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neering and prototyping. He established an R&D center for Honda in Ann Arbor, Mich., that did development engineering and prototyping for off-road vehicles. Toikka communicated directly with founder Soichiro Honda. During his career Toikka also worked at Schaper Toys in Minneapolis.

Toikka founded Neotech Research in 1982 in Anoka. The company focused on research and development before starting manufacturing in 1984 for the medical, toy and industrial markets.

Toikka bought Waters Instruments in Rochester in 2001 after he sold Neotech Research. Waters was founded in 1970 and had an electrical test manufacturing division that produced harnesses. The Waters medical division eventually became a separate company known as Waters Medical Systems owned by the French corporation IGL Group. Toikka sold NRI a few years ago but remains as CEO.

"Our culture has improved in the last two years," Benda said. "There is a high sense of urgency about efforts involving turning around orders fast and addressing customer needs. There are more proactiveness and employee involvement, too."

Benda emphasized the atmosphere of openness. Meetings are held twice a year at which all employees are present to hear about financials and continuous improvement goals. Departments hold regular meetings, and executives gather

frequently to discuss key performance indicators such as on-time delivery, quality, scrap and employee hourly utilization.

Because lean and Six Sigma characteristics are incorporated in NRI operations, continuous improvement is stressed. For example, a production employee suggested a different process for cutting convoluted tubing that matched tubing and cutting wheels by color.

"We let him develop the procedures and processes, and the result was increased throughput on boards, more harnesses produced and reduced scrap," said Van Osdale, who has Six Sigma black-belt certification. "His idea was more efficient and reduced the chance for error."

Van Osdale said one project involved adding new racking in the finished goods area for better organization. Improved handling of printed job packets by implementing an automated label-printing process was another project. Yet another one was a machine operator moving a bench 90 degrees to improve product and traffic flow.

"Each project gives employees the motivation and creativity to shine," Van Osdale said. "They improve quality, safety and efficiency. Direct feedback on what they are doing is always welcome."

The company staff's work has meant growth in 2012 of 4.2 percent, down from 14.6 percent in 2011 but matching 2010. The best year recently was 2009 with 16 percent. It began a period of rebounding from the economic trauma

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of 2008 when business declined 45 percent and eventually prompted closing a facility in Eveleth, Minn., at the end of 2009.

"We are very confident about projecting profitability into the future," Benda said. "We've been positively affected by the ag industry. It has had really significant growth."

To increase sales, another person has been hired by manufacturers rep Steve Van Den Berg of Waconia, Minn., to increase his territory beyond Iowa, the Dakotas, Nebraska and western Wisconsin. They complement three in-house salespeople and four customer service reps.

Sales and marketing efforts also include an updated Web site, which Benda said "has brought in new opportunities," and attendance at trade shows. No print advertising is done.

With Benda reporting more than 20 harness manufacturers in NRI's primary five-state service area, he described competition as "very intense. But, our biggest competition is Mexico. When people in the big companies' materials departments change, the new buyers often outsource to Mexico and Costa Rica."

Martinson stated the trend is especially evident in the U.S. Environment Protection Agency Tier emission standards. "The material costs for Tier 4 have increased so much that the only way to lower the product cost is by labor, so companies go to Mexico," he said. "Therefore, we have to be better, smarter and more competitive."

Doing so is a challenge, Martinson said, partly because most companies are not forecasting. "When the economy changed, now there's no visibility forecast anymore by anyone - not even 45 days out," he said. "There's less commitment to signing long-term contracts and carrying inventory." Those factors put pressure on everyone at NRI, particularly those in production, according to Van Osdale. "I'm most proud of the involvement and commitment by the employees on the shop floor," he said. "Their knowledge is invaluable because they catch design inconsistencies, and then we can

go back to the customer."

For more information, call 763-427-9572, e-mail sales@nrielectronics.com

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Jasna Kustura in the Rochester materials room. NRI has full traceability of all materials through batch control in a climate controlled atmosphere.

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NEWS PLUGS continued

WIRE HARNESS ASSEMBLY STATIONS

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Bus and Coach Giant Alexander Dennis selects Zuken's E³.series

Alexander Dennis Limited (ADL), Britain's largest bus and coach manufacturer, has recently adopted Zuken's leading electrical and fluid CAD software, E³.series.

Alexander Dennis chose E³.series after an extensive selection process which focused on their desire to create a fully-integrated electrical design process and a unified project and data management environment. They will use E³.series to help drive process change for electrical system and harness design.



Alexander Dennis Limited's Enviro500 double deck export bus – part of a new order worth £220 million secured in November 2012

A key factor in Alexander Dennis' decision was E³.series' object-oriented architecture, which will enable the company to create smart draw-

ings which feed all stages of the design process, including manufacturing and purchasing. Additionally, Zuken's PDM adaptor (ZPA) will integrate electrical design and part data with Siemens TeamCenter, Alexander Dennis' chosen PLM tool.

David Alexander, Group Engineering Systems Manager at Alexander Dennis, said: "We wanted a flexible, highly integrated electrical design solution which would help us improve our existing system and establish new design processes, ranging from the capture of a vehicle's functional electrical topology, through detailed design, to the creation of harness manufacture data."

An additional factor was E³.series' built-in capacity for design process evolution; as process needs change, the system can be developed to keep up with new requirements.

E³.series will enhance the accuracy, consistency and availability of Alexander Dennis' data, helping them meet the future challenges of competitive product development and manufacturing.

Every minute of every day ADL buses carry 25,000 passengers in 20 countries around the world, covering 2.5 billion miles per year. ADL is the fastest-growing bus business in the western world, having tripled turnover in the past five years to £500m, extending its reach with build partnerships, joint ventures and acquisitions in territories such as Hong Kong, China, Australia, New Zealand and North America.

For more information about E³.series, see www.zuken.com/e3-series

For more information about Alexander Dennis, see www.alexander-dennis.com.



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“Once I helped round up a cow that got loose in a customer’s plant.

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

Customers report something unusual too: Mando’s “can-do” attitude.

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

“Can’t be done” is not in Mando’s vocabulary—either English or Spanish. On his own initiative, he solves problems, leads training classes, helps boost plant efficiencies, and makes lasting friendships while doing it.

Mando exemplifies the Eubanks business experience—highest-quality, U.S.A.-built wire strippers and markers backed by dedicated people itching to solve your wire problems.

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NEWS PLUGS continued
Schleuniger, Inc. to Demonstrate Wire Stripping Machines at WHMA Annual Wire Harness Conference

Schleuniger, Inc., a leading international manufacturer of high-precision wire processing machines and member of the Wire Harness Manufacturer's Association

of equipment to fit a variety of processing needs, Schleuniger sets new technical standards by bringing precision, flexibility and user-friendliness to wire processing. At WHMA 2013, attendees will have the opportunity to meet with Schleuniger's wire processing experts and experience hands on demonstrations of the UniStrip 2300, RotaryStrip 2400 and UniStrip 2550. These programmable wire stripping machines feature an intuitive touch screen user interface, are able to strip different



RotaryStrip 2400



UniStrip 2300



UniStrip 2550

Schleuniger has participated in the WHMA Annual Conference for several years now and is proud to be part of an organization that is dedicated to providing valuable, timely industry information and to addressing the specific needs of wire harness manufacturers and suppliers.

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

General Cable and Dow Inside Alliance Introduces Empowr® Link+ Medium-Voltage Cable

General Cable and Dow Electrical & Telecommunications (Dow E&T), a business of The Dow Chemical Company (NYSE: Dow), are pleased to introduce BICC® Brand EmPowr® Link+, an enhanced tree-retardant cross-linked polyethylene (TRXLPE) insulated medium-voltage cable that sets the new standard for reliability and asset management.

This powerful General Cable—Dow Inside alliance brings together two long-standing innovators with more than two centuries of combined technical expertise. General Cable and Dow are committed to providing valued solutions to customers by combining advanced materials with advanced manufacturing. EmPowr Link+ underground medium-voltage cable offers longer service life and the potential for a lower total system cost, offering peace of mind now and for decades to come for consumers and utilities alike.

EmPowr Link+ utilizes DOW ENDURANCE™ HFDC-4202 EC next-generation insulation compound, which offers enhanced dielectric performance with improved water tree-retardant technology, and is coupled with advanced conductor and insulation shield technologies that help reduce electrical stress and enables easier accessory installation over a broader temperature range. These components, combined with exceptional material processing and state-of-the-art cable manufacturing capabilities, deliver a medium-voltage cable proven to provide


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“Working together, Dow and General Cable are driving innovation forward and establishing new standards for reliability that improve the total system economics and offer enhanced peace of mind throughout the value chain,” said Kim Ann Mink, Ph.D., Business President, Dow Elastomers, Electrical & Telecommunications.



EmPowr Link+ medium-voltage TRXLPE insulated cables

EmPowr Link+ medium-voltage TRXLPE insulated cables meet or exceed industry standards and specifications while offering proven extended cable life as demonstrated by extensive wet aging comparisons and time-to-failure ACLT testing. For more information, email empowrlink+@generalcable.com or call 1.888.222.6584.

General Cable headquartered in Highland Heights, Kentucky, is a global leader in the development, design, manufacture, marketing and distribution of copper, aluminum and fiber optic wire and cable products for the energy, industrial, specialty and communications markets. For further information about General Cable visit at www.GeneralCable.com.

Dow Electrical & Telecommunications, a business unit of The Dow Chemical Company (“Dow”), is a leading global provider of products, technology, solutions and knowledge that sets standards for reliability, longevity, efficiency, ease of installation and protection that the power and telecommunications industries can count on in the transmission, distribution and consumption of power, voice and data. For more information, visit www.dow.com/electrical.

More information about Dow can be found at www.dow.com.

LADD Industries Is Now LADD Distribution

LADD Industries LLC, the exclusive authorized US distributor of DEUTSCH industrial electrical connectors, announces a company name change and is now LADD Distribution LLC. The new name and logo, which are in effect immediately, reflect the company’s transition to a global industrial electrical connector distributor. LADD has added a stocking and operations center in Germany, increasing the company’s geographic reach. LADD is now serving the United States, Canada, and Europe, the Middle East, and Africa (EMEA). Additional locations for China and Japan are targeted for near future expansion.

Headquartered in Kettering, Ohio, LADD Distribution serves customers in the off-highway, marine, trucking, agriculture and engine markets.

A focus for LADD is DEUTSCH industrial electrical connectors. DEUTSCH connectors are specifically designed for critical applications where dust, dirt, moisture, salt spray, and rough terrain can con-

taminate or damage electrical connections and systems.

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NEWS PLUGS continued

New PV Cable from Amphenol Used in Grounded and Ungrounded Systems

Amphenol Industrial Global Opera-

tions, a global leader in interconnect systems, now offers a single jacket photovoltaic (PV) cable used for interconnection wiring in grounded and ungrounded PV systems. Amphenol's PowerLink solar cable is ideal for use on utility solar farms and in commercial and residential solar projects.

Designed with a smaller outer diameter



PV Cable from Amphenol

than a standard dual jacket, the single jacket PV cable is more malleable and makes crimping connectors easier. It is also available for fast delivery.

The new cable, which is offered from 6 AWG to 18 AWG, is sunlight resistant and suitable for direct burial. It has a temperature rating of 90°C wet or dry and a cold bend of -40°C. Its voltage rating ranges from 600 V to 2000 V. This new RoHS compliant, UL4703-rated cable has a flammability rating of VW-1.

Unlike a dual jacket cable that is only available in black to meet 720UV requirements, the PowerLink solar cable is manufactured in a variety of colors including black, white, red, blue, green, yellow and orange.

For more information, please visit <http://www.amphenol-industrial.com> or e-mail energy@amphenol-aio.com.

IPC APEX EXPO Executive Management Meetings Help Industry Leaders Position their Companies for Success

Before the activities at IPC APEX EXPO® get into full swing, industry executives will gather for the IPC EMS Management Council Meeting and the new IPC PCB Supply Chain Leadership Meeting. The meetings, taking place February 18, 2013 at the San Diego Convention Center, will focus on business issues unique to senior-level decision makers in the EMS and PCB industries.

The day will open with joint sessions on issues critical to both groups: a business outlook for the global electronics industry, presented by Walt Custer, Custer Consulting, and disruptive environmental regulations, presented by Fern Abrams, IPC. Regarding environmental regulations, Abrams says, "Technology is no longer the only driver in product design and devel-

opment. Compliance with evolving environmental and social responsibility issues such as REACH, California's Green Chemistry regulations and conflict minerals requirements continue to be key drivers for all segments of the electronics industry."

The EMS Management Meeting includes a committee update from Mark Wolfe, Phoenix International; an economic update for small to medium EMS companies, with Lloyd Caplin, Pacific Global Consulting; and an M&A update for Tier 2 and 3 EMS companies by Jack Calderon, Lincoln International. In the afternoon, Sharath Bhat, Kaynes Technology India Pvt. Ltd., will present on the current status and future opportunities in the EMS market in India; John Sharp, TriQuint Semiconductor, will guide executives in developing a disaster preparedness plan; Jim Rosenberg, Arrow Electronics, will provide a distributor perspective on the state of the industry; and Chris Narup, Phoenix International, will address best practices for customer relations.

The new IPC PCB Supply Chain Leadership Meeting, a new learning and networking forum for senior executives of PCB manufacturers and their supplier companies, will focus on critical strategic and management topics. Kevin Arledge and Jerry Magera, both of Motorola Solutions, Inc., will provide attendees with a PCB roadmap from the OEM point of view. Other presentations will address what the executive needs to know about distributive technologies, including: conductive pastes, presented by Jim Haley, Ormet Circuits Inc.; embedded components, presented by Raj Kumar, Viasystems Group Inc.; and printed electronics, presented by Mark Poliks, Ph.D., Endicott Interconnect Technologies, Inc. Laser drilling and 3-D circuits will also be addressed. Don Walsh, Uyemura International Corp., will present on environmental regulations' impact on materials availability; and Pares Vasani, Indian Printed Circuit Association and Circuit Systems (India) Ltd., will discuss PCB fabrication in India, including market status and opportunities.

Continued on page 50

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Industry Problem

In today's global manufacturing sector, a common problem is the leaking (leak paths) of over-molded electrical components, such as connectors, coils, cables, wire harnesses, conductors, etc. Multiple factory recalls have taken place due to this issue, compromising the quality stature of many top manufacturers. The most common solution is the use of potting compounds that can only give a potential end seal vs. 100% seal. Dimensional allowances have to be tolerated in the design of components using potting compounds.

With industry standards demanding high quality componentry in a world of precision high performance parts, this problem exists under demanding conditions, and causes fluid leakage, moisture penetration, and fluid migration. The solution has not grown with precision componentry until now...

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NEWS PLUGS continued

Continued from page 48

The day will culminate with roundtable discussions providing opportunities for attendees to exchange ideas and share experiences. Complete agendas for the EMS and PCB executive management meetings are available at www.ipcapex-expo.org/executives.

Executives are encouraged to bring their staff to IPC APEX EXPO to participate in other activities taking place at the show. Individuals who register by January 25 will save 20 percent off registration fees. A new registration option for 2013, the Maximum Value Package (MVP), offers a savings of more than 75 percent over individual item prices. For more information or to

register for IPC APEX EXPO, visit www.IPCAPEXEXPO.org.

In the Black: WAGO 2060 Series

A new, black housing for WAGO Corporation's 2060 Series SMD Push-Button Terminal Block helps ensure correct LED device wiring. Offered as a 1-pole unit (2- and 3-pole upon request), the black housing provides on-board "+" and "-" color-coding when paired with light gray 2060 Series blocks.

Beyond clear inputs/outputs, the new block also offers WAGO-exclusive push-button terminations to streamline LED device assembly, e.g., downlights.

The new housing also supports higher-temp applications, such as high-output, outdoor LED fixtures for roadway and stadium lighting.

The black 2060 Series features the same ratings as its UL/CUL Recognized siblings — 600 V (1-pole), 250 V (2- and 3-pole)

and 9 A nominal current (all models).

2060 Series' push-button terminations are a labor-saving alternative to hand-soldering PCB leads. Push-buttons also permit wiring error correction — no costly scrap/rewiring. 2060 Series accommodates the broadest range of solid/stranded conductors (AWG 24–18) within one unit — even tinned, top-coated or pre-bonded ones.

LED applications include: recessed luminaires, emergency lighting and signage. Just 4.5mm high, 2060 Series also serves electronics requiring low-profile SMT components, such as alarms and HVAC controls.

WAGO is the leader in spring pressure connection technology that eliminates loose wires resulting from vibration and temperature cycling, while providing highly reliable, corrosion-resistant and maintenance-free connections. Products: DIN-rail, PCB and chassis mount terminal

blocks; signal conditioners; the WAGO-I/O-SYSTEM and more.

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

T&B Announces of Key Executive and Structural Changes

The integration of Thomas & Betts (T&B) and ABB's low voltage electrical products businesses continues with the announcement of key executive and structural changes designed to further enhance the company's value propositions. The value propositions are expressed as being the "Supplier of Choice for Distributors and the Brand of Choice for OEM and End Users."

Brian Herington was named local division manager, U.S. LP, with responsibility for leading the combined U.S. business of T&B and ABB's low voltage products local business units, breakers and switches, control products, enclosures and DIN-rail

products. Herington will continue to serve as president of T&B's U.S. and Latin America businesses. Herington will report to Chuck Treadway, CEO of T&B and ABB regional division manager of ABB low voltage products in North America.

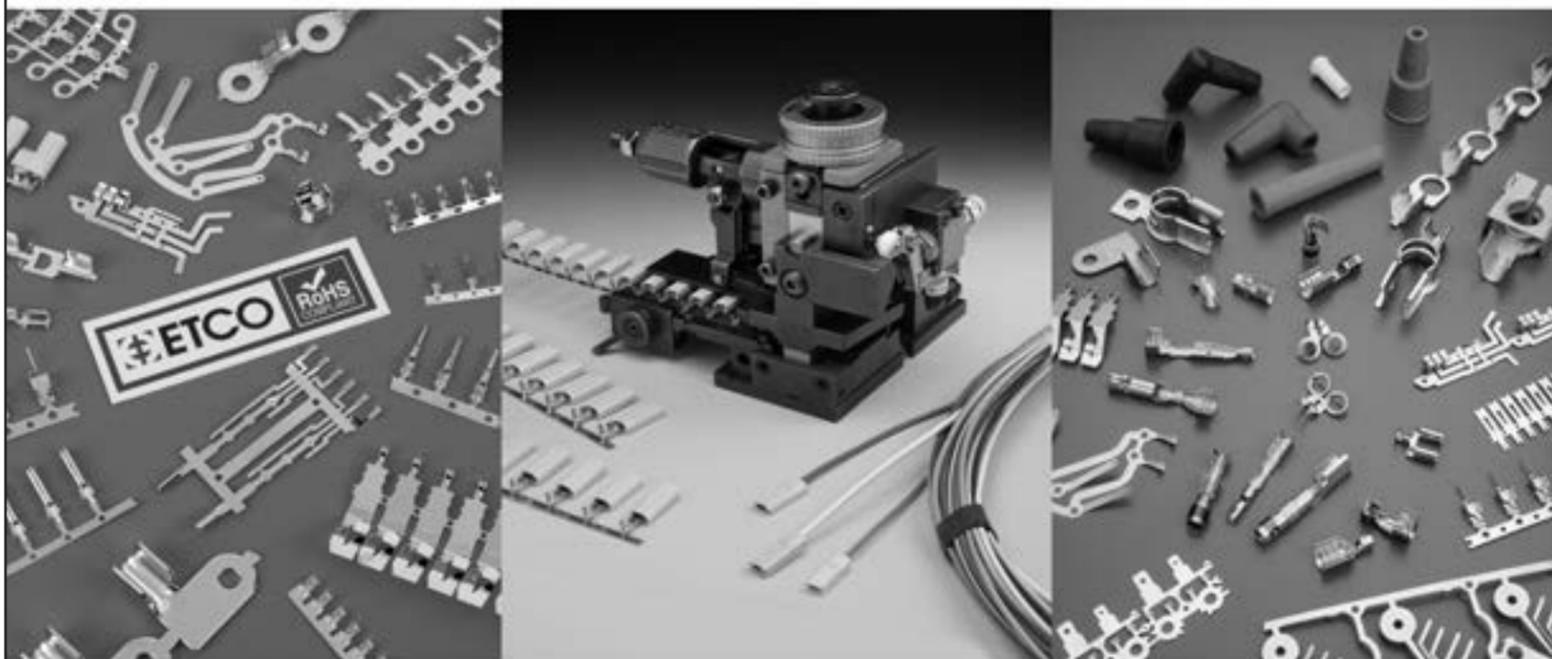
Additionally, the commercial integration of the two businesses continues. Effective Jan. 1, 2013, the ABB regional sales managers and sales and quotations teams will report to Ned Camuti, vice president for regional sales. Camuti will continue to serve as vice president of sales for T&B's U.S. and Latin America electrical business. The company is investing to further expand the sales organization in targeted key markets.

"Combining our sales organizations allows us to bring an even broader portfolio of market-specific products to customers in key vertical markets," said Camuti. "Furthermore, our decision to invest in and grow our sales teams reflects our commitment to support our distributor partners by driving pull-through sales and helping them increase their market share."

In September, the company announced that distribution and logistical support for ABB low voltage products would be moved to T&B's central distribution center (CDC) in Byhalia, Miss. During 2013, additional integration activities will take place to move the business closer to T&B's "easy to do business with" model. These initiatives include T&B's "one order, one shipment, one invoice" business approach that lowers transaction and working capital costs for customers.

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tribution for the combined entity's broad product portfolio and integrating our sales teams were the next logical steps in enhancing support for our distributors and delivering the synergies and growth inherent in the merger of Thomas & Betts and ABB," said Herington. "We have made excellent progress in successfully blending our organizations and leveraging best practices from both enterprises. We expect 2013 to be another year of progress and growth."



Brian Herington has been named Local Division Manager US LP for T&B and ABB low voltage products.

Thomas & Betts Corporation, a member of the ABB Group, is a global leader in the design, manufacture and marketing of essential components used to manage the connection, distribution, transmis-



Ned Camuti will lead the combined sales organization for ABB and T&B low voltage products in the U.S.

sion and reliability of electrical power in utility, industrial, commercial, and residential applications. With a portfolio of more than 200,000 products marketed under more than 45 premium brand names, Thomas & Betts products are found wherever electricity is used. Thomas & Betts' headquarters are in Memphis, Tenn. For more information, please visit www.tnb.com.

Boeing To Begin Marketing Wichita Plant This Month

Boeing officials say they will begin actively marketing the company's Wichita defense facilities by the end of January.

The company announced last year that it was closing the Wichita plant and moving work to Oklahoma, Texas and the Pacific Northwest.

Boeing owns 97 buildings on 413 acres, with properties ranging from large hangars to tool sheds.

Company spokeswoman Kathleen Spicer says Boeing is working with national real estate firm CBRE Group of Los Angeles to arrange the sale of the property.

Boeing has done some site preparation work, including separating utilities and some environmental remediation. Spicer wouldn't say how much interest the company has received.

Boeing closed its Wichita commercial aviation business in 2005 and has concentrated on military programs since then.

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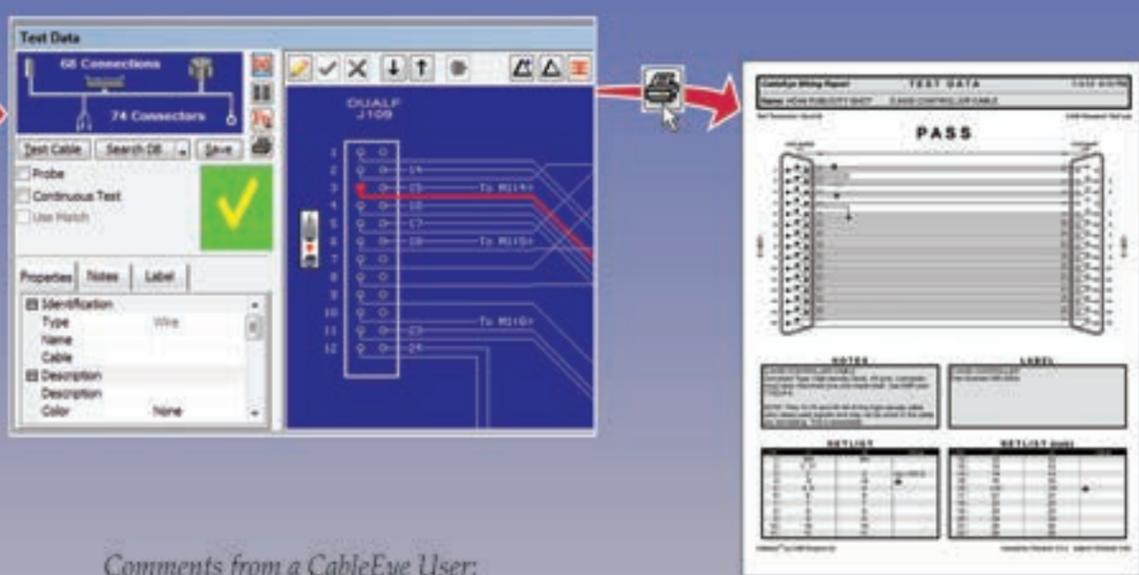
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NEWS PLUGS continued

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A complete line of ergonomic cutters and pliers that feature static dissipative hand grips and conform to ANSI/ESD.S20.20 and DOD-HDBK-263 specifications is available from Xuron Corp. of Saco, Maine.

Xuron® ESD-Safe Cutters & Pliers are ergonomically designed, made from highly alloyed steel, and feature static dissipative hand grips and Light-Touch™ return springs. Producing a clean, square cut without spikes, the cutters come in several head styles and employ Xuron's Micro-Shear® by-pass shear cutting action which is easier to squeeze than compression cutters.

**Xuron® ESD-Safe Cutters & Pliers**

Featuring the same construction as the cutters, Xuron® ESD-Safe Pliers are offered in 10 head styles for crimping, forming, and bending wires and leads including the Tweezer-Nose™ model for precision

PCB work. Suitable for electronics assembly, production, and field repair applications, these static-safe tools hand grips exhibit 106-109 ohms surface resistivity.

Xuron® ESD-Safe Cutters & Pliers are priced from \$14.25 (sugg. list), depending upon model, and manufactured in the U.S.A. A catalog and pricing are available upon request.

For more information contact Xuron Corp., 62 Industrial Park Road, Saco, ME 04072-1840. Phone (207) 283-1401 or Fax (2078) 283-0594. Visit www.xuron.com

New Handbook of Automotive Lubricants and Testing Available from ASTM International

Manual 62, ASTM Handbook of Automotive Lubricants and Testing, addresses major issues and current development status of automotive lubricant test methods.

This new ASTM manual features 30 chapters that provide a comprehensive

overview of various lubrication aspects of a typical powertrain system including the engine, transmission, driveline, chassis and other components.

Topics included in Manual 62 include advanced lubrication and tribochemistry of the powertrain system, such as diesel fuel lubrication, specialized automotive lubricant testing development, filtration testing of automotive lubricants, lubrication of constant velocity joints, and biodegradable automotive lubricants. Major chapters in book cover:

- Automotive tribology systems;
- Automotive engine lubricant tests and specifications;
- Transmission fluids;
- Gear oils and grease;
- Automotive bench test simulation and tribological bench tests;
- Tribological simulation, wear tests and laboratory characterization;
- Designing for wear life and frictional performance for automotive applications;
- Surface analysis and tribochemistry of automotive engine components;
- Problems and opportunities regarding the lubrication of modern automotive engines; and
- Overview and future trends of automotive lubricants and testing.

Manual 62, ASTM Handbook of Automotive Lubricants and Testing, is available for \$140 USD in print (ISBN: 978-0-8031-7036-0; Stock #: MNL62-CAT) or as an E-Book (ISBN: 978-0-8031-7038-4

E-book Stock #: MNL62-EB-CAT)

To purchase ASTM publications, search by stock number on the ASTM Web site (www.astm.org), or contact ASTM Customer Relations (phone: 877-909-ASTM; sales@astm.org).

ASTM International is one of the largest international standards development and delivery systems in the world. ASTM International meets the World Trade Organization (WTO) principles for the development of international standards: coherence, consensus, development dimension, effectiveness, impartiality, openness, relevance and transparency. ASTM standards are accepted and used in research and development, product testing, quality systems and commercial transactions.

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As always, Thermosleeve USA products are safe and reliable high-quality products that are manufactured under strict quality controls (some meet or exceed UL/224/MIL) and are certified under the following agencies: F-Mark, TUV, VDE, UL/CUL.



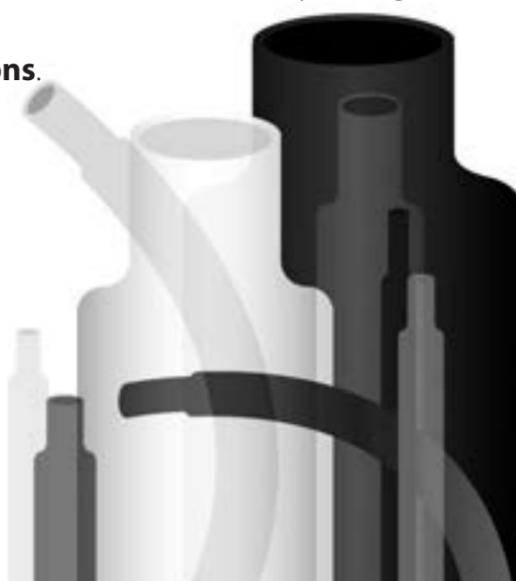
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SEA Wire and Cable, Inc. Announces Promotion of Chase Layton to Operations Manager

SEA Wire and Cable, Inc., a leading Military/Aerospace Wire and Cable distributor, announces the promotion of Chase Layton to Operations Manager effective January 1, 2013. Chase will be responsible for warehouse and daily operations for SEA.

"Through his hard work and dedication, Chase has proven to be a valuable asset to the SEA management team. We expect Chase's commitment and quantitative skills to prove to be a key component in SEA's future growth. Chase will provide that critical vision to help shape our tactical and strategic plans" said Marty Clark, President and COO of SEA.

Chase started with SEA working summers to help finance his college expenses. After graduating from University of Alabama in 2008, Chase joined the sales organization where he honed his skills and learned the basics of the business. Chase is currently graduating with his MBA from University of Alabama Huntsville with emphasis on operations management. In addition to providing support to the warehouse over the past several months leading to new programs, systems, and efficien-

cies - he has also been instrumental in technology updates with new ERP P21 system.

SEA Wire and Cable, Inc. of Madison, Alabama was founded in 1970, is a woman owned small business has been dedicated to providing its clients with consistent, reliable quality, accurate technical support and exceptional customer service at a competitive price. For more than 41 years, SEA Wire and Cable, Inc. has been a full stocking supplier of military/aerospace wire, cable and related harnessing products. SEA is a world class provider of vendor managed inventory programs, logistical management, and value added services. SEA is also an ISO 9001:2000 and AS9100 Rev C certified company and registered with ITAR.

SEA specializes in supplying wire, cable, tubing, termination sleeves, cable ties, EMI/RFI backshells, and other cable assemblies for the most demanding electronic applications. To provide fast service and to meet a wide range of client needs, the company currently stocks over 11,000 items and 50 million feet of wire in its modern 88,000-square-foot facility.

For further information contact SEA Wire and Cable, Inc, 451 Lanier Road, Madison, AL 35758 Visit www.sea-wire.com

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NEWS PLUGS continued



Modular Power/Signal Connector Maximizes SWaP Reduction

Positronic Industries is proud to announce the addition of an 8.20mm low-profile version to the popular Scorpion

power/signal connector series. The Scorpion product is unique for three key reasons: 1) Its modular tool design allows for a nearly limitless variety of customer-defined contact arrangements; 2) The molding process yields a one-piece insulator; and 3) The customer can define the connector width as long as the maximum envelope of 101.00mm is not exceeded.

Due to the modular tooling, customers can achieve optimum size, weight and



Low-profile Version of Scorpion Power/Signal Connector Series from Positronic Industries

power by configuring a power/signal connector from a wide selection of modules. In the low-profile version, the module options include size 12 contacts, size 20 contacts, size 22 contacts and blanks/spacers. Contacts are rated up to 55 amps for size 12, 12 amps for size 20 and 3 amps for size 22 contacts. Contact resistance values are as low as 1 milliohm for standard conductivity contacts and 0.7 milliohms for high conductivity contacts. The blanks/spacers allow the user to space power and signal contacts to tailor creepage and clearance values to meet design criteria. Contact terminations include board-to-board, board-to-cable, cable-to-cable, and panel mount options. Additional features/accessories include ventilation slots in the connector housing, integral blind mate system, integral locking system, float mounts, panel mount clips, and board locks. The Scorpion Series is the solution to maximize power throughput and minimize space claim.

For more information about the Low Profile Scorpion connector visit

www.connectpositronic.com/scorpion.

Information on the full Positronic connector line can be explored by visiting our web site at www.connectpositronic.com/products. To locate the nearest Positronic sales office, visit www.connectpositronic.com/contact/sales_offices

BURNDY Organizational Announcement

Rodd Ruland, President of BURNDY LLC, an affiliate of Hubbell Incorporated, has now added responsibilities for both Hubbell Canada LP and Hubbell de Mexico, S.A. de C.V. These operations serve as the focal point through which many Hubbell products are marketed to our Canadian and Mexican customers.

Rodd was managing the BURNDY division of FCI in October 2009, when it was acquired by Hubbell Incorporated. During the past three years, he has successfully integrated BURNDY LLC operations, significantly grown sales and consistently delivered strong operational results. In 2011, Rodd also led the business development initiative to expand BURNDY LLC with the acquisition of the Wiley product line, the #1 brand in solar grounding products to the Hubbell connector, grounding and tooling products portfolio.

Rodd earned his Bachelor's degree in Business Administration from Gettysburg College. He has held roles of increasing responsibility across a variety of functions including, finance, sales, marketing, product management and business development in the US and Europe at companies



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Rodd Ruland
President of BURNDY LLC

including AMP, Tyco Electronics and FCI.

Headquartered in Manchester, New Hampshire BURNDY has over 85 years of dedicated customer support in both service and product. Our customers need to look no further than BURNDY for all their connector, tool, and accessory needs with our BURNDY Engineered Systems of coordinating dies, connectors and tools. The three elements have been specifically designed to work together and engineered to meet stringent, accepted quality standards – providing the user complete confidence in the integrity of the connection.

For further information visit www.BURNDY.com

TE Connectivity Announces Qualification Approval on CII High Performance Time Delay Relays

TE Connectivity (TE) announces receipt of qualification approval from the Defense Logistics Agency (DLA) for its CII line of high-performance time delay relays. (The governing military specifications are MIL-PRF-83726/28, 29, 30, and 31.) The DLA is the Department of Defense's largest logistics combat support agency, providing worldwide logistics support to the military services as well as several civilian agencies and foreign countries.

"This DLA qualification approval signals an important recognition for TE's broad range of high-performance relays for the aerospace and defense market," said Don Stalker, Product Manager, TE Aerospace, Defense & Marine. "These time delay relays broadens our offering of military approved high-performance relays and help us provide our customers with a one-stop shopping experience."

The mid-range time delay relays combine multiple functions into a single package and are specifically

designed for operation in extremes of temperature, shock, vibration and altitude. This series of time delay relays incorporates proven electromechanical relay design features along with advanced digital timing circuitry. They are hermetically sealed and provide a variety of mounting configurations. All have contact ratings of 10 Amps and include four functional versions:

- Delay on operate, fixed
- Delay on operate, adjustable
- Delay on release, fixed
- Delay on release, adjustable

Available customizing options include: extended timing ranges, tighter timing tolerances, custom header and mounting, and 115 VAC, 60 Hz. input types. With a temperature range of minus 55 degrees Celsius to 85 degrees Celsius or minus 55 degrees Celsius to 125 degrees Celsius, the time delay relays offer numerous out-

put options which include 4A rated contacts in 1-4 form C (SPDT-4PDT) arrangements and 10A rated contacts in 1-2 form C (SPDT-DPDT) arrangements. Military approved subminiature digital timing modules are also available.

For more information on TE's mid-range time delay relays, visit www.te.com/catalog/menu/en/23185 or contact the Product Information Center at +1 (800) 522-6752.

TE Connectivity and the TE connectivity (logo) are trademarks of the TE Connectivity Ltd. family of companies.

Laird Technologies Releases Two New Tflex™ Series Products

Laird Technologies, Inc., a global leader in the design and supply of customized performance-critical components and systems for advanced electronics and wireless products, announced the release of two new Tflex™ series thermal gap fillers.

The Tflex™ SF800 and Tflex™ SF200 are the latest addition to Laird Technologies' thermal gap filler line. The introduction of these two new products expands Laird Technologies' silicone-free gap pad selection. Tflex SF800 is a high performance gap pad with exceptional wetting characteristic, while Tflex SF200 features extremely low contact resistance for effective heat transfer. These products are naturally tacky on both sides and require no additional adhesive coating, allowing for exceptional thermal performance.

Both the Tflex SF800 and Tflex SF200 are offered in a variety of thicknesses to suit virtually any need. The SF800 has thermal conductivity of 7.9 W/mK, while the SF200 offers thermal conductivity of 1.8 W/mK or 2.0 W/mK, depending on thickness. These silicone-free gap pads are easy to handle in all available thicknesses

Continued on page 56

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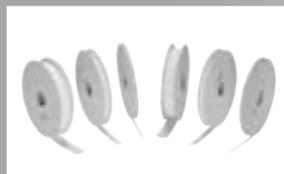


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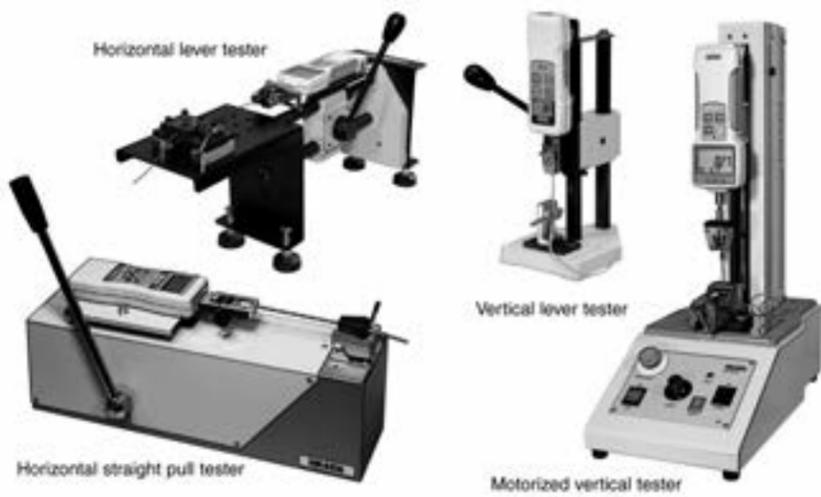
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NEWS PLUGS continued



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while their natural tack allows for the pad to be held in place during assembly. Tflex SF200 is available with differential tack for easy assembly and rework.

"These new products are not only great solutions for silicone sensitive applications, but they are also effective in applications where silicone pads are traditionally used," said Jane Lacy, Laird Technologies Product Manager. "They are ideal for a variety of applications including automotive, consumer products, medical devices and laser equipment."

As an industry leader in high-performance and cost-effective Thermal Management Solutions, Laird Technologies provides the knowledge, innovation, and resources to ensure exceptional thermal performance and customer satisfaction for applications in the medical, analytical, telecom, industrial, and consumer markets.

Laird Technologies is a global technology company focused on providing components and solutions that protect electronic devices from electromagnetic interference and heat, and that enable connectivity through wireless applications and antenna systems.

Custom products are supplied to all sectors of the electronics industry including the handset, telecommunications, data transfer and information technology, auto-

motive, aerospace, defense, consumer, medical, mining, railroad and industrial markets.

For additional information, visit www.lairdtech.com or contact Laird. In the Americas: +1-888-246-9050, Europe: +46-31-704-67-57 and Asia: +86-755-2714-1166 x374.

Catamount® Twist Tail® Cable Tie Wins Innovation Showcase Award

The Catamount® Twist Tail® Cable Tie from Thomas & Betts was recognized with an Innovation Showcase Award at TESSCO Technology Inc.'s Innovation Showcase, a trade event held in Baltimore.



Catamount® Twist Tail® Cable Tie from Thomas & Betts

TESSCO Technology Inc., a Thomas & Betts distributor, provides products and services for the construction, operation and maintenance of wireless and broadband communications and data systems. The event drew more than 50 vendors and more than 500 attendees, most of whom were contractors, buyers and specifiers in government, fossil fuel, rail and transit, internet service provider and retail industries. The awards were determined by a

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poll of the attendees.

"The Catamount® Twist Tail® Cable Tie allows the removal of the excess tail without the use of tools, which substantially reduces installation time," said Chad Smith, director, product management at Thomas & Betts. "All the installer needs to do is grasp the excess tail between his thumb and forefinger, bend it in the other direction and twist. It's also safer, as removal of the tail doesn't leave sharp edges."

For more information about Catamount® Twist Tail® Cable Tie, visit www.tnb.com/contractor/docs/cata-mount.pdf or call (800) 816-7809.

RUSSTECH Engineering Company, Inc. Receives Gold Boeing Performance Excellence Award

RUSSTECH Engineering Company, Inc. announced that it has received a 2012 Boeing Performance Excellence Award. The Boeing Company issues the award annually to recognize suppliers who have achieved superior performance. RUSSTECH Engineering Company, Inc. maintained a Gold composite performance rating for each month of the 12-month performance period, from October 1, 2011 to September 30, 2012.

This year, Boeing recognized 594 suppliers who achieved either a Gold or Silver level Boeing Performance Excellence Award. RUSSTECH Engineering Company, Inc. is one of only 153 suppliers to receive the Gold level of recognition.

Founded in 1974, RUSSTECH Engineering Company, Inc. is a leading specialist manufacturer/supplier serving the aerospace, military, transportation, and electronic industries.

RUSSTECH Engineering Company, Inc. is also an innovator in quality and reliable Aircraft Electrical Components. RUSSTECH holds PMA for many current production and legacy aircraft programs with a focus in flight deck switching, light dimming controls, windshield heating terminations, encapsulated diodes, resistors, flexible bus assemblies, extruded terminal track, and hardware.

This year, RUSSTECH Engineering Company, Inc. enters the IFE market with our inflite® line of light weight, EMI rated, composite Back Shells for D-Sub connectors. This innovative product saves up to 40% compared to competitive metal systems and is EMI rated to 10GHz.

RUSSTECH Engineering Company, Inc. offers excep-

tional Connector Tooling Solutions, advancing the art with many ergonomic, efficient and patented designs. As an example, our RTCRT™ patented Contact Retention Test Tool and associated process has become an industry standard, greatly improving connector reliability and first time quality.

The RUSSTECH factory maintains a quality system that is ISO 9001:2008/ AS9100 REV C registered. All products are manufactured in California by a team of creative, innovative and dedicated individuals

Sunlight Resistant Silicone Cables Withstand Exposure to High Levels of UV Rays

Cicoil's Sunlight Resistant Cables are designed to withstand extensive exposure to high levels of radiation and ozone with no adverse effects. The crystal-clear flat

Silicone encapsulated cable offers uninterrupted performance, flexibility and reliability, even after 10+ years in direct sunlight.

Cicoil's proprietary silicone extrusion process allows multiple wires, shielded pairs, power conductors, coax conductors, tubing, and other design elements like Cicoil's patented StripMount™ fastening strip to be placed in a single flat cable, precisely controlling the inner component spacing, jacket thickness and the overall cable shape. Incorporating various components into a single, mechanically tough flat cable allows for greater current carrying capacity, a tighter bend radius, space savings, extended operation-life and eliminates the need for external conduit, plastic pipe, interlocking armor or protective devices.

Unlike other outdoor cables that become brittle, discolored or stiff when exposed to sunlight, Cicoil's ultra-durable silicone is "self-healing" from small punctures and will not deform, wear or crack due to prolonged exposure to UV rays, ozone, intense heat (+260°C), acid rain, flames, shock, salt, humidity, cold temperatures (-65°C), vibration, weathering, coarse sand, submersion in water, mechanical stress and most chemicals.

For applications that require additional abrasion and adhesion resistance, Cicoil offers anti-friction coating options by request.

Cicoil's Sunlight Resistant Cables are UL Recognized, CE Conforming, RoHS & REACH Compliant, Halogen-Free, Flame Retardant and are manufactured in an

Continued on page 59

Wire Terminal Testing



Made simple

The all-new WT3-200 wire terminal tester is an integrated solution for measuring wire and tube termination pull force. An ergonomic lever easily produces up to 200 lbf (1,000 N) of force for wire diameters up to 0.25 in (6.3 mm). The WT3-200 includes a long list of features and functions, such as data outputs via USB, RS-232, and Mitutoyo, on-board data storage for 1,000 readings with statistical calculations, password protection, and more. It can be operated on a rechargeable battery power, or AC. All at a competitive price of just \$2,195.

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NEWS PLUGS continued

Continued from page 57

automated, climate controlled environment. Standard "off the shelf" single conductor, multi-conductor and hybrid cables are available from stock in continuous lengths, cut to order, or as assemblies with connectors of your choice, 100% tested and inspected.

Cicoil has been a leader in designing and manufacturing high performance cable assemblies for over fifty years. The company's unique silicon coated flat cables provide high flexibility, extremely long life, and they can withstand temperature extremes from -65 degrees to +260 degrees Celsius. Cicoil's cables are used in thousands of demanding applications, including aircraft fuel control cells, semiconductor automation, and the Space Shuttle. Cicoil designs and manufactures its cable and cable assemblies in an automated facility in Valencia, California. Cicoil's quality assurance system is certified to the ISO 9001 (AS9100) standard. Visit www.cicoil.com for more information, or call 661-295-1295 to speak to an application engineer.

NEMA Publishes ANSI/NEMA WC 67-2012 Standard for Uninsulated Conductors Used in Electrical and Electronic Applications

The National Electrical Manufacturers Association (NEMA) published ANSI/NEMA WC 67-2012 Standard for Uninsulated Conductors Used in Electrical and Electronic Applications.

ANSI/NEMA WC 67-2012 covers the following uninsulated conductors:

- single end (solid) and stranded
- coated and uncoated copper
 - coated copper alloy
 - coated copper-clad steel
- aluminum conductors
- thermocouple extension conductors

These conductors are used primarily in insulated wires for aerospace, electrical, electronic, and other high performance applications.

"WC 67-2012 provides the requirements for high-reliability conductors used in aerospace, electrical, and electronic equipment. The 2012 revision will be referenced by a battery of high performance wire and cable standards," said Kevin

Coderre, technical director, RSCC Aerospace and Defense, and NEMA 7HW Aerospace Technical Committee chairman. "Specifically, the revision adds silver-coated copper and silver-coated copper alloy requirements to bring the document in line with the current state of practice of the industry."

ANSI/NEMA WC 67-2012 is available in electronic or hardcopy format for \$78. To purchase, visit NEMA's website or contact IHS by phone at 800-854-7179 (within the U.S.) or 303-397-7956 (international), or visit global.ihs.com.

NEMA is the association of electrical equipment and medical imaging manufacturers, founded in 1926 and headquartered in Arlington, Virginia. Its member companies manufacture a diverse set of products including power transmission and distribution equipment, lighting systems, factory automation and control sys-

tems, and medical diagnostic imaging systems. Worldwide annual sales of NEMA-scope products exceed \$120 billion.

Cerro Wire Offers Footage Guarantee

Cerro Wire LLC, a leading manufacturer of copper electrical wire and cable, has announced an update to its reel completeness guarantee. The improved guarantee is effective for all SLiPWire™ wire in sizes of one AWG and larger produced after January 1, 2011.

Footages on Cerro Wire's standard reels of SLiPWire, which were previously guaranteed to be within +/- .75 percent, are now guaranteed to be within +/- .50 percent of the tagged footage. If the footage falls below that range, Cerro Wire will either give the customer credit for the omitted product or replace the missing wire. In addition, Cerro Wire will also reimburse the customer for reasonable, direct,

out-of-pocket labor costs incurred as a result of the shortage.

The guarantee does not include responsibility for any consequential, incidental, or indirect damages, costs or expenses, including lost profits or revenue.

"The customer should not see more than one in twenty reels not actually marked zero-to-finish length," said Rick Bennett, Director of Quality for Cerrowire Electrical Distribution. "The others will be within guaranteed tolerance. No other competitor offers this performance or cost savings."

Cerro Wire LLC, a leading manufacturer of copper electrical wire and cable, supplies its products to wholesale electrical distributors and retail centers across North America. Visit www.cerrowire.com for a complete description of products and services.

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NEWS PLUGS **continued****Allied Wire & Cable Celebrates 25 Years**

Allied Wire & Cable announces a year-long 25th anniversary celebration. The company, which began in the Flynn family basement in 1988, is now one of the fastest growing wire and cable companies in the United States. Still family owned and operated, Allied Wire & Cable attributes its success to its emphasis on “common sense” over “dollars and cents.”

Founded in the Flynn family basement in Wayne, Pennsylvania in 1988, Allied Wire & Cable began as a home-grown company where the owners made sales calls, ordered materials, re-spooled wire by hand, packed, and shipped the products themselves.

Thanks to hard work and dedication to customer service, Allied weathered the challenges of creating a business from modest beginnings and overcoming tough economic times to become one of the fastest growing wire and cable companies in the United States.

In 2013, with locations across the country, sales and stocking locations in Pennsylvania, New Hampshire, Florida, Wisconsin, and Nevada, and customers around the world, Allied Wire & Cable is proud to celebrate how far it has come in a quarter century.

“We started this company in our par-

ents’ basement with no money, but a lot of optimism. Now we are well over a one hundred million dollar company with multiple locations and close to two hundred people working with us,” said co-owner and President of Allied Wire & Cable, Tim Flynn. “It has been an exciting ride and it isn’t over yet. Can’t wait to see what the next 25 years brings us.”

Allied Wire & Cable’s year-long 25th anniversary celebration will feature a different theme each month, highlighting a specific company achievement and incorporating a related customer giveaway, with prizes such as a Kindle Fire, themed gift baskets, and a grand prize trip. To learn more about Allied Wire & Cable’s 25th anniversary events, connect with them on Facebook and LinkedIn. They will be updating their social profiles with information on the company’s history and its monthly events throughout the year.

Allied Wire & Cable is a family owned and operated specialty manufacturer and distributor of wire and cable. Allied services many of the largest markets in the country, including the government, military, and the aerospace, automotive, and telecommunication industries. Dedicated to providing the best and most personalized service possible, Allied offers customization services, including cut and strip, printing, dyeing, striping, twisting, and more, so customers get their wire and cable exactly the way they need it. Allied also assigns individual sales reps to customers, providing a single point of contact to guide them through the cable buying process. Headquartered in Colleagueville,



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Announcing IPC / WHMA A-620 Rev B

Significant technical updates, greater ease-of-use and compatibility with other key assembly standards are among the many changes users will find in the newly released B revision of IPC/WHMA-A-620, Requirements and Acceptance for Cable and Wire Harness Assemblies. This important industry standard is a joint effort of IPC — Association Connecting Electronics Industries® and the Wire Harness Manufacturers’ Association (WHMA).

The revision addresses more than 500 documented comments and recommendations from users throughout the industry and features 125 new or changed illustrations.

IPC/WHMA-A-620B is 400 pages long and features 682 full-color illustrations. IPC/WHMA-A-620B standards are also available on CD-ROM

**Call Judy Hansen at 952-253-6077
or order online today at WHMA.org**

WHMA
Wiring Harness Manufacturer's Association

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PA, Allied has offices in New Hampshire, South Carolina, Tennessee, Texas, Wisconsin, Nevada, and Florida, along with several warehouses across the country. For more information on Allied Wire & Cable, please visit www.awcwire.com.

IPC Conflict Minerals Seminar Proceedings Now Available: Explains SEC Regulation and Provides Compliance Assistance

To help industry professionals navigate conflict minerals compliance, IPC — Association Connecting Electronics Industries® is offering the proceedings from its fall seminars, featuring multimedia presentations about the U.S. Securities and Exchange Commission (SEC) regulation and its impact on the electronics manufacturing supply chain industry. IPC's Conflict Minerals Critical Issues Seminar Proceedings offers the best of two seminars hosted by IPC in late 2012.

The proceedings provide necessary information on understanding regulatory requirements, customer requirements and emerging industry practices. For companies seeking guidance on ensuring compliance with the new regulation, the proceedings DVD includes audio and slide presentations on a variety of topics ranging from traceability to conflict-free smelter programs to SEC auditing requirements.

Industry experts David Engvall, Covington & Burling LLP; Lee Wilmot, TTM Technologies; Andrew Cooper, ITRI; John Plyler, Research in Motion, Ltd.; and Lawrence Heim, Elm Consulting Group, provided insights into the impact of the SEC conflict materials rules and addressed some of the most frequently asked questions about the regulation.

"IPC's conflict minerals seminars contributed significantly to the understanding of those in the electronics industry who are concerned with how this regulation affects their companies and their customers — and who need to understand the complexities of compliance," said Stephanie Castorina, IPC manager of environmental programs and a presenter at the seminar. "By making these proceedings available, IPC is giving those who could not attend the seminars the opportunity to benefit from the knowledge shared by industry experts and those in the trenches who are developing or have developed compliance plans for their companies."

Representatives from Hewlett-Packard, Brady Corp., Freescale Semicon-

ductor, Motorola Solutions, AMD and KEMET Electronics shared details of their respective companies' efforts and plans to ensure their products are DRC conflict-free and comply with the SEC conflict minerals regulation.

IPC's Conflict Minerals Critical Issues Seminar Proceedings is available for \$100 to IPC members; \$150 industry rate. Running time for the complete proceedings is 2 hours and 45 minutes. For more information visit www.ipc.org/proceedings-conflict-minerals.

WAGO Power Distribution Blocks

Acting on panel-builder requests, WAGO Corporation's Engineering Services division has developed five DIN-rail mount Power Distribution Blocks. Routing higher-current power supplies to PLCs, I/O and associated components within space-restricted panels, four models are



WAGO Power Distribution Blocks

rated up to 30 A. The fifth, an ultra-slim model, is rated up to 65 A.

Featuring two poles for connecting both sides of the power supply output and daisy-chaining, 30 A block connection configurations range from 2x8 to 2x24.

The 65 A unit is a single-pole block. The

30 A units stand 1.47" tall and feature a 38mm depth — nearly 27% more compact than typical power distribution blocks.

To better serve panel-builders, WAGO Power Distribution Blocks replace traditional, screw-based terminations with CAGE CLAMP® Spring Pressure Technology. This minimizes installation time (no torquing) for all conductors AWG 28–12. It also eliminates connections-related warranty claims — the maintenance-free connections are vibration-proof and thermal cycling resistant. The 30 A blocks employ Slide Stops to prevent sliding on DIN-rail once mounted.

Manufactured at WAGO's Wisconsin HQ, the Power Distribution Blocks are pre-marked via ink-jet and WAGO's miniature WSB markers; custom marking is available. Contact info.us@wago.com or 1-800-DIN-RAIL for pricing and availability.



TE OCEAN APPLICATOR SERIES

NEW APPLICATOR FEATURES DEVELOPED TO PROVIDE IMPROVED PRECISION AND REDUCED SETUP TIMES

Crimping standards continue to rise to higher levels of quality and repeatability. Taking customer input and market demands into consideration, TE Connectivity (TE) has created the new Ocean Applicator series to meet those higher demands and to take terminal crimping to a new level.

By consolidating our past applicator offering, TE was able to provide design consistency and tooling standardization to the market. One of the resulting benefits to customers of this consolidation is flexibility in the choice of feeding options: new and improved mechanical and pneumatic feeds along with the innovative and precise servo feed option. The new Ocean Applicator series design also allows customers to perform field upgrades to system III and Smart Applicator technology. It provides an upgrade path for terminal intelligence that allows the machine to obtain set-up features as the applicator is upgraded.

- One applicator platform – modular family design
- Two ram interface styles
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- Smart Applicator Integration

For all your application tooling needs, contact Heilind Electronics or visit heilind.com/rpages/te_oceanapp.



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- Opportunities to interface, generally with executive level personnel, of the leading suppliers to our industry.

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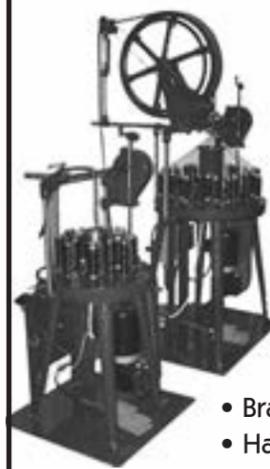
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EMPLOYMENT OPPORTUNITIES IN AUSTIN

A growing Central Texas wire harness and cable manufacturer is needing to fill the following positions:

1. **VP of Operations** is responsible for managing all operations including purchasing, manufacturing, shipping and receiving. Also manages a multitude of suppliers in China, working with our India factory and ensures their product meets our specifications and is on-time.

Minimum 5-7 years experience in wire harness and cable manufacturing as well as a Bachelor's degree in business, engineering, logistics or related field. Masters degree in business or logistics is an added advantage. Experience with China factories and visiting Asia. LEAN or Quality Certifications are a plus

2. **QA Manager** is responsible for developing quality system for ISO certification to include; defining and developing procedures, business processes, work instructions, training, documentation and internal audits.

Minimum 3-5 years Quality Assurance experience in a wire harness and cable manufacturing environment. Bachelor's degree preferred. LEAN or Quality Certifications are a plus.

3. **Manufacturing Engineer** is responsible for developing and improving manufacturing processes by studying product and manufacturing methods.

Minimum 3-5 Years Experience in Harness and Cable Assembly manufacturing environment. Experience with lean manufacturing. Engineering degree and additional LEAN or Quality certifications are a plus

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CAREER OPPORTUNITIES

RESCO Electronics, a rapidly expanding wire harness and electro-mechanical manufacturer, has the following Baltimore based openings:

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CALENDAR OF EVENTS

Automotive News World Congress **Detroit Marriott Renaissance Center** **January 15-17, 2013** **Detroit, MI**

This past January, more than 1000 people came to the Detroit Maxriott Renaissance Center for the annual Automotive News World Congress to hear the industry's top executives explain how they will compete and thrive this year. 2013 promises to be even better. World Congress attendees receive a pass to visit the auto show on Thursday, January 17, before it opens to the public. Registration also includes the presentation of the BorgWarner owner and driver trophies as well as the Automotive News/PwC Shareholder Value Awards on Wednesday evening. *For further information visit www.autonews.com.*

DesignCon **Santa Clara Convention Center** **January 29-30, 2013** **Santa Clara, CA**

DesignCon is structured as a comprehensive B2B event, segmented into well-defined technological sections of the engineering & manufacturing industry. *See www.designcon.com for further information.*

Electronics West **Anaheim Convention Center** **February 12-14, 2013** **Anaheim, CA**

Meet face-to-face with electronics professionals offering the best solutions. Explore first-hand the latest developments, technologies, products and services affecting your industry including: components, subassemblies, software, contract service, assembly, test and inspection products and much more. 350 exhibitors will display the latest electronics-related products and services. *Visit www.canonradeshow.com/expo/atxw13 for exhibitor or attendee information.*

Wiring Harness Manufacturer's Conference **Renaissance Las Vegas Hotel** **February 20-22, 2013** **Las Vegas, NV**

Once a year WHMA sponsors a conference that offers members the opportunity to participate in committee sessions, attend educational programs and check out the industry's latest at the supplier's technology exhibits. *For further information visit www.wbma.org or call (952) 253-6085.*

IPC APEX Expo **San Diego Convention Center** **February 19-21, 2013** **San Diego, CA**

APEC 2013 continues the long-standing tradition of addressing issues of immediate and long-term interest to the practicing power electronics engineer. Outstanding technical content is provided at one of the lowest registration costs of any IEEE conference. *See www.apex-conf.org for more information.*

APEC 2013 **Long Beach Convention Center** **March, 17-21, 2013** **Long Beach, CA**

IPC APEX Expo is the largest event in North America featuring advanced and emerging technologies in printed board design, electronics and test. Show highlights include:

- More than 400 exhibitors showing equipment, materials and services for printed boards and electronics manufacturing
- The industry's most technically proficient programs in electronics manufacturing and assembly.
- The largest technical conference for our industry in the world
- FREE! Industry poster sessions-catch up on the latest research and meet the authors.
- And much, much more!

See www.ipcapexexpo.com for more information.

Assembly New England **Boston Convention & Exhibitor Center** **April 10-14, 2013** **Boston, MA**

Assembly New England is the only trade show dedicated exclusively to the function of assembling discrete parts into finished products. Today's challenges demand innovative thinking. Whether the path to your success lies in improving quality, keeping a tighter rein on costs or cutting lead times, this event has the resources you need. *For more information see www.cancom.com.*

Interwire 2013 **Georgia World Congress Center** **April 23-25, 2013** **Atlanta, GA**

Introduced in 1981, Interwire is the largest and longest-running wire and cable marketplace in the Americas. It is an international trade event that includes exhibiting companies, speakers and attendees from more than 50 countries around the world. The show crosses dozens of vertical industries including automotive, construction, aerospace, transportation and communications among others. *For more information see www.wirenet.org/events.*

Del Mar Electronics Show **Del Mar Fairgrounds** **May 1-2, 2013** **Del Mar, California**

A high value design and manufacturing show, this event serves the electronics, medical and biotech industries. The show will play host to an impressive list of exhibitors. *For further information or a listing of the seminars available visit www.vts.com.*

EDS 2013 **The Cosmopolitan** **May 6-9, 2013** **Las Vegas, CA**

Every year, the manufacturers of electronic components, instruments and accessories, as well as distributors and manufacturer's representatives, come together to meet, make contacts and build their businesses. Suppliers of industry goods and services also are on hand to market their products. The emphasis at EDS is on forging and maintaining business relationships through scheduled, one-on-one meetings, but the event is also filled with important product exhibits educational, educational programs and networking opportunities. *For further information or a listing of the seminars available visit www.edsconnects.com*

National Electrical Wire Processing Technology Expo **The Delta Center** **May 8-9, 2013** **(formerly Frontier Airlines Center)** **Milwaukee, WI**

Since 2001, the National Electrical Wire Processing Technology Expo continues to be the exclusive showcase for the latest technology for the electrical wire harness, wire & cable processing and related industries. Meet over 100 world class suppliers of equipment, instruments, tools, materials and supplies used in wire & cable harness assembly, inspection and repair. *For further information visit www.expoproductionsinc.com.*

Semicon West/Intersolar **Mosecone Center** **July 9-7, 2013** **San Francisco, CA**

SEMICON West attracts more than 30,000 professional attendees representing the leading global technology companies, including IDMs, foundries, fables, contract packaging and test houses, OEMs, materials manufacturers, components and sub-systems companies, and many others. Visitors come to see the latest products and technologies, meet with and learn from technologies and technical experts, and source solutions that enable them to advance their own product development and move their ideas and businesses forward. *For further information visit www.semiconwest.org.*

PCB West 2013 **Santa Clara Convention Center** **September 24-26, 2013** **Santa Clara, CA**

All the major design software providers are here, and scores of topnotch board fabricators and assemblers are represented. We see a real trend whereby OEMs are reconsidering their outsourcing strategies, and in many cases moving product design and build back to North America. The Silicon Valley remains the world's most vibrant electronics engineering community. For 21 years, PCB West has been the best place in the Silicon Valley to extend that community. *For further information visit www.pcbwest.com*

MD&M Minneapolis 2013 **Minneapolis Convention Center** **October 30-31, 2013** **Minneapolis, MN**

For 21 years, MD&M Minneapolis has been the trusted resource for what's next in medical design and manufacturing. Regardless of your particular design and development objectives, MD&M offers everything you need to drive your project to the finish line. *For further information visit <http://MDMminn.com>*

Productronica 2013 **New Munich Trade Fair Centre** **November 12-15, 2013** **Munich, Germany**

productronica is THE leading trade fair for electronics production. It showcases the entire value chain for electronics manufacturing- from software to process control, from technology to applications, and from products to system solutions - under a single roof. It also focuses on the latest innovative and future-oriented highlight themes. Take advantage of this added value and profit from the effects of synergy. In short: productronica is an outstanding gathering for leading German and international manufacturers and newcomers who give other participants a look at both the present and the future. *For further information email info@productronica.com*

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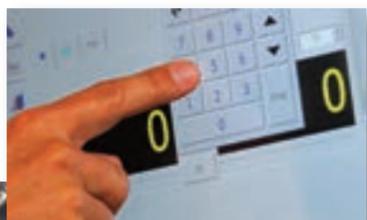


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