- Industry News
- Calendar of Events
- New Product Information
- Electrical Wire Processing Expo Schedule of Events
- Surplus and Used Machinery, Parts, Employment Opportunities



Milwaukee in May

The National Electrical Wire Processing Technology Expo continues to be the exclusive showcase for the latest technology for the electrical wire harness, wire and cable processing and related industries.

The 10th annual Wire Processing Expo will be held Wednesday, May 12 and Thursday, May 13, 2010 at the Midwest Airlines Center, Milwaukee, Wisc. It is tailored expressly for those in the electrical wire and cable processing industry.

For the first time, the National Electrical Wire Processing Technology Expo and the Wire Association International (WAI) Wire Expo will co-locate on the 2010 show dates.

Jay Partington, president of Expo Productions has provided attendees with a full slate of seminars providing timely information to enable you to meet challenges and changes in the wiring harness/cable assembly industry.

Tyco Electronics Corporation is providing IPC/WHMA-A-620 CIT re-certification. The two-day Recertification Class is available Tuesday & Wednesday, May 11 & 12. A Walk in Challenge Testing for Recertification is provided Tuesday through Thursday, May 11–13. (See page 3 for further information.)

_Continued on page 29

Computer-Guided Harness Assembly

By Christoper E. Strangio President, CAMI Research, Inc.

dvances in computer automation over the last 30 years have brought huge increases in productivity to electronics manufacwe seek methods within reach of current technology that provide helper functions for assembly technicians whose job it is to mate pinned wires with connector shells, the most timeconsuming and error-prone aspect of harness assembly.



The National Electrical Wire Processing Technology Expo, now in its tenth year, will once again be at the Midwest Airlines Center, Milwaukee Wisconsin, May 12-13, 2010.

Selecting the Correct Water Blocking System

turing. Populating printed circuit boards with components, soldering, cleaning, inspection, and test can now be handled almost entirely by computer-controlled machinery. Not only have the costs of computing engines dropped radically, but software advances in machine vision, gauging, sensors, control, and testing have brought us manufacturing facilities that can operate tirelessly, and err only to the extent that flaws in their programming remain undetected.

Unfortunately, cable and wire harness assembly have not seen such marked advances. The core task of inserting pinned wires into connector cavities relies largely on the acuity of human vision to guide marvelously dextrous human fingers, a feat of computation and control that cannot be equalled by any present-day machine. Nonetheless, In general, we have three aims:

1 - Reduce the abstraction level of pin location.

2 - Minimize the physical motion necessary to insert a pin.

3 - Provide feedback to confirm that the insertion task is complete.

As we approach these goals, we will increase assembly speed, reduce the error rate, and, perhaps most importantly, reduce the fatigue experienced by workers performing this assembly task; lower fatigue levels enable technicians to function for longer periods without a loss of speed or accuracy.

_Continued on page 13

By Raynes Brown DSG-Canusa

s today's automobiles evolve, the need for comfort combined with fuel efficiency and very low noise has become paramount.

Although there have been significant advancements in vehicle design, the wiring harness has remained relatively untouched. The very slow evolution of such a valuable vehicle component is attributed to the vital function of supplying power to the automobile at a relatively low cost.

One area of concern is the harness feed through location, where preventing water migration into the vehicles interior continues to be a source of frustration for harness designers and engineers. Cable bundles often require waterproof sealing, as well as resistance against thermal, chemical and mechanical influences.

An automotive designer is tasked with selecting the correct water blocking system. They are challenged with choosing the most cost effective system, ensuring that the system provides the necessary protection 100% of the time and that the system is simple and easy to install.

The designer typically has the following options:

____Continued on page 8



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Milwaukee in May

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The National Electrical Wire Processing Technology Expo continues to be the exclusive showcase for the latest technology for the electrical wire harness, wire and cable processing and related industry.

Computer-Guided Harness Assembly

Advances in computer automation over the last 30 years have brought huge increases in productivity to electronics manufacturing.

Selecting the Correct Water Blocking System

Cable bundles often require waterproof sealing, as well as resistance against thermal, chemical and mechanical influences.



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Today's Manufacturing World

Paul Hogendoorn shares his perspective on "survival of the excellent".

News Plugs

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

Wire Wisdom

What size wire do I need? This Wire Wisdom will highlight most of the critical considerations that fluence the selection of a conductor size.



Classified

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IPC/WHMA-A-610 CIT Re-Certification

Tyco Electronics is providing IPC/WHMA-A-620 CIT Re-certification at Wire Processing Show, May 11-13, 2010

√yco Electronics Corporation is providing IPC/WHMA-A-620 CIT re-certification at the 10th Annual National Electrical Wire Processing Technology Expo, in Milwaukee, Wisc.

A 2 day Recertification Class is available Tuesday & Wednesday, May 11 & 12. Visit this link http://tooling.tycoelectronics.com/a-620.asp or call Rick Hawthorne at 717-810-2417 to register for the class. The request for quote form will be used to provide the information necessary to begin the registration process. The fee for the class is \$1050/participant.

A Walk in Challenge Testing for Recertification is provided Tuesday through Thursday, May 11-13. Testing may begin any time between 8:00 a.m. and 12:00 p.m. Preregistration is not required. The fee for challenge testing is \$525/participant.

Rick Hawthorne, Tyco Electronics

terCard, Discover, and Checks made out to Tyco Electronics are acceptable forms of payment at the time of testing.

Certificates will be processed after the show. Locations for the Recertification will be displayed at the Show Hall.

Please contact Rick Hawthorne at 717-810-2417, rlhawtho@tycoelectronics.com, for answers to any questions.

Purchase Order Numbers, VISA, Mas-

2010	Production Schedi	ule
<u>Issue</u>	Reservations Due Date	<u>Materials Due Date</u>
May/June 2010	April 2, 2010	April 9, 2010
July/August 2010	June 4, 2010	June 11, 2010
September/October 2010	August 6, 2010	August 13, 2010
November/December 2010	October 1, 2010	October 8, 2010

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Over 10,000 copies of Wiring Harness News (ISSN 1097-0789) are distributed bi-monthly to wiring harness & cable assembly shops, cord set manufacturers, companies that process electric wire & cable (including fiber optic) for use in their own products, their suppliers and other interested parties.

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at the Wire Processing Technology Expo

Two Day Recertification Class

- May 11-12, 2010; 8:00 am 5:00 pm
- Must be pre-registered and confirmed by Friday, April 30th by logging on to www.tooling.tycoelectronics.com/mailer/a620_cit_rfq.asp

IPC/WHMA-A-620 Recertification

or by calling Rick Hawthorne at 717-810-2417. \$1050/per participant

Challenge Testing for Recertification

- May 11-13; begin testing any time between 8:00 am - 12:00 pm
- Pre-registration is not required; just walk in
- \$525/per participant

Both classes will be held at the Midwest Airlines Convention Center in Milwaukee during the Expo. Certifications expiring up to the end of August may recertify now without losing any time on the current certification. The new expiration date will be the month of current expiration in 2012.

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Today's Manufacturing World: Survival of the

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ost of North America has felt the effects of the downturn in the automotive industry the last two years, but my region - Southwestern Ontario - has been hit harder than most. In fact, I have read many reports and stories about how the London region in particular has been hard hit.

But it's not all bad news, it's just that the bad news seems to be printed quicker, and more often.

The other day, I needed to drive from my office to the airport to pick up a colleague. The drive took me east on Highway 401 and then north on Veterans' Memorial Parkway - about 10 miles. It was a route I have taken many times, but on this particular day I was more sensitive to the indications of success than I was to the evidence of failure.

I noticed a German based seat manufacturing company, in a bright new building with a full parking lot. Following that, I saw an American transmission part factory. And then on Veterans' Memorial Parkway, I passed a brand new food manufacturing facility, a new Korean building materials facility, two other German based Tier 1 companies, a Canadian high tech environmental company, another advanced manufacturing Tier 1 supplier, a local family owned packaging company, and then at the end was an air-



Paul Hogendoorn, President OES, Inc.

craft company that built airplanes entirely from composite materials.

There were many apparent differences between these companies - from their places of origin, be it the US, Europe, Asia or local home grown, to the industry they were in, be that automotive, environmental, packaging, food or aircraft.

But there were also many noteworthy similarities. They all appeared to be successful, despite the difficult business climate, and they all appeared to have an air of "excellence" about them. After giving that some thought, I realized that I had been in most of those facilities, and

_Continued on page 6

Visit with Marilyn & Kathy at the **10th Annual National Electrical** Wire Processing Technology Expo May 12 & 13, 2010



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all of them were in fact concerned with the pursuit of excellence in all that they did.

They were concerned about excellence in their products, in their processes, in their staff, in their staff and management relationships, in their buildings, and even in the landscaping around their buildings. Everything about them had to be "excellent"; good enough was never good enough. One company took it to such an extreme that even the shrubs in the front garden had to be the same as the exotic shrubs in the front gardens at the head office in Europe.

Common sense would suggest that those would be the first things to be discarded in a downturn. Gardens, foyers, receptionists, building appearance etc., none of those things add value to the product or for the customer. They would be the first to be cut. But the evidence what I tuned into on that particular day - suggested otherwise. These companies weren't spending money on the pursuit of excellence because they were successful enough to afford it, they were successful enough to afford it because they pursued excellence in every facet of their business.

One company official told me about how visitors from head office took as much notice of the shrubs and office furniture as they did of equipment on

the production floor. I guess the theory is that excellence isn't more important in some areas of the business than in others. If the gardens are well tended, then so are the relationships with the employees. If the office furniture is clean and in perfect order, then likely so is the production equipment. It made me think of so many of the other factories I toured in earlier years that were no longer here today. A quick replaying of recent history seemed to suggest a correlation between a company's lack of attention to excellence in all areas of their business and their eventual demise. The domestic Tier 1's with the worst gardens, building maintenance and office furniture also seemed to be the factories with the most stressed employee relations and the poorest equipment condition. And they were the first factories to be closed.

What does the pursuit of excellence really cost, even in supposedly non-critical things like gardens, parking lots and office furniture? Not much really, maybe only a percent or two of the total revenue of the operation. But what does it return? I'd argue "nearly everything". Morale, attitude - everybody settling for nothing short of excellence, in virtually everything they do.

That' the difference between success and failure, the key differentiating feature between these London companies that have survived and thrived, and all

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Wiring Harness News MARCH/APRIL 2010 7

those that failed. Some companies pursue excellence in all they do; others do only what they need to do to make a profit.

History, recent and longer term, suggests that the pursuit of excellence in all facets of a business is a better strategy for success than even a collection of the singular goals popular today, like product quality, production efficiency, and cost reductions. Partial excellence isn't



Precision Plus Announces Launch of New Website and Logo Design

Precision Plus announces the launch of its new website and logo design in an effort to rebrand itself and better convey its capabilities to the customer base. Founded in 1982, Precision Plus established itself as a value-oriented supplier of connector pins, miniature screws, shafts and valve components using its Swiss made Tornos screw machines. Through the years they have quietly built the reputation as a niche supplier.

"From humble origins with a handful of machines and craftsman, much has changed and we felt it important to get the message out," President Michael Reader stated. "In the past 10 years we have reinvested more than six million dollars in

excellence at all. Excellence is an attitude that has to permeate everything in order for a company to be truly excellent.

Paul Hogendoorn is president of OES, Inc. and OES-A, Inc. He is a founding member of the London Region Manufacturing Council and currently serves as its chair. He can be reached at pbogendoorn@oes-inc.com.

~ WHN ~

our plant and equipment upgrades to expand capability within our Swiss machining niche".

When asked why they have done this he replied "in order to flourish in this new economy it is essential to continually upgrade equipment, capability and skills". He went on to say that "when machine shops from other niches have flocked to learn the Swiss machining art in order to offset declines in their core business, Precision Plus started in Swiss machining and continue to focus on being the very best."

Precision Plus enters the new year with 18 CNC Swiss type machines with up to 7axis and 60+ traditional Tornos Swiss machines. Additionally they have added two 2" capacity Miyano ABX 51SY (twin spindle, twin turret) to compliment the Swiss lineup after customers had inquired about even broader capability. While the evolution has been constant over the years, the look and marketing efforts have not kept up.

Continued on page 24







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Selecting the Correct Water Blocking System

Continued from page 1

- Drip Loops
- Epoxy's/Silicones's

• Hot Melt Adhesive Profiles (with Heat Shrink Tubing)

• DSG-Canusa's Coldmelt Water Blocking System (using Mastics)

<u>Drip Loops</u>

Drip loops are the oldest and most widely used method in preventing vehicle water ingress via the wiring harness. They involve the addition of an extra 12-18 inches of cabling into the wiring harness just before it enters through the vehicles fire wall. The cables are bent to form a concave – U shaped loop. The premise behind drip loops is that when water beads onto the wiring harness it will flow down the cables and away from entering the inside of the vehicle.

Drip loops are being repeatedly redesigned in an effort to improve reliability, particularly in vehicles that are designed to perform in both on-highway, and off-road conditions.

The main areas of concerns with drip loops are performance and noise.

When water gets to the side of the drip loop closest to the vehicles interior it gains unimpeded access to the interior wire harness. If there are unsealed splices in the interior harness water will wick up the cables and into the splices and create corrosion and ultimately failure of components.

The extra lengths of cable increase the vehicles curb weight and ultimately the assembly labor cost as the excess wires are cumbersome to maneuver.

As the wiring harness is generally fed through a hollow grommet, the noise generated in the engine compartment and from the road travels uninhibited into the vehicles interior.

<u>Epoxy and Silicones</u>

The process of using epoxy or silicone improves upon drip loops as it eliminates the excess cables and allows for easier pulling of the harness during assembly. They ensure complete encapsulation of each individual cable in the wiring harness bundle and provide some noise suppression. These types of material are usually supplied and applied in the semi-liquid state, allowing for easy injection into a specially designed grommet.

The benefits of epoxy's and silicones are off-set by long curing times, EHS issues and the challenge of containing them during processing.

Silicones and epoxies creep over time, losing shape and volume. The hard-



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Through on-board guided assembly

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ening of these materials creates excess stress at the blocked area increasing the likelihood of cable insulation damage and ultimately water penetration.

There are also health concerns with the high odor and potential off-gassing on epoxies and silicones.

Hot Melt Adhesive Profiles (with Heat sbrink Tubing)

This type of water blocking solution accommodates only a relatively small number (up to a maximum of 20) of cables in the wire bundle.

Despite this obvious limitation hot melt adhesive profiles were proven to be an adequate solution until additional issues were discovered during application.

Special care had to be taken to ensure that the cables were properly positioned into the pre-notched openings of the adhesive, and the subsequent heating of the adhesive to its melting point allowing for the complete encapsulation of each individual cable.

There is also an extreme high risk of short-circuits on larger bundle sizes due to the high heat required to melt the adhesive

Some hot melt adhesive longitudinal blocking designs water utilize microwave heating, which can cause short circuits, particularly with twisted pairs.

DSG-Canusa's Water Blocking

Solution using Mastics Mastics are the most widely used water blocking solution in automotive applications. They are generally low cost, easily applied and provide the necessary strain relief, while ensuring 100% water proofing when correctly installed.

DSG-Canusa, a leading manufacturer of heat shrink products and application equipment, has developed an innovative system to block this method of water penetration.

DSG-Canusa's Deray® Coldmelt water blocking system employs a 2 part solution of a fast recovering heat shrink tubing and specially formulated mastic. By using a carefully designed shrink oven, Deray[®] ColdMelt effectively seals 100% of the time.

This very cost effective, OEM approved solution eliminates drip loops, adds harness design flexibility, allows for grommet standardization and reduces handling during vehicle assembly.

Deray[®] ColdMelt is extremely easy to install and accommodates cable bundles ranging in sizes from 10-150 wires. Offered in several expanded tube diameters from 17 to 50 mm, with adhesive strips in 50 and 70 mm lengths. It is ideal for any application where water leakage/moisture ingress is a potential problem.

Applying Coldmelt can be incorporated into the wire harness on-line assembly or off-line on a bench top as follows:

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Selecting the Correct Water Blocking System

Continued from page 1 _

Application sequence for the Deray® ColdMelt water blocking system.



#1 - First embed the cables of the wiring harness into the mastic.



#2 - Protect the adhesive with a low temperature shrink tube.



#3 - Use the Deray® Sealman to both shrink the outer tubing and to mechanically squeeze the mastic between the cables.



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Computer-Guided Harness Assembly

Continued from page 1

Historical Approaches

Cable and harness assembly represent only one instance of an electrical and mechanical assembly task that has not quickly yielded to automation. For such tasks, computers are used to display sequential images of assembly steps, project light onto an assembly panel to direct the technician's attention to the next operation, provide spoken instructions, and respond to spoken words. Bar code scanners eliminate the manual reading of numbers on components or wires, vision sensors detect color, and image processing enlarges or enhances a video image to enable reliable judgment by the human eye. These technician aids have advanced the state of the art by eliminating, one-by-one, complex processes that computers and machines are increasingly able to perform.

Assembling Connectors

Connectors commonly used in wire harnesses involve an open connector body with separate pins. The technician's chief job is to insert pinned wires into the appropriate cavities in the connector body according to a printed build list.The perceptual challenge involved in this highly repetitive task invites error and fatigue.These are the issues:

1 - Pinned wires must be identified.

A numeric wire code, color code, or insulation color normally serves this purpose. While advanced scanners may be employed, it is not common because of the expense involved. Most applications rely on the technician's vision. When numbers identify wires, reading these numbers printed on a curved surface and remembering them, especially when many digits are involved, taxes both vision and memory.

2 - The wire ID or color must be looked up in build list, and remembered, to find the target cavity.

3 - A labeled rubber grommet or formed plastic shell on the connector body must be searched to locate the target cavity.

For connectors with few pins or

_Continued on page 14



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Flexible PVC Tubing

Computer-Guided Harness Assembly

Continued from page 13 _

large openings, each cavity can be numbered clearly. Unfortunately, this often is not true. Instead, a number may be equally near to two cavities leading to potential confusion. In some cases, the pins are so numerous or so dense as to make numbering for each cavity impossible, and the technician must count forward or backward from reference points.

4 - The pinned wire is inserted into the target cavity.

Manual methods do not normally provide feedback at this point to confirm that the wire has indeed been inserted into the correct cavity.

To perform this task accurately, effi ciently, and repeatably over the course of a work day, the assembly technician must be skilled, well-trained, and able to manage common distractions in the workplace. Even a skilled worker becomes fatigued in these tasks as the work day progresses, leading to slower performance and increased likelihood of error.

Computer-Guided Assembly

In late 2008, CAMI Research introduced a computer-aided assembly system to simplify the tasks identified above. The Light Director[™] system uses light fibers driven by superbright LED



Figure 1 - An illuminated target cavity.

lamps to individually illuminate target cavities in the connector being assembled, as shown in Figure 1. When the technician enters the wire code printed on unconnected wires, or touches a wire connected at the other end to a sensor, software turns on the appropriate fiber, thereby causing a bright, flashing light to project from inside the target cavity guiding the technician to the proper insertion point. Correct insertion is confirmed by the elimination of light from that location, whereas insertion into an incorrect cavity leaves the flashing light visible. See a videoclip demonstration at:

http://www.camiresearch.com/LDvideo

Continued on page 14



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Computer-Guided Harness Assembly

Continued from page 14

Figure 2 shows how light follows the fi ber into the connector cavity, while Figure 3 shows a mounted connector fixture. The connector fixture is shown mounted on the test platform and ready to use in Figure 4.

In addition to an illuminated target cavity, the system provides



Figure 2 - Light fiber driven by super-bright LED lamp.

spoken instructions to reinforce identifcation of the target, and a graphic image of the connector with the target pin highlighted to

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permit easy recovery from interruptions. Insertion into the correct cavity is confirmed when the flashing light disappears. Speech recognition may also be employed to allow the operator to issue commands, like "Next", or read color codes or num-

bers.

This automated guidance greatly reduces operator fatigue, assembly time, and error rate by eliminating the need to manually locate pin positions. Field experience with the Light Director has shown productivity improvements of 20-50% while at the same time reducing the error rate to near zero.

Assembly Methods

Wire harnesses vary widely in the number of connectors, number of wires, pin count, length, and other factors. In simple cases, wires extend one-to-one between two connectors. In other cases, large, complex harness boards support

2:1 shrink ratio

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1 - First-Sided Pinning

In this situation, the pinned wires ready for insertion into the connector body have no electrical contact with the system. Wires are identified solely by codes printed on each wire or by the wire's insulation color. The wire code alone must be used



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Figure 3 - Connector fixture with shroud.

to determine the target cavity. First-sided pinning always applies to the first connector assembled in a harness and may, if desired, be applied to all connectors. Figure 5 (page 18) shows the setup for first-sided pinning.

The design and printing of wire codes on the insulation largely determines the suitability of first-sided pinning for automation. In order of speed, one of these methods may be employed:

_Continued on page 18











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Computer-Guided Harness Assembly

Continued from page 17 _

1 - Wire Scanner - A scanner capable of reading bar code, color code, or text printed on the curved surface of the insulation would be the fastest and most accurate input scheme for wire codes. Either a handheld scanner brought near printed code, or a fixed scanner with a slot through which the wire is pulled, might be used. The handheld scanner has a limited field of view and may not work for long codes. Scanners of this type represent emerging technology and generally are not ready for widespread use.



Figure 5 - First-Sided Pinning.

2 - Speech Recognition – Software available for most computers may be used for direct speech input. This is known to work well for English speech recognition using the Vista or Windows 7 operating systems, and is suitable for reading wire color or short (3-4 digit) numeric codes. When dictating wire codes, the highest accuracy results when a checksum digit is added to the wire ID allowing the computer to immediately flag misread data.

> 3 - Mouse Input. We rely on the operator's eyes to read the numeric or color code in this case, and click on a matching color bar or number displayed on the computer screen.

> 4 - Keypad Input. When none of the previous options is suitable, wire codes may be typed in manually using a numeric keypad. When the code consists of more than three or four digits, or if check digits cannot be used, this method becomes impractical and may actually slow down the overall assembly process.

2 - Second-Sided Pinning

When pinned wires ready for insertion have previously-attached connectors at the far ends, electrical fixtures which mate to these connectors may drive signals into the wires.

This permits an electrical probe, or finger with wrist strap, to identify



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10767 Gateway Blvd. W - Ste, 510 EL Paso, TX 79935 USA Phone: +1 915-598-3037 Fax: +1 915-598-5374 Email: elpaso@schaefer biz Web: www.schaefer biz wires by touch, *eliminating the need to input wire codes into the system*.As a result, we realize a huge speed and accuracy advantage because electrical sensing makes unnecessary all of the complexity associated with entering wire codes.

Electrical sensing of unattached wires has other advantages. Once detected, the system speaks both the color (or code) of the wire and the target cavity. If you touch a red wire and the system says "Blue Wire to Pin A",

__Continued on page 20

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Computer-Guided Harness Assembly

Continued from page 17 _

you have identified a miswire on the first side. Refer to Figure 7 (page 23).

3 - Seal Plug Insertion

Unused cavities often require seal plugs before the connector is closed. The Light Director guides the assembly technician in this task also. By flashing all unpopulated cavities simultaneously, the technician adds plugs until all light ceases. Typically, this step occurs before pin insertion.



Figure 6 - Second-Sided Pinning.

4 - Testing the Finished Assembly The test platform controlling the

Light Director and sensing unat-

Measure conductor and insulation crimp widths

tached wires for second- sided pinning may also perform an electrical test on the completed assembly.

This becomes practical when the harness does not span a great distance on the harness board and offers two advantages. First, the test can be performed without removing the workpiece from the harness board or detaching it from the system. Second, the operator will find errors immediately before closing the connectors or removing them from the fixture.

Cost-Benefit Analysis

An initial one-time investment in the test platform and software, and ongoing investment in new Light Director fixtures and electrical interfaces, must increase productivity sufficiently to warrant the expense. If we find a saving in labor cost on each cable, and an overall reduction in rework due to improved accuracy, cost savings increase directly with the number of cables assembled. We need only to find the crossover point where the total saved labor and rework expense surpass the cost of the fixturing.



The target crimp specs and master image are recovered from the hard drive and displayed. Using current production samples the operator measures the conductor and insulation crimp heights and widths. The operator measures the pull force. The operator captures an image, either cross section or terminal image. When finished the data is stored in Excel.

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Example: Assembling and testing a 64-wire two-ended cable.

A 256-point test platform consisting of CAMI's CableEye tester, AutoBuild software, and high-quality voice font requires an onetime investment of about \$3400, with a five-year depreciation lifetime. This 256-point system has sufficient capacity to mount two 64-pin Light Director boards and two 64-pin electrical interfaces to provide for first-sided pinning, second-sided pinning, and

___Continued on page 23



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Computer-Guided Harness Assembly

Continued from page 20



Figure 7 - Electrical sensing of unattached wires greatly increases assembly speed.



Figure 8a - Unused cavities flashing.



Figure 8b - Seal plugs inserted.

____Continued on page 25

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Continued from page 7

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Computer-Guided Harness Assembly

Continued from page 23



Figure 9 - In-place electrical test flags errors before the finished cable is removed from the fixture or the connectors sealed.

electrical test. Including yearly calibration and extended warranty, the capital cost is approximately \$75 per month per station.

For each connector, allow approximately \$450 per Light Director board for the board kit, LED fibers, mating connector, assembly time, and programming. Because the electrical interface will be required to test the completed assembly whether it is assembled manually or with the Light Director, the cost of the electrical interface applies equally to both methods and need not be considered in judging payback on the Light Director.

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PROCESSING TECHNOLOGY EXPO

Assumptions:

- The 64-pin two-ended cable requires 2 hours to build manually.
- The loaded labor cost is \$20/hr.
- Four cables per 8-hour day are assembled

1 - Cost Savings per Day

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_Continued on page 26



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Computer-Guided Harness Assembly

Continued from page 23

2 - Fixture Payback Measured in Work Days

At a cost of \$900 for two fixtures, the payback time is about 14 days if you are saving 40% on assembly labor, or 23 days if you are saving 25% on labor.

3 - Fixture Payback Measured by Number of Cables Built

Manual Assembly, 2 hrs per cable x \$20/hr = \$40

Light Director at 40% faster assembly: 1.2 hrs per cable x \$20/hr = \$24 Savings per cable: \$16

Light Director at 25% faster assembly: 1.5 hrs per cable x 20/hr = 30Savings per cable: \$10

At a cost of \$900 for two fixtures, the number of cables built to payback fixture cost is 56 cables if you are saving 40% on assembly labor, or 90 cables if you are saving 25% on labor.

4 - Other Factors that will Reduce Assembly Cost when using the Light Director

- · Because of increased accuracy, rework cost will be lower
- As a result of a lower fatigue level, worker output will be higher overall.
- The Light Director components may be reused for new projects, reducing future fixture expense by at least 25%.
- By using an actual mating connector during building, you assure proper fit of the build connector and keying slots.
- By immediately following the build process with test, any errors found may be corrected at the build bench without remounting the cable. Hipot testing may be integrated with the Light Director if desired.

Alternative Technologies

The Light Director system identifies target cavities by projecting light into the cavity from below. Other technologies introduced over the last few years offer guided assembly by, in one case, projecting light onto a target cavity from above, and in another case by imaging the connector from above and superimposing a graphic that identifies the tar-

get. Each method has advantages which depend on the application and number of connectors to be assembled. Overhead projection or imaging systems require no mating connector or fixture, but both of these methods prevent close-in viewing of the workpiece, and one requires the unnatural task of looking at a monitor in one direction while your hands work in another. Further, these systems are applicable to fi rstsided pinning only and cannot offer the speed benefit of second-sided pinning, or integrated test. For assembly volumes above 75 to 100 units, fixturing costs associated with the Light Director are quickly repaid, and the ability to combine first- and second-sided pinning with electrical test offer speed and worker endurance advantages unequalled by competing technologies.

Summary and Conclusion

The assembly of cables and harnesses using high-reliability connectors suitable for aerospace, military, and certain industrial applications depends largely on human technicians because of their exquisite vision and finger dexterity. While machine vision and robotics continually advance, present-day technology cannot provide cost-effective automation to replace the assembly technician. However, automation increasingly provides helper functions that reduce the perceptual challenge associated with manual assembly, resulting in increased assembly speed and lower error rates while reducing worker fatigue level associated with manual methods. Because of the large increase in productivity offered by such systems, assembly shops failing to apply this technology risk being underbid on new jobs by companies that do.

Christopher E. Strangio is the founder, president, and director of marketing of CAMI Research, Inc. CAMI entered the Test Equipment market in 1993 with its patented CableEye® Tester and is now shipping its fourth generation product. CAMI has worldwide distribution. For further information contact CAMI Research, Inc. 530 Main Street, Acton, Massachusetts 01720. Phone 978-266-2655 or Fax 978-266-2658. Email: sales@camiresearch.com.



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

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

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Milwaukee in May

Continued from page 1

Wednesday, May 12, 8:30 a.m. - 9:30 a.m. Aina Vilumsons, Executive Director, Wisconsin Procurement Institute will present "Making the Government Your Next Customer." For the past 13 years, Aina's mission has been to bring more Federal procurement dollars to the State of Wisconsin and strengthen the Government Procurement Supply Chain.WPI is a leader in developing the capabilities and maximizing the access of Wisconsin businesses to the government marketplace. She has successfully integrated her over 28 years of experience in Contracting

(Government and Commercial), Operations Management, Business Development, Information Technology and Finance to provide practical advice and mentoring to Wisconsin businesses and organizations

It is true - the Federal becoming market is increasingly competitive. It is also true that there are significant opportunities for a business with the federal government.

Aina's presentation will cover:

· How does a business WIN?

• Learn the process and requirements

• Become an active member of the federal contractor community

• Overview of the scope of the market

· How to do some basic market research

· How to target your sales and marketing efforts

• How to maximize your success in the market

Wednesday May 12, 10:30 a.m. - 11:30 a.m.

electrical interfaces, interface performance

• Processing these interfaces into durable wiring assemblies

• Direction in reducing size, weight, and cost of electrical interfaces

• Reduced terminal spacing centerlines and reduced wire insulation thickness

• Challenges in processing these new products

Speakers for this presentation are Don Price Ph.D, Ford Motor Company Connectors & Components Engineering Technical Specialist, Matt Marzec, Chrysler Connectors & Components Engineering Product Engineer, Jim Roberts, USCAR Electrical Wiring Components Application Partnership Technical Specialist, and Tom Simko, GM Powertrain Wiring & Connectors Engineering Technical Specialist.

Wednesday, May 12, 12:30 pm - 1:30 pm "Crimp Quality Verification Methods and Trends" presented by Rob Boyd, Crimping Product Manager, Schleuniger, Inc.

Rob Boyd has been the Crimping Product Manager for Schleuniger, Inc. for 10 years. He holds a BS in Electrical Engineering from

Continued on page 31

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"Wiring the Next Generation of North American Automobiles" presented by the Electrical Wiring Component Application Partnership (EWCAP), a subgroup of the United States Counsel for Automotive research (USCAR LLC). USCAR LLC is a consortium funded by Ford, General Motors, and Chrysler. The EWCAP group is focused on common electrical interfaces, interface performance, and processing these interfaces into durable wiring assemblies.

EWCAP's presentation will cover:

• Focus on common

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Milwaukee in May

Continued from page 29

Boston University and an MBA from UNH. Rob's presentation is for persons who would like an overview of traditional crimp quality assurance methods and want to learn how to access the quality of crimped terminals using crosssection micrographs.

Rob's presentation will cover:

• Traditional crimp quality verification methods:

- Visual inspection
- Crimp height & width measurement
- Destructive pull testing
- Crimp force monitoring

• Identify defects by examining crosssections of crimped terminals

• New crimp quality standards and trends

Thursday, May 13, 8:30 am - 9:30 am "Revamping Medical and Robotic Cable Design" presented by Donald Dodge, VP Research, Calmont Wire & Cable. Don entered the wire and cable industry in 1969, as a Quality Control Laboratory Supervisor at Pacific Electricord, moved to Quality Control Manager and finally as Chief Engineer. He has served as Chairman of the Flexible Cords Technical Committee of NEMA, and Chairman of the US Delegation for IEC SC20B for wires and cables. He was involved with ribbon cable while at T&B Ansley. Don has been with Calmont Wire and Cable for the last 28 years, where he has designed many ultra-flexible cables

for Military, Medical and Aerospace applications.

Don's presentation will cover:

• Design considerations for selection and use of conductor materials, platings used on the conductors, insulations, shields and shield materials

- Jacket or sheathing materials
- Trade-offs & benefits of the choices

• Life testing and environmental issues

• Effect on Restriction of Hazardous Substances (RoHS)

• Newer WEE standards will be covered

Thursday, May 13, 10:30 a.m. -11:30 a.m. "Utilizing Ultrasonic Metal Welding in Today's Production Environments" presented by Tim Crider, Midwest Operations Manager, Stapla Ultrasonics Corporation a member of the Schunk Sonosytems.

Tim has over 10 years of experience in the field of ultrasonic metal welding which provides joining solutions to a large number of markets, including Automotive, Military, Aerospace, Motor, Battery, Appliance and Electrical Devices. Tim's involvement with these industries has contributed to Stapla's capabilities in providing resolutions to the everyday challenges of the production environment, as well as setting the standards within the ultrasonic metal welding industry.

Continued on page 32



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Milwaukee in May

Continued from page 31

Tim also has numerous sales and marketing responsibilities, allowing him to work closely with his design and applications group in developing new products for the market place.

Tim's presentation will cover:

· Various applications in wire harness manufacturing

• How ultrasonic metal welding works

 Baseline requirements, process controls

• How to monitor your process

· Overall advantages of ultrasonic metal welding

Thursday, May 13, 12:30 p.m. -

1:30 p.m. "Current Status and Growth of Solar/Photovoltaic Technology" presented by Bill Duncan, Director of Product Management at Komax Solar, is focused on the development of equipment required for the manufacturing of crystalline photovoltaic modules. Responsibilities include developing individual machines as well as full turnkey assembly line products. This, at times, involves working with PVcomponent manufacturers to improve design for automation. He currently serves as the Technology Committee Chairperson for IPVEA (International PhotoVoltaic Equipment Association).

Electronics/AMP for 21 years in various automation engineering and process development management roles as well as Product Manager for wire and cable assembly products. He was also V.P. of Program Management and V.P. of Marketing for Bulova Technologies, a contract manufacturer of complex electromechanical assemblies for the semi-conductor, medical and defense industries.

Renewable energy has gotten significant attention over the last few years. The PhotoVoltaics has evolved from an R&D laboratory environment to a mainstream energy source. Crystalline (silicon based) photovoltaics are just one of the commercially available products being used to provide power in residential, industrial and large scale solar farm/power plant applications.

Bill's presentation will cover:

• Basic background on crystalline PV cells/modules and their uses

· Module installation process wire/cable applications associated with system

- Supply of silicon
- Module production
- PV generating power systems
- PV promises to have a robust future

For further information on the National Electrical Wire Processing Expo visit www.electricalwireshow.com or call 800-367-5520.

Bill has previously been with Tyco

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NEWS PLUGS continued

Sylvin Technologies Launches **Customer Focused Website**

Sylvin Technologies Inc., a leading custom vinyl compound manufacturer, has launched a new customer focused, interactive website. The new user friendly website is much faster with direct download capabilities. "The new website will be a great source of information for prospective customers as well as our current customers. We wanted an easy to navigate website that our customers will find informative and attractive", said Sylvin President and CEO, Jon Newman.

Sylvin Vice President of Sales and Marketing, Chris O'Connell said "At Sylvin we have always taken customer service very seriously, especially by listening to our customers. The results of our surveys and customer feedback have greatly influenced the new website content and design. We are continually innovating and improving our products and services. The new website at www.sylvin.com is a natural next step."

Sylvin Technologies has been manufac-



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turing vinyl and vinyl alloy compounds since 1978. Sylvin offers a complete line of custom materials for a variety of markets and applications including automotive, general purpose and industrial (including products for extrusion and injection molding), specialty blends, highly regulated (FDA, medical, appliances, toys), building and construction, wire and cable and electrical. For further information please visit www.sylvin.com.

Schleuniger to Unveil New Products at the 2010 Wire Processing Technology Expo

Schleuniger will be exhibiting 4 new products at the 2010 Wire Processing Technology Expo in Milwaukee, WI. Innovation remains a clear part of Schleuniger's focus with the addition of these products to their wire processing line:

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NEWS PLUGS continued



Gladding Braid Announces Cable Armoring Expansion

Gladding Braided Products' recently expanded 85,000 sq foot manufacturing plant is wellequipped to handle all cable protection needs: from aerospace thermal and EMC protection; automotive and electronics corrosion and abrasion protection; to armored and shielded cables, Gladding is here to help. Gladding also offers raw materials and bobbin sales to companies that do their own braided assemblies. If you're interested in entering this market in any capacity, Gladding can help.

"We allow companies of all types to enter into the armored cable business," explained Sparky Christakos, Gladding President. "We have years of expertise manufacturing shielded cables and assemblies. We engineer and build harness braiding machines from raw steel, as well as purchasing used braiding equipment, rebuild, refurbish and make them suitable for harness work. We save costs and simplify processes at every step of the way."

Gladding's unique harness braiding system provides a protective casing over a core set of wires. The core (hose, ground wire, fuel line, or electrical harness, etc) is covered with a braided protective material. Gladding can supply the finished harness, the raw materials (textile coverings such as nylon, polyester, Nomex, Kevlar, Fiberglass, PTFE, VN-4000S; and wire materials such as stainless steel, copper, bronze, aluminum), and the braiding machinery to apply the shield.

The diameter of the core wires or harness will determine the size of the braiding machine needed: a 1/4" harness may use a 16 carrier machine, a 1" diameter harness might require a 32 carrier machine, etc. Gladding



Gladding offers braiding materials, machines and braiding services.



supplies machines for all sizes. With a machine purchase, Gladding gives training at their factory as well. "The skill of the operator is of utmost importance," Christakos added.

Located in the foothills of the Adirondack Mountains in Central New York State, Gladding Braided Products is a family-owned and operated business, offering bobbin winding services, harness braiding, overbraiding, buss wire, military spec. braids (wire & textile), raw materials, and production machinery sales.

For more information on services and products, visit the Gladding website: www.gladdingbraid.com or call (315) 653-7211.

ASMC Receives \$70 Million Order for Wind Turbine Electrical Control Systems from China's Shenyang Blower Works

American Superconductor Corporation (AMSC), a global power technologies company, announced that it has received an initial order for full wind turbine electrical control systems from China's Shenyang Blower Works (Group) Co., Ltd. (SBW) that is worth approximately US\$70 million. The systems will be deployed in the 2 megawatt (MW) doubly fed induction wind turbines that were







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Founded in 1934 and based in Shenyang, China, SBW is a large stateowned enterprise that provides a wide array of industrial equipment including large-scale compressors, blowers, fans, heat exchangers as well as large-scale nuclear power pumps, boiler feed pumps and

petrochemical pumps. The company has more than 5,700 employees and approximately US\$1.4 billion in annual sales.

SBW plans to erect its first 2 MW wind turbine in March 2010 and will be the fourth AMSC customer to enter volume production of advanced wind turbines in China. AMSC expects to begin shipping the electrical control systems to SBW in the second half of calendar 2010 and complete shipments in the first half of 2013.

"Shenyang Blower Works prides itself on innovation and manufacturing excellence for the wind power sector," said Su Yongqiang, Shenyang Blower Works president and chief executive officer. "Our partnership with AMSC Windtec has helped us quickly launch a new growth engine for our company. We believe SBW will play a key role in China's build-out of renewable energy in the decades ahead."

AMSC Windtec codeveloped the 2 MW doubly fed induction wind turbine with SBW under a contract signed in late 2008. Under the terms of the agreement, SBW has the right to sell the 2 MW wind turbines globally.

"The magnitude of this electrical control system contract sends a strong signents include the company's proprietary PowerModule™ power converters, pitch and yaw converters, SCADA systems and other power electronics. They enable reliable, high-performance wind turbine operation by controlling power flows, regulating voltage, monitoring system performance, controlling the pitch of wind turbine blades and the yaw of the turbines to maximize efficiency.

More information is available at www.shengu.com.cn.

AMSC offers an array of proprietary technologies and solutions spanning the electric power infrastructure – from generation to delivery to end use. The company also offers a host of Smart Grid technologies for power grid operators that enhance the reliability, efficiency and capacity of the grid, and seamlessly integrate renewable energy sources into the power infrastructure.

More information is available at www.amsc.com.





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nal that Shenyang Blower Works is positioned to be a key player in China's vibrant wind power market," said Greg Yurek, founder and chief executive officer of AMSC. "The company is planning to begin volume production later this year and sees significant longterm potential for this new line of business. AMSC expects to help every step of the way with its worldclass wind turbine engineering, customer service and electrical control technologies and products."

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NEWS PLUGS continued



Allied Wire & Cable Donates Proceeds from 2009 Charity Week to The Make-A-Wish Foundation

Allied Wire & Cable's 2009 Charity Week was a success, having raised \$9223.31. Seven charities benefitted from this year's Charity Week. The Make-A-Wish Foundation received \$7727.31 and the six other charities featured in their website vote each received \$250.

Allied Wire & Cable is proud to announce the success of their 4th Annual Charity Week, which ran from December 14 to December 18 2009. Each year, Allied sets aside a portion of sales for a full



Each year, Allied sets aside a portion of sales for a full week in December to donate to their charity of choice. This year's benefactor was the Make-A-Wish Foundation.

week in December to donate to their charity of choice. This year's benefactor was the Make-A-Wish Foundation, chosen by Allied's customers in the first month-long poll held on their website. Allied has proudly supported Make-A- Wish for several years, including previous charity weeks, and were excited to have the opportunity to do so again.

The Make-A-Wish Foundation aims to grant the wishes of children with life-threatening medical

conditions and the average wish can cost upwards of \$7000. Allied raised a total of \$9223.31 that will be split between Make-A-Wish and the other charities featured in the vote. Dennis Heron, President and CEO of the Make-A-Wish Foundation of Philadelphia & Susquehanna Valley, and Karen Traten, Director of Development, visited Allied on January 5th and were presented with a check for \$7727.31.

The remaining \$1500 will be donated to the other charities, each receiving a \$250 donation. These charities include: American Farmland Trust, ASPCA, Autism Speaks, Coalition to Support America's Heroes, Meals on Wheels Association of America and Susan G. Komen for the Cure.

Allied has always found it important to give back to those who are less fortunate, and greatly appreciates all the support it has received from customers that made this Charity Week a success.

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For more information on Allied Wire & Cable, please visit www.awcwire.com.


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

What Size Wire do I Need?

a given application can be a daunting task. This Wire Wisdom will highlight most of the critical considerations that influence the selection of a conductor size.

Choosing the right conductor size for

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Understanding Wire Sizes

In the U.S., conductors are usually specified in units of AWG (American Wire Gauge) or circular mils. See Table 1 for a list of conductor sizes and the corresponding diameters and conductor circular mils. Note that larger conductors are denoted by smaller AWG values.Additional information on conductor sizes and properties is available in the "Con-

ductors" section of Anixter's Wire & Cable Technical Information Handbook¹ and in Wire Wisdom C-1, "Conductors - The Electron Superhighway"².

Electrical Considerations

The dominate factor in determining a safe and efficient wire size is ampacity, or the amount of current the wire can carry. The second most common consid-

Class	B Concentric-Lay Stranded Cond	uctors
AWG	Nominal Diameter (inches)	Circular mils
14	0.0726	4,110
12	0.0915	6,530
10	0.116	10,390
8	0.146	16,510
6	0.184	26,240
4	0.232	41,740
2	0.292	66,360
1/0 (0)	0.373	105,600
2/0 (00)	0.419	133,100
4/0 (0000)	0.528	211,600
250 kcmil	0.575	250,000
500 kcmil	0.813	500,000
750 kcmil	1.00	750,000

Table 1: Class B Concentric-Lay Stranded Conductors





eration is voltage drop, or the amount the voltage reduced due to losses. For more information about these specific issues, see Wire Wisdom V-1 "If Voltage Drops, Will it Break?"³ and Wire Wisdom A-1, "What?... A Power Cable Doesn't Have an Ampacity Rating?"4

Wire Sizing Checklist

Wouldn't it be nice if there were a simple checklist to be sure you've thought of everything relative to sizing a wire? Though it's not a comprehensive list, here is a good start:

• Ampacity-related considerations

- o Temperature rating of wire or cable
- Short-circuit requirements 0 of wire or cable
- Ambient operating 0 temperature
- Installation environment 0
- Free airflow 0
- Thermal resistivity of 0 enclosure
 - Adjacent conductors
- Solar radiation 0

0

- Other sources of external 0 heat (steam pipes, coils, etc.)
- Maximum expected 0 current
- Temperature rating of 0 termination

· Voltage drop related considerations

- o Circuit lengths
- o Current of circuit
- o Type of circuit
- (single phase vs. three
- phase) o Operating frequency (60 Hz,
- 50 Hz, DC, or nonsinusoidal)
- o Power factor of circuit
- o Installation type
 - (PVC vs. aluminum vs.
- conduit or steel sleeve)
- Other electrical characteristics
- o Resistance
 - o Impedance
 - Capacitance 0
 - Inductance 0
 - o Attenuation
- Standards requirements: NFPA, NEC, IEC, CEC, BS, etc.
- Commercial concerns o Price
 - o Availability
- Flexibility • Durability
- Space limitations
- · Bending radius
- Ease of handling
- · Pulling tension

- Conductor material
- Efficiency
- Termination size range

Wire & Cable Technical Information Handbook. November 2008. http:// www.anixter.com/AXECOM/US. NSF/TECHNOLOGY/TheWireandCableTechnical InformationHandbook_WIRE-

CABLE?

OpenDocument&Division=DivT ab5

²Wire Wisdom. "Conductors -The Electron Superhighway" July 6, 1994. http://www.anixter. com/./AXECOM/AXEDocLib.nsf/ (UnID)/340A46A109465690802 56F24006F4F92/\$file/C-1_8.pdf

³Wire Wisdom. "If Voltage Drops, Will it Break?" September 21, 1994 http://www.anixter. com/./AXECOM/AXEDocLib.nsf/ (UnID)/D079397B33C17C0E802 56F24007605E1/\$file/v-1_33.pdf

⁴Wire Wisdom. "What?...A Power Cable Doesn't Have an Ampacity Rating?" July 5, 1944 http://www. anixter.com/./AXE-COM/AXEDocLib.nsf/(UnID)/A2 1CCBBEA139A97480256F24006 D8B24/\$file/a-1_1.pdf



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An Introduction to New Technology Braiding Machines

The North American wiring harness market has traditionally sourced a high proportion of its machinery from the rebuilt/refurbished sector. While this has obvious benefits from a price point of view, it does mean that businesses are missing out on many of the benefits of modern braiding machines.

With constant pressure on wiring harness producers to improve efficiencies



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ECCO's extensive Amphenol inventory includes the popular 5015 style 97 A & B in standard, RoHS compliant, & reverse bayonet versions. We also stock the Mil-C-5015 (E, F, & R) miniature cylindrical PT (MS26482-I), 48, environment resistant Mini E 67, miniature standard 165, & high density circular 348 (M81511) series. and profitability, and at the same time meet ever more stringent workplace regulations, many are reassessing their traditional sources of equipment and are realising that the market has seen a great deal of innovation in recent years.

Traditional all-metal braiding machines are masterpieces of engineering design, but generally require high levels of regular maintenance to maintain peak performance. They are also more difficult to integrate into the modern production environment due to their noise and high levels of lubricant needed to prevent premature wear.

Modern braiding machine design takes advantage of composite materials, especially in the drive trains. Cobra, for example, has invested in the development of a special self-lubricating composite for gear manufacture; this provides levels of strength and wear resistance, and offers significantly lower operational noise.

A lot of thought has gone into modern machines to eradicate oil leaking. They feature sealed, automatic precision oiling systems, which, when combined with sealedfor-life bearings and self- lubricating composite gears, eliminate the need for antislip mats or sand to absorb excess oil. The consequence is that, instead of the machines being located in parts of a facto-

ry where the excess noise and leaking oil can be tolerated, they can be fully integrated into their logical position in a modern workflow.

The use of modern control systems enables a high degree of precision to be introduced into the manufacture of wiring harnesses. Motor speed controls allow the optimum speed to be selected for any given operation - this becomes more important given that modern braiding machine designs are capable of nearly double the throughput of many traditional machines, eliminating frequent yarn breaks at higher speeds.

Another design feature is the jog forward and jog back facility. This allows an operator to make or unmake one braid at a time, and has the potential of saving the manual reworking of a complete harness if a fault is noticed during production. It also speeds and simplifies starting breakouts, resulting in a neater and more consistent quality output.

The modern machine also has the ability to accept larger yarn and wire spools. This is more supportive of an intensive production environment, with less downtime due to package changing and reductions in run-out waste.

Commenting on the impact that Cobra machines have had in the US, CEO Neil Hyde said "Users of our new-technology braiding machines comment favourably on the high profitability they achieve, resulting from more productivity and lower overheads from downtime and maintenance. They also report strong customer feedback regarding the quality of the braiding on finished harnesses."

For more information contact T.S.R. Inc., 5185 N. US 31, Eastport, MI 49627 or phone (231) 599-9956. Visit the COBRA website at www.cobrabraids.co.uk.



Close-up of COBRA machine braiding with Nomex.

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NEWS PLUGS continued



Dynalab Announces Newly Enhanced NX View

Dynalab Test Systems is pleased to announce that NX View now supports images of connectors and fixture blocks.

NX View is a software application that resides on a PC. Using a serial connection between the PC and an NX Wire Harness Tester, NX View displays information from the tester on the PC's monitor. In addition to enhanced presentation of error messages, NX View provides representations of connectors, showing the operator which connectors and cavities are associated with the displayed error. Although these connectors can be automatically rendered by NX View, a newly released feature allows the connectors to be represented by displaying an image of the connector as the background. This results in realistic, high impact visual information that effectively guides the operator through the wire harness testing process.

On the same screen, NX View can display instructional information that originates from a variety of sources: documentation files, graphics files, movie files - anything that can be displayed in a web browser can be displayed on NX View. This enables operators to be more effective in dealing with specific error conditions or assembly operations. NX View also allows the operator to interact with the NX Tester entirely through the PC's keyboard and mouse.

More information and NX View screen shots can be viewed on Dynalab's website at: www.dynalabtesters.com/nxview

NX View is available for a free 60 day demo. For additional information, contact Dynalab Test Systems at +614-729-6550 or email sales@dynalab-inc.com.

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NEWS PLUGS continued



Deutsch Offers New High Temperature Connector

LADD Industries is pleased to announce the release of the new Deutsch Industrial DTM series connectors for high temperature environments. Deutsch Industrial provides innovative environmentally sealed connector solutions for heavy duty and industrial markets. Deutsch connectors are built for critical applications in challenging environments, and the new DTM high temperature (DTMH) connectors expand the range of Deutsch connector options where excessive heat is a factor.

The new DTMH connectors are

manufactured from temperature resistant thermoplastic, and are designed for applications with temperatures ranging from -55°C to 150°C. The expanded temperature range makes the DTMH ideal for use anywhere the electrical system could be exposed to higher than normal temperatures.

The new DTMH connectors:

• Are available in 2-position, inline plugs and receptacles

• Accept standard #20 Deutsch



DTMH High Temperature Connectors contacts that carry 7.5 amps eachHave integrated, keyed wedge-locks for fast assembly

Deutsch is also offering designedto-fit, high temperature straight and 90° backshells for the DTMH connectors.

Deutsch Industrial builds heavyduty connectors that are ideal for harsh environments where dust, dirt, moisture or rough terrain can contaminate or damage electrical connections. Please contact LADD Industries, your exclusive authorized US distributor for Deutsch Industrial products, at 1-800-223-1236 for more information on the DTMH connectors, accessories and for all your Deutsch Industrial connector needs.

Carpenter Manufacturing Introduces Model 88E Magnet Wire Stripper

Carpenter Manufacturing Co., Inc., introduces the new Model 88E Magnet Wire Stripper, a fast and accurate way to efficiently strip miniature coils and fine magnet wire by using rotating cone shaped stripping wheels. These wheels come in two grit textures and have a stripping range from 26 to 48 AWG.

Our unique Twincone® wheel design makes close stripping possible on all types of film insulations to within 1/8" of a component's body. Additionally, the Twincone Stripping Wheels fit competitive equipment.

The Model 88E comes standard with a durable powder coat finish and a one-year limited warranty.

For more information about Carpenter's Model 78 Pneumatic Wire Stripper or to see a video of the system in action, visit www.carpentermfg.com.

Sullins Connector Solutions Announces Expanded Stocking Initiative with Heilind Electronics

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Manufactured by **RTI** 333 Newquist Place • City of Industry, CA 91745 • (626) 333-7884 • (626) 333-0774 fax tions, a leader in the design and manufacturing of RoHScompliant board level interconnect products, and Heilind Electronics, a distributor of interconnect products has announced the expansion of their distribution agreement to include all the most popular Sullins and Micro Plastics product lines. This latest agreement further enables Heilind to offer an unparalleled depth of inventory to OEM customers from their strategically located distribution centers throughout North America. Over 10 full

_Continued on page 46

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NEWS PLUGS continued

Continued from page 44 _

lines of Sullins' standard and custom edgecards, headers, bi-level and CompactPCI™ connectors are included in this comprehensive stocking initiative.

According to Wade Harb, CEO of Sullins, "We are very excited about Heilind's expanded stocking initiative as it confirms our mutual commitment to provide OEMs and design engineers with reliable, fast and easy access to Sullins' extensive portfolio of innovative interconnects. Heilind has a well-earned reputation for helping customers speed-time-tomarket, as they understand the connector industry's unique requirements for prod-

uct variety, pricing, support, and fulfillment. We are certain customers will recognize the added value a distributor of Heilind's caliber brings to their supply chain, especially with their expanded product availability."

"By adding extra Sullins inventory, OEMs are further assured Heilind can ship the parts they need when they are needed", said Alan Clapp, vice president - supplier business of Heilind. "While many distributors had reduced inventory during the recession, Heilind has substantially increased its stocking level of interconnects from Sullins. This depth of inventory gives OEMs a competitive edge as it enhances their ability to manage production timelines and budgeting processes. The new initiative exemplifies our dedication to assist customers achieve sales and profitability goals."

Included in Heilind's expanded stocking initiative are Sullins' full lines of standard and custom interconnects which are ideally suited for use in an array of mission-critical consumer, commercial and industrial products. These parts are most frequently specified in high-temperature, high-cycle life environments including test and burn-in ovens, communication systems, process control, medical equipment, instrumentation, and automotive applications. Among the most popular Sullins interconnects newly inventoried by Heilind are PCI Express® (PCIe) card edge connectors, Insulation Displacement Connectors (IDC), ruggedized double point card edge connectors, fully shrouded box headers and mates, and double-row male card edge connectors. Moreover, cus-

tomers may choose from a selection of such options as terminations, contact center dimensions, contact finishes, number of contact positions, mounting styles, and insulator/contact materials are available.

Headquartered in San Marcos, CA, Sullins Connector Solutions, Inc. (www.sullinscorp.com) has been a world leader in the design, engineering, and manufacturing of high-quality edge cards and headers since 1971. The Company provides the industry's widest selection of UL/CUL approved edgecards, and additionally offers product development services together with engineering support. Sullins' edgecards, headers, bi-level and CompactPCI™ connectors are widely specified for use in mission-critical applications by a broad spectrum of leading industrial, commercial, military and consumer products manufacturers. Sullins' connectors and interconnect systems are available through a global network of sales representatives and distributors.

Heilind Electronics (www.heilind. com), is a leading distributor of connectors, relays and switched, thermal management, and circuit protection products, terminal blocks, wire and cable, wiring accessories, and insulation, as well as identification products. Heilind serves OEMs and contract manufacturers in the medical devices and instrumentation. industrial controls and equipment, nonautomotive transportation, aerospace and telecommunications markets. In addition to the world's largest interconnect inventory, Heilind offers a complete portfolio of innovative logistic and supply chain management services including automated

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IPC Releases PCB Industry Results for December 2009

IPC — Association Connecting Electronics Industries[®] announced the December findings from its monthly North American Printed Circuit Board (PCB) Statistical Program.

PCB Industry Growth Rates and Book-to-Bill Ratios Announced

Rigid PCB shipments declined 3.4 percent, but bookings were up 27.3 percent in December 2009 from December 2008. Year to date, rigid PCB shipments were down 23.2 percent and bookings fell by 18.1 percent. Compared to the previous month, rigid PCB shipments increased 13.2 percent and rigid bookings increased 23.3 percent. The book-tobill ratio for the North American rigid PCB industry in December 2009 registered 1.05.

Flexible circuit shipments in December 2009 went down 0.4 percent and bookings decreased 27.4 percent compared to December 2008. Year to date, flexible circuit shipments were down 1.1 percent and bookings were down 4.9 percent. Compared to the previous month, flexible circuit shipments went up 4.9 percent and flex bookings fell by 2.9 percent. The North American flexible circuit book-to-bill ratio in December 2009 slipped back to 0.95.

For rigid PCBs and flexible circuits combined, industry shipments in December 2009 decreased 3.2 percent from December 2008, and orders booked increased 22.1 percent from December 2008. Year to date, combined industry shipments were down 21.7 percent and bookings were down 17.2 percent. Compared to the previous month, combined industry shipments for December 2009 increased 12.6 percent and bookings went up 21.5 percent. The combined (rigid and flex) industry book-to-bill ratio in December 2009 dipped but remained positive at 1.04.

"Growth rates in both sales and orders continued to improve in the rigid PCB sector in December," said IPC President Denny McGuirk. "Orders continued to outpace sales, which is keeping the rigid PCB book-to-bill ratio positive. Although the flexible circuit business was lackluster in December, both sectors of the PCB industry in North America showed typical seasonal patterns. The recovery is continuing, but the road back up is proving to be a long one."

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

Book-to-bill ratios and growth rates for rigid PCBs and flexible circuits combined are heavily affected by the rigid PCB segment. Rigid PCBs represent an estimated 91 percent of the current PCB industry in North America, according to IPC's World PCB Production and Laminate Market Report.

The Role of Domestic Production

IPC's monthly survey of the North American PCB industry tracks bookings and shipments from U.S. and Canadian facilities, which provide indicators of regional demand. These numbers do not measure U.S. and Canadian PCB production. To track regional production trends, however, IPC asks survey participants for the percent of their reported shipments that were produced domestically (i.e., in the USA or Canada). In December 2009, 86 percent of total PCB shipments reported were domestically produced. Domestic production accounted for 86 percent of rigid PCB and 84 percent of flexible circuit shipments in December by IPC survey participants. These numbers are significantly affected by the mix of companies in IPC's survey sample, which may change slightly in Jan-

__Continued on page 48



The CT4 Coastelmatic Pneumatic Tool Holder

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

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NEWS PLUGS continued



Continued from page 47 _

uary, but are kept constant through the calendar year.

Bare Circuits versus Assembly

Flexible circuit sales typically include value-added services such as assembly, in addition to the bare flex circuits. In December, the flexible circuit manufacturers in IPC's survey sample indicated that bare circuits accounted for approximately 74 percent of their shipment value reported for the month. Assembly and other services make up a large and growing segment of flexible circuit producers' businesses. This figure is also sensitive to changes in the survey sample, which may occur at the beginning of each calendar year.

Interpreting the Data

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

The information in IPC's monthly PCB industry statistics is based on

data provided by a representative sample of both rigid and flexible PCB manufacturers in the USA and Canada. IPC publishes the PCB Book-to-Bill Ratio and the PCB Statistical Program Report each month. Statistics for the previous month are not available until the last week of the following month.

Molex Introduces Bench-Top Press that Terminates Large Lug Products Up to 4 AWG

Molex Incorporated announced availability of its new, industry-standard TM-4000[™] Universal Crimp Press for bench-top crimping that provides 3.5 tons of crimp force to terminate large lug products up to 4 AWG.

The TM-4000 Universal Crimp Press provides an effective method

volume,

of applying a wide range of side- and rear-feed terminals to heavy-gauge wires—

ideal for automotive, industrial and commercial appli-

cations. Designed for mid-

bench-top operations, the TM-4000 press is an inex-

pensive, electrically controlled, direct-drive press.

semi-automatic

Increased crimping flexibility, reduced costs

The Tape-Terminal Crimp Module and Tape Terminal Press from Molex will reduce tooling investments, reduce setup times and allow you more production flexibility.



The **Tape-Terminal Crimp Module** from Molex efficiently crimps terminals to wires from 4 to 30 AWG with minimal setup adjustments and achieves optimal cycle rates for mid-to-high volume, semi-automatic operations.

Features and Benefits of the Tape Terminal Crimp Module Include:

- Quick-change modular tooling accepts all existing ATP-201 and ATP-301 die sets.
- Used in Molex TM-3000™ and TM-4000™ presses, which accept Molex applicators and most industry standard applicators.
 Independent adjustment of insulation crimp height provides flexibility for various wire insulation thicknesses.



The TM-4000™ Universal Crimp Press is the only industry-standard, bench-top press on the market that terminates large lug products on Mylar tape up to 4 AWG, resulting in lower overall applied costs. The TM-4000™ has electrical requirements of 240 AC 50/60Hz.

Features and Benefits of the TM-4000™ Universal Crimp Press Include:

- Provides 3.5 tons (31 kN) of crimp force for tape-mounted terminals up to 4 AWG.
- Accepts Molex FineAdjust[™] and Mini-Mac[™] applicators with side and rear feeds; accepts most industry-standard applicators.
- Can be used with Molex Tape Module (64016-2000).

the guard.

- Meets OSHA safety and noise requirements and is CE approved.
- · Has two safety interlock switches attached to
- According to Molex Product Manager Bob Grenke, "The press will allow our customers to reduce their applied costs—per part—as well as their quality increase through the use of a consistent bench top machine instead of a more manual operator dependent hand tool process. The TM-4000 is less expensive than other standard press offerings that only terminate up to 10 AWG."

The TM-4000 Universal Crimp Press accepts any Molex and most common industry-standard applicators in the marketplace, including air-feed applicators that process terminals mounted on Mylar* tape. This flexibility reduces tool-

Quick tool changeover from die set to die set.

Come see the TM-4000™ press demonstrated at the Electrical Wire Processing Technology Expo, Booth #1737, May 12-13, 2010

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ing costs, providing greater production flexibility.

The TM-4000 Universal Crimp Press meets OSHA safety and noise requirements and is CE approved, which reduces risk of injury. Two attached safety interlock switches prevent it from cycling if the guard is open or when the press is being hand cycled.

For more information about the Molex TM-4000 Universal Crimp Press, please visit: http://www. molex.com/link/tm4000. html.

Mentor Graphics Acquires Virtual Garage Technology from Freescale to Expand Electrical Design Scope

Mentor Graphics Corporation (NAS-DAQ: MENT) announced that it has acquired the Virtual Garage product line from Freescale, a US-based technology company. Virtual Garage is a software suite that addresses two important topics within the design and management of automotive electrical and electronic systems: the trade-off between value-of-variety and cost-of-complexity caused by optional electronic content; and provision of vehicle-specific design data, such as dynamic electrical schematics, on demand to service networks.

Both topics carry significant profitability implications. Martin O'Brien, general manager of Mentor Graphics Integrated Electrical Systems Division, said "Virtual Garage is highly complementary to Mentor's CHS software for electrical systems design and wire harness engineering. Virtual Garage expands our scope both upstream into product planning, where decisions about product configuration complexity significantly impact long term costs, and downstream into the key area of online service documentation for dealer networks. Our customers consistently tell us that these are both areas that require strong software support."

The Virtual Garage products are OEM proven and add significant value across the supply chain. Mentor has acquired the relevant intellectual assets and the key architects of the solutions. Mentor also acquired one key commercial contract under the acquisition. Renee Mitchell, director, corporate strategy and business transformation for Freescale, said "As a responsible supplier it was important to Freescale that Virtual Garage was transferred to the right new owner. Mentor Graphics has world-leading expertise in automotive electrical and electronic design, and the global reach needed to support automotive customers. Although we considered other expressions of interest, it was clear that Mentor is the best company to take Virtual Garage forward."

Following this technology acquisition, Virtual Garage will be incorporated into Mentor's automotive industry product portfolio. Virtual Garage was also be featured in several sessions at the IESF conference in Detroit on March 18, 2010. The sessions were:

• "Delivering Dealers VIN-based Service Documentation Online and On Demand," presented by Ron Wadood, wiring diagrams/electrical systems manger, dealer technical operations, Chrysler

• "Challenges of Automotive Electrical Complexity - The OEM Perspective," presented by John Antilla, Operations Program Manager, Systems & Components, Chrysler

• "Managing Electrical Complexity with Virtual Garage," presented by Brad McCaskey, Mentor Graphics

For further information contact Mentor Graphics, 8005 S.W. Boeckman Road, Wilsonville, Oregon 97070-7777. Visit website: http://www.mentor.com



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*Field testing has shown a doubling of assembly speed while practically eliminating errors. Reduced worker fatigue using the Light Director permits more consistent production output throughout the work day.

unconnected wire with probe

or finger.

2 - Target cavity begins to flash. Computer also reads pin number in natural voice. 3 - Insert and lock pin in place. Light blocked to confirm insertion.

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NEWS PLUGS continued

Leus Expands Drawn

Zeus Expands Drawn Fiber Capabilities

Zeus, Inc., a global leader in material science and high performance polymer extrusions, has expanded its drawn fiber capabilities to include PFA, FEP, ETFE, and other polymers.

This product line expansion will result in enormous benefits for manufacturers around the world and allow more flexibility and options in regard to aerospace, semiconductor, and chemical applications.

The enhanced product

offering creates an arsenal of fibers that have diverse properties, such as abrasion resistance, chemical inertness, and optical clarity. Zeus' standard product line of drawn fiber includes the following polymers, but customized fibers can be developed upon request:

PEEK Drawn Fiber is a high-tensile, abrasion-resistant fiber that is commonly used in wire harness and hose braiding applications. The high tensile strength, coupled with the light weight of PEEK Fiber, make it an ideal material for aerospace applications.

PFA Drawn Fiber is capable of continuous service at 500° F (260° C). PFA Fiber is

commonly used to make meshes and filters for semiconductor applications where its purity and resistance to chemical attack ensure a long service life in aggressive environments.

FEP Drawn Fiber is a very robust material that can be used to make mist eliminating filters and screens for harsh chemical environments where other materials would fail. With a luminous transmittance of 96%, FEP is the most optically clear performance fiber available.

ETFE Drawn Fiber is the fiber of choice for applications that require superior mechanical toughness and chemical inertness. Its radiation resistance allows for repeated Gamma sterilization without any adverse effect on its mechanical properties.

Zeus, Inc. is headquartered in Orangeburg, SC, USA. Zeus is a world leader in material science and the production of high-performance polymer tubing used in demanding applications, operating multiple facilities in North America and internationally. Zeus products and services are preferred by companies in medical, automotive, electrical, fluid handling, aerospace, and mechanical markets. For more information, visit www.zeusinc.com.

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with a supplier problem.



A supplier of an electronic component for a major automobile manufacturer went out of business leaving the automaker with no ISO/TS 16949 supplier. While the automobile company was able to get the die for the part during the supplier's bankruptcy, the tool package & documentation was lost.

At the automakers request, ETCO took the die and reverse engineered the tool package & process. Once that was achieved, ETCO was able to start producing the part quickly and efficiently, helping the manufacturer out of a tight spot on very short timing.

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Wiring Harness/Cable Assembly Manufacturer's Directory *"Keeping You Connected"*

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Amertron, established in 1974, is a minority owned small business. We specialize in the small run production of high reliability electronic products. Our capabilities include the design, manufacturing, and test of electronic subassemblies, chassis, and cables. We take pride in providing quality products on time and within budget with superior customer service.

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Affordable Subassembly, Inc. supplies high quality wire, cable and mechanical assemblies to a wide customer base in the electrical/electronics industry, which notably includes the electronic sign industry. ASI also has the capabilities to perform specialty services such as contract manufacturing and metal stamping prototype services. We are proud to be serving a wide range of customers which includes the gaming, automotive and cell phone industries. Call, fax or e-mail us for inquires as to how we can help with all your assembly, cabling and prototype needs. No job is too big or too small!

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ASSEM-tech Inc., has been supplying high quality solutions to our customers since 1985. We supply a wide variety of assemblies to a number of different markets including: Aerospace, Appliance, Automotive, Recrea-tional Vehicles as well as commercial and industrial applications. Our primary focus is on wiring harnesses, box/panel builds and electrical subassemblies. Please contact us for a quote on your next project.

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ASIG performs integration engineering, certification & program management, installation kit fabrication and assembly of structural components, wire and cable harness assemblies and the installation of Communications, Navigation, Situational Awareness and Air Traffic Management equipment for aircraft & other air vehicles. Additionally ASIG performs research and development of emerging technologies in support of aircraft operations, maintenance, modification and repair for civil, commercial, government and foreign flight departments.

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Delta Group Electronics, Inc. is a full service, ISO 9001:2000 certified electronics manufacturing services company offering cost effective, high quality, build-to-print manufacturing from prototype to volume production. Our wide range of services includes cable and harness assembly, box build, circuit card assembly, materials management, functional test, purchasing,J-I-T delivery, testing and repair, and system integration.

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Harris Assembly Group is a contract manufacture that builds to customer prints, Cable/Wire Harness, Electro-Mechanical, Mechanical, and sub assemblies. We are a full turn key supplier certified to ISO 9001:2008 and UL recognized. Our market areas include commercial, industrial, automotive and military. Our buying power allows us to pass on great savings, when purchasing material for programs. We have been serving the OEM electronics industry for over 29 successful years. METRO ASSEMBLIES, INC. 500 38th Avenue NE, Minneapolis, MN 55421 PH: 763-788-8395, Fx: 763-789-4400 E-mail: jzappa@metroassemblies.com Web: www.metroassemblies.com

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RPC Manufacturing Solutions in Denver, CO. is contract manufacturer specializing in box-builds, panel assembly, wire harnesses, custom cables, component modifications, power cords and electro-mechanical assembly services.RPC serves OEM manufacturers in a variety of industries including: Aerospace, Medical Equipment, Gaming, Telecom, High Tech, Automotive, Agricultural Equipment, Measurement Instruments, Control Devices and Electrical Equipment Manufacturers of all types. RPC complies with standards for IPC/WHMA A-620, ISO & FDA in addition to being UL registered and qualified for NASA ground support projects. designs quality coaxial cable assemblies with quick turnaround.

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Web: wwwtennesseewire.com Founded in 1998, Tennessee Wire Technologies is a new company, but with old roots in the Wiring Harness Industry. Our key employees and department supervisors have more than 150 years experience in the development and manufacture of wiring assemblies for both appliance and automotive customers. We are also well versed in custom panel assemblies. Our business is built on quality and customer service and we pride ourselves on keeping our facility and all equipment in top condition. We offer many value-added services including on site engineering assistance and 100% continuity testing of assemblies.

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Thermtrol MGI Global LLC is a TS16949 Certified manufacturer of custom wire harness & cable assemblies with notable competencies in insert/over molding. The company is currently serving that automotive, agricultural equipment and appliance industries among others. For high volume/high labor content manufacturing, the company features the services of its six-year old wholly owned sister company, Thermtrol (VSIP) Co. of HCMC, Vietnam. Thermtrol is genuinely interested to explore strategic opportunities with industry partners.

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Cesar-Scott, Inc. is a sales and marketing company. It was founded in 1988. The company is divided into three business units; manufacturing, distribution and representation. Cesar-Scott manufactures wire harnesses and cable assemblies for the appliance and automotive industries. Cesar-Scott sells and distributes electronic components, wire, and heat shrink tubing. We are a minority enterprise and members of the Greater El Paso Chamber of Commerce.

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TIM-CO/CAL-F has served the Aerospace, Defense, Computer, Telecommunications and Industrial industries since 1960 with on-time delivery. We are ISO 9001:2000 compliant. TIM-CO is an authorized value-added distributor of electronic and electrical connectors (commercial and military), passive and electro mechanical components. CAL-RF manufacturer's and

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WMI, established in 1983, is a full service contract manufacturer with a diverse line of products, including simple to complex custom wire harness and cable assemblies. Our company is competitive in both the domestic and international markets due to our low prices, experience in manufacturing, attention to detail, and dedication to quality. Please visit us on the web for more information and try our quick and convenient bidding process.

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Winstronics has been providing design and manufacture solution globally to our partner since 1982. Our ISO 9000, ISO 14000, UL and CSA certified facilities specialize in production ranging from cable, connector, wireharness assembly, plastic injection molding, PC Board assembly, sheet metal, to full box build.

Wiring Harness Supplier Directory "Keeping You Connected"

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COMPOSITE & WIRE MACHINERY INC. 490 Old Baptist Road North Kingstown, RI 02852 PH: 401-884-4760 Fx: 401-885-2499 E-mail: jack@compositewire.com Web: www.compositewire.com For 20 years, Jack Dennehy and Composite & Wire Machinery have provided new

design and completely rebuilt braiding machines for many industries while keeping delivery times to a minimum. Expert technical assistance is an integral part of our line of braiders

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> ECC 5905 Green Pointe Drive, Suite G Groveport, OH 43125 PH: 614-409-9104, Fx: 614-409-9115 E-mail: sales@ecco.com Web: www.ecco.com

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> THE ERASER COMPANY, INC. 123 Oliva Drive, PO Box 4961 Syracuse, NY 13221 PH: 315-454-3237 or 800-724-0594 Fx: 315-454-3090 E-mail: info@eraser.com Web: www.eraser.com

The Eraser Company, Inc., celebrating its 99th anniversary in business, manufactures a wide range of industrial products including wire, cable and tubing cutters, wire and cable strippers, wire twisters, wire brush wheels, dereelers, infrared heating equipment, measuring tools, and fybRglass® erasers. Custom design services. Free sample program. ISO 9001:2000 certified.

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IPC/WHMA-A-620 Recertification at the Wire Processing Technology Expo

Two Day Recertification Class

- May 11-12, 2010 8:00 am 5:00 pm
- Must be pre-registered and confirmed by Friday, April 30th by logging on to www.tooling.tycoelectronics.com/mailer/a620_cit_rfq.asp or by calling Rick Hawthorne at 717-810-2417. \$1050/per participant

Challenge Testing for Recertification

- May 11-13 begin testing any time between
- 8:00 am 12:00 pm Pre-registration is not required; just walk in
- \$525/per participant

Both classes will be held at the Midwest Airlines Convention Center in Milwaukee during the Expo. Certifications expiring up to the end of August may recertify now without losing any time on the current certification. The new expiration date will be the month of current expiration in 2012.

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Accessories

CALENDAR OF EVENTS

The Work Truck Show 2010 March 10-12, 2010

America's Center St. Louis, Missouri

The Work Truck Show 2010 showcases more than 500,000 square feet of Class 1-8 vocational trucks and equipment. The show attracts thousands of work truck industry professionals, including manufacturers, distributors, dealers, fleet managers, government buyers and leasing companies. *For further information visit www.ntea.com.*

IPC APEX EXPO 2010 Man April 6-8, 2010

Mandalay Bay Resort & Convention Center Las Vegas, Nevada

IPC APEX EXPO is the world's premier conference and exhibition for the electronic interconnect industry - developed and presented by the industry for the industry and provides a significant opportunity to build visibility for presenters and their companies. *For further information contact www. IPCAPEXEXPO.org.*

9th World Copper Conference April 6-8, 2010

Grand Hyatt Santiago, Chili

This event is one of the most influential gatherings of copper industry executives in the world, regularly attracting over 400 delegates. A program given by many of the copper industry's top miners, leading academics, top analysts and financial institutions will presented. The conference backdrop is CESCO week, so you will benefit from the conference and many other networking functions. *For further information visit www.cruevents.com.*

wire Düsseldorf April 12-16, 2010

Düsseldorf Exhibition Center Düsseldorf, Germany

Organizing by Messe Dusseldorf GmbH, the wire is recognized as one of the most renowned events for focusing on the wire and cable industry. Held at Dusseldorf Exhibition Centre, Nordrhein-Westfalen, Germany, it is entitled as world's biggest forum for meeting with top notch professionals. *For further information visit www.mdna.com*.

Electronics New England April 21-22, 2010

Boston Convention & Exhibition Center Boston, Massachusetts

Electronics New England is the premier event in New England where design and manufacturing professionals gather to source new produces, meet prospective suppoiers, and learn about new technology for electronics assembly and manufacturing. Complementing the expanded exhibit floor will be a full conference program addressing the latest industry trends and technologies. *For further information visit electronics-ne.com*.

Design and Manufacturing South April 27-29, 2010

Charlotte Convention Center Charlotte, North Carolina

Five co-located shows - this combined event will include more than 700 exhibition companies and 8,000 visiting production and manufacturing managers, engineering managers, packaging and process engineers, project managers, design engineers, operations managers, purchasing staff, and general corporate managers. Major industry sectors in attendance include these key markets: aerospace and aviation, electronics, IT and instrumentation, automotive and transportation, industrial equipment, military and defense, food and beverage, pharmaceutical, medical, consumer products, industrial products, and more. For further information about this event please call (310) 996-9415 or visit www.CanconSouthShows.com.

DMES Show - Del Mar Electronics May 5-6, 2010

Del Mar Fair Grounds Del Mar, California

IC Products & Services, Electronic Components, Instrumentation Equipment, Fabrication Products & Services, Engineering Software & Services, Manufacturing Products & Services, Contract Manufacturing Services and more. DMES will feature free industry programs and high tech presentations by leading-edge companies. For further information contact Del Mar Trade Shows, Inc., 5724 La Jolla Hermosa Ave., La Jolla, CA 92037. Phone (858) 459-1682 or Fax (858) 459-2236. Email delmar@vts.com or visit www.vts.com.

10th Annual National Electrical Wire Processing Technology Expo May 12-13, 2010

Wednesday, May 12: 9:00 a.m. - 4:00 p.m. Thursday, May 13: 9:00 a.m. - 3:00 p.m.

Advanced manufacturing solutions. The latest wire processing technologies. It's all under one roof at the National Electrical Wire Processing Technology Expo. Now in its tenth year, the Expo features more than 100 exhibitors with new products and services for electronic cable assemblies, cord sets, wiring harnesses and other products within the wire processing industry.

In 2010, the National Electrical Wire Processing Technology Expo and the Wire Association International (WAI) Wire Expo will co-locate on the same show days. The WAI Wire Expo is held even-numbered years opposite their Interwire show at a different industry hub each year. This will be the first time that the Wire Expo will be held in Milwaukee. The Wire Expo has a material focus, while the Electrical Wire Technology Expo has a processing focus. The show offers free technical seminars and social/networking events. Free advance registration or \$15.00 at the door. *For information visit www.electricalwireshow.com or call 800-367-5520*

60th ECTC 2010 June 1-4, 2010

Paris Las Vegas Hotel Las Vegas, Nevada

The premier international packaging, components, and microelectronics systems technology conference, the Electronic Components and Technology Conference (ECTC) offers attendees an outstanding array of packaging technology information. This year's conference will have 39 technical sessions, 16 professional development courses, a panel discussion, a plenary session, a CPMT Seminar, and a technology corner for exhibitors.

The technical program contains papers covering leading edge developments and technical innovations across the packaging spectrum. Topics include advanced packaging, modeling and simulation, optoelectronics, interconnections, materials and processing, applied reliability, assembly and manufacturing technology, components and RF, and emerging technologies. Both poster and presentation formats are Used. Special papers presented at the ECTC will be awarded the Intel Best Student Paper Award and best and outstanding paper awards. *For further information contact www.ectc.net*.

POF WORLD WEST 2010 June 14-17, 2010

Santa Clara Convention Center Santa Clara, CA

One of the main focal points of POFWORLD WEST 2010 will be "POF in Short-Distance Applications". There is a growing need for high-speed, low-cost interconnects in a wide range of applications, including supercomputers, data centers, storage area networks, home networks, terminal devices, in-box, box-tobox, rack-to-rack, and on circuit boards, to name only a few. These applications are from a few centimeters to 100 meters. Short distance applications have found their way into automobiles, with over 70 models of automobiles and over 55 million optical nodes on the road in Europe and Asia. This has resulted in economies of scale, allowing POF to reach its low-cost potential. This same technology will soon find its way into short-distance interconnects in industrial, consumer, medical, computer, and aerospace fields. *For further information contact www.pofworld.com/west10/*.

Assembly Technology Expo September 28-30, 2010

Donald E Stephens Convention Center Rosemont (Chicago), Illinois

Stay at the forefront and remain competitive with the latest technical training for manufacturing professionals. The ATExpo Conference gives you the knowledge you need to make your assembly process work better from design to endof-line packaging. Attending Assembly Technology Expo helps you keep pace with global competition with innovative products and ideas that make your process faster, better, and less costly. *For further information visit www.atexpo.com.*

Midwest Airlines Center Milwaukee, Wisconsin

EDS 2010

May 11-13, 2010

Paris/Bally's Hotel Complex Las Vegas, Nevada

The global summit of electronic distribution where channel decision makers gather for forging relationships, introducing products and programs, planning market strategy, accelerating business. *For further information visit www.edsc.org.*

Electrical Manufacturing and

Coil Winding Expo 2010 October 18-20, 2010

Gaylord Convention Center Dallas, Texas

A technical conference with presentations from Industry Leaders related to the design and manufacturing technologies of transformers, permanent magnets, AC/DC motors, electrical coils and components. This new 6 in 1 event will attract hundreds of professionals from the electrical manufacturing industry. *For further information visit www.emcw.org.*

If you have an event you would like to have listed here, send it to Marilyn Magowan marilynmagowan@yahoo.com

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8:30 am – 9:30 am Revamping Medical Robotic and Cable Design

10:30 am – 11:30 am Utilizing Ultrasonic Metal Welding in Today's Production Environments

12:30 pm - 1:30 pm Current Status and Growth of Solar/ Photovoltaic Technology

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Fax or mail one competed Registration Form per person before April 21, 2010 to receive your Show Badge and Prize Ticket by mail. After April 21, 2010, bring completed form with you to show site. Registration without this form is \$15.00 at the door. Attendee Show Badges will be mailed after April 22, 2010.



See Two Shows with One Badge! New for 2010, the Electrical Wire Processing Technology Expo and Wire Expo will co-locate to run side-by-side events with cross-over admission for all attendees. Wire processing and wire making have been linked for years by industrial proximity – there's no better way to identify new products, especially in a show venue.

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J. Dereelers U. Wire Harness		iess		
K. 🗆 Electrical Tool Suppli	es V.	V. 0 Other		
4. Classify your company ((one only):			
A. Driginal Equipment N	tigr. D.	🗆 Distributo	r	
8. Dob Shop/Contract M	fgr. E.	Military C	ontractor	
C. Assembly	E	Other	20 C	

Single-sided loading... attractively priced.

The Zeta 651 offers you a complete solution.

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Add more processing stations, wire marking systems, plus other options and accessories

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