

Wire Processing

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ICONN PERFECTS CUSTOM CABLE ASSEMBLY

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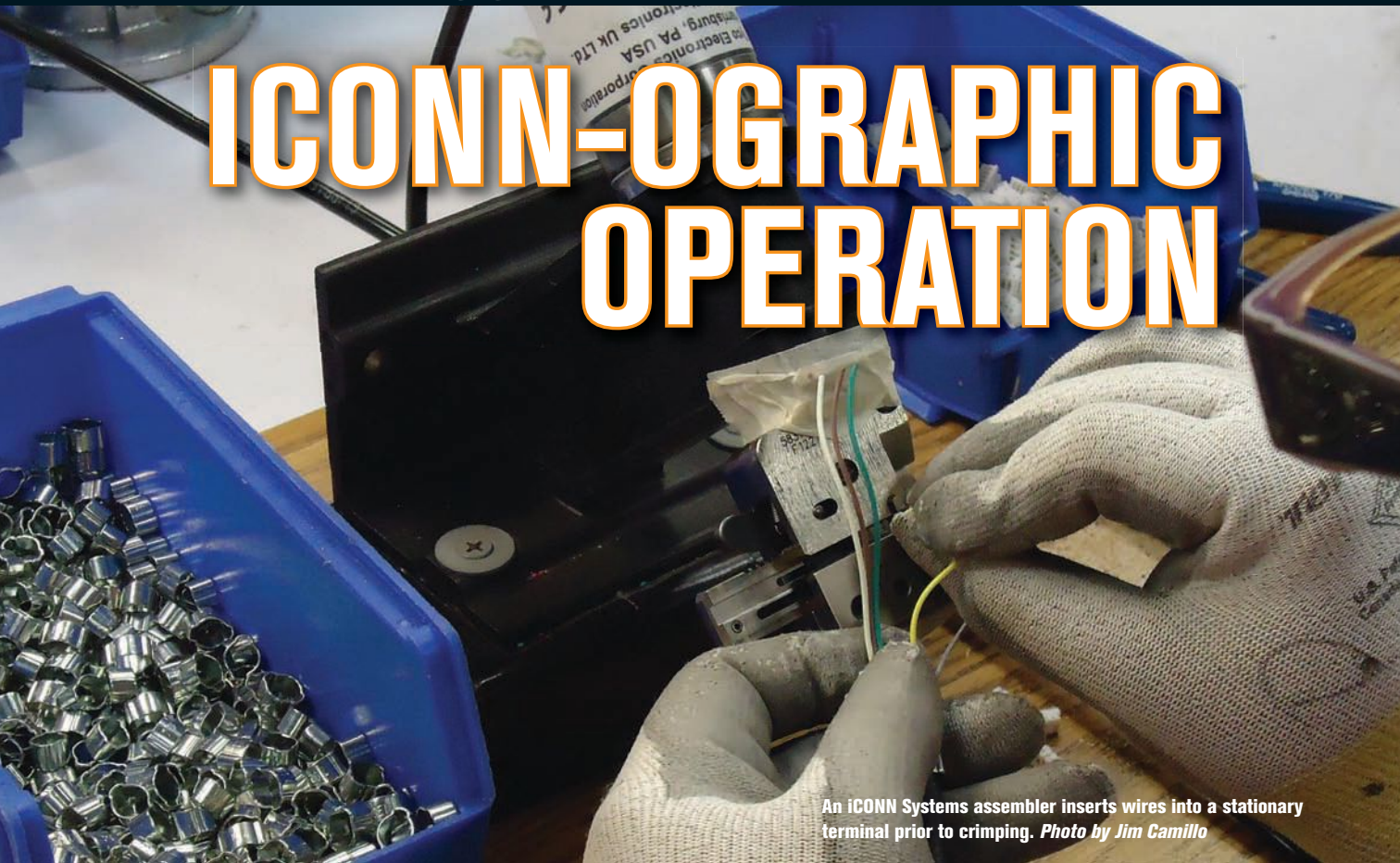
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Photo by Jim Camillo

ICONN-OGRAPHIC OPERATION



An iCONN Systems assembler inserts wires into a stationary terminal prior to crimping. Photo by Jim Camillo

Engineering expertise and skilled assemblers help iCONN Systems LLC carve its own niche in the overmolded cable assembly marketplace.

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Dirty jobs require more than tough workers. They also require durable equipment. Lombard, IL-based iCONN Systems LLC specializes in assembling highly engineered, overmolded cables for rugged machines subjected to harsh environments. A good example is the sewer-pipe inspection equipment made by CUES Inc.

CUES came across iCONN on the Internet in 2009. The OEM was in search of a cable assembler that could improve the performance of its polyurethane-jacketed cable, which featured rubber connectors and integrated O-rings that often failed. It also had a poor appearance after being compression molded.

Sewer inspectors run the cable from a computer (sitting inside a truck) to the housing of a high-definition camera. This housing is mounted on a 150-pound transport vehicle, which inspectors lower into the sewer using a winch. The wheeled vehicle travels through the pipe and takes images that appear on the computer and show pipe damage and blockage locations.

“We proposed using polyurethane connectors, but the

manufacturer said it had gone down that path before and they didn’t work,” explains Kerry Nelson, vice president of sales and marketing for iCONN. “We requested a test specification for the assembly and were told there wasn’t one. So our engineering group created one, CUES modified it and we agreed on the spec.”

iCONN then paid for the connector tooling, built 10 of each assembly and sent them to the manufacturer for testing—with one caveat. If any of the connectors failed, iCONN would swallow the tooling cost and step aside. If they all passed, CUES would pay for the tooling, and iCONN would provide their cables going forward.

“The applications are brutal on connectors,” claims Nelson. “But, we knew our connectors would pass the spec, and now that OEM is our third largest account. We make almost all of their connector assemblies. What’s interesting is we even sell product to their ex-cable supplier.”

SISTER COMPANIES

When Rich Regole co-founded iCONN in late 2006, he saw the potential of it providing complementary products to



A computer monitor within each station displays drawings of the cable component or components to be assembled, along with specific assembly instructions. Photo by Jim Camillo

the same markets served by Mechanical Products (MP), another company he oversees. MP was founded in 1940, and it specializes in manufacturing miniature thermal circuit breakers.

"We [founders] saw some synergies on interconnect products within the customer base of MP, but we didn't want to bring those products into MP," notes Regole, president and CEO of iCONN. "So we formed iCONN. The company ended up serving a different set of applications and customers starting in late 2007."

Both companies are part of a holding company called R2M Holdings LLC, which has Regole as one of its three managing partners. He also leads the iCONN management team that includes Nelson, Vice President of Operations Rob Smith and Vice President of Engineering Tony Czyz. Together, they have more than 100 years of connector-industry experience.

The two companies occupy four units of an industrial complex, with iCONN using 2.5 units and MP 1.5. Size wise, iCONN occupies 21,000 square feet, and MP occupies 15,000. Regole says one half of iCONN's space is for cable assembly, while the other half is for component manufacturing and offices.

The company has grown at a rate of

up to 25 percent annually, enabling it to expand three times. It has 47 regular full-time employees and a dozen or so temporary full-time workers.

The process of converting workers from temporary to regular takes six to 12 months, depending on skill level. Regular workers receive full benefits.

Nearly 40 workers perform assembly or machine operation. They work from 6 a.m. to 2:30 p.m., Monday through Friday. Overtime is done either before the regular 6 a.m. start or on Saturdays. Office people typically work 7:30 a.m. to 4:30 p.m. They include nine people in operations and quality, four in engineering and four in sales, as well as a few in accounting and human resources.

"We add overtime at the beginning of the day so our people still get home early," says Smith. "By leaving at 2:30 p.m., people can beat traffic and greet their kids when they get off the school bus—even if they have to start work at 3 a.m."

CUSTOM CABLES

Cable assembly is done in U-shaped cells featuring up to 12 workstations. A computer monitor within each station displays drawings (created by the engineering department) of

the cable component or components to be assembled, along with specific assembly instructions. The assembly area has been air conditioned since 2012.

All assemblers are cross-trained to perform wire stripping, potting, heat shrinking, soldering, connector termination, horizontal overmolding and testing. Assemblers handle wire as small as 26 gauge and cable as large as 4/0. Their experience ranges from 3 months to 27 years. Cable lengths vary from 3 inches to 200 feet.

Assembly equipment includes hand tools made by Daniels Manufacturing Corp., Astro Tool and Plato USA; arbor presses from Schmidt Technology; and stripping machines by Schleuniger Inc. Small machines automatically dispense 3M flame-retardant epoxy for bonding components. Workers heat shrink tubing on the cable by placing it briefly over an industrial heat gun.

Horizontal overmolding is done with in-house-designed molds on molding machines controlled by an Allen-Bradley PLC. Connector testing is done on Cirrus Signature testers.

iCONN buys plastic connectors from TE Connectivity and other suppliers, but molds all of its own designed plastic components. Smith says the company plans to buy equipment so it can make its own molds. iCONN also produces metal components with Swiss CNC machines that run 24 hours per day.

Schleuniger machines are used for high-volume measuring, cutting and stripping of cable. An integrated Schleuniger hot stamp machine imprints markings on the cable jacket.

"We'll build and ship about 750,000 assemblies for 60 or so customers this year," says Nelson. "As a custom cable provider, we can participate in every market. Often, it's our engineering services that get our foot in the door."

CUES is one of iCONN's monitoring market customers. iCONN classifies its other markets as fire and safety, medical, global positioning and locating systems (GPS, GLS), public safety, signage, off-road truck and bus, transportation and industrial.

In terms of revenue, fire and safety

is the largest market, and it includes police and fire departments. ICONN makes cables for radar systems in police vehicles. The company's cables are also used by fire departments for self-contained breathing apparatuses (SCBAs, or air packs) and fire-suppression systems.

Recently, iCONN redesigned a cable for a major SCBA manufacturer. The original cable's receptacle was mounted into a housing that contains an air pressure gauge and is filled with epoxy. Now, the receptacle is located outside the housing, and it features an overmolded grommet that securely mates with the connector. ICONN's engineers designed the grommet with a tight tolerance so it creates a seal and prevents epoxy leakage.

The OEM performs many tests on this cable. One is a fire test, which involves exposing the cable to a 1,700 F flame for a short duration to simulate what a firefighter would encounter. The manufacturer also performs a snag test, where a hook is placed under the cable

and pulled for 500 or 1,000 cycles. This test simulates the situation of the cable getting caught on something when a firefighter walks through a building.

"The challenge in this application was the cable had to be reverse compatible," says Regole. "We had to design something that worked with the existing SCBA products in the marketplace. Our redesign eliminated all their warranty issues, and we saved them roughly 25 percent in costs."

Large retailers like Wal-Mart mount sensors on their trailers to track vehicle location via a satellite- or cell-tower-based GLS. Each sensor features a receptacle for cable connection.

For one GLS manufacturer, iCONN's receptacle assembly includes soldering a flex circuit to a miniature, high-density circular end connector. The IP-67 cable also features a cord grip that enables the installer to quickly and easily position the cable for connection.

Another GLS manufacturer relies on iCONN for a soft polyurethane cable with rectangular connectors and

O-rings that provide a dynamic seal. The cable also has a connector position assurance feature that keeps an internal flex circuit receptacle mated with a connector.

Well-known for its LED billboards and Vegas Vic neon sign, Young Electric Sign Co. (YESCO) is one of the company's largest signage customers. Initially, iCONN supplied YESCO with cables for PCBs that feature a snap-lock end connector.

Currently, iCONN also designs and supplies end-cap assemblies to YESCO for large and small aluminum extrusions. The assembly contains Samtec headers that are terminated to cable and overmolded. YESCO places a PCB into the extrusion before backfilling it with clear silicone and installing an assembly at each end to prevent leakage.

Other interesting cable assemblies include those for NASCAR-vehicle communication systems, diesel-engine exhaust gas recirculation, a respirator battery charger, and a fire-detection

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system in General Electric locomotives.

“On short notice, we have sent cable assemblies to several [music] venues for installation just prior to concerts,” says Smith. “Just last year, we assembled cables for the video system used on Paul McCartney’s tour.”

Regole says that job sizes range from just a few cables up to 60,000. The company’s highest density cable assembly thus far features 37 contacts and is used in the mining industry.

WHAT’S NEXT

Looking ahead, Regole sees three main challenges for iCONN. The first is improving its lean manufacturing practices to lower operating costs and offset the financial impact of the Affordable Care Act and higher minimum wage.

“Both of these are going to cost us



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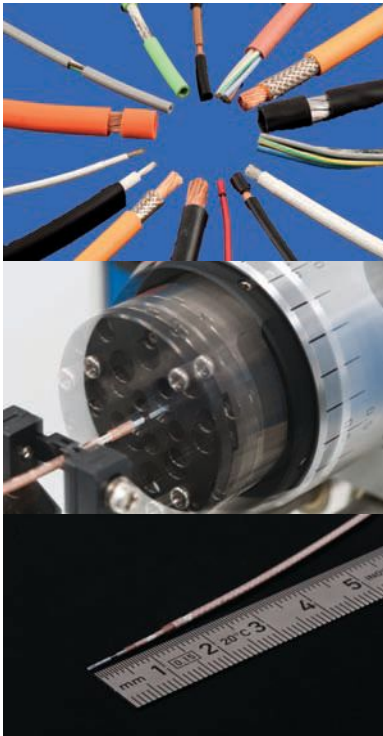
a lot of money, and we can’t just pass those increases on to customers,” says Regole. “We have to take a look at what we do, and do it better.”

The company also wants to reshore more of its manufacturing operations from China. Just last year it purchased a Pillarhouse Jade S-200 MK II automated soldering machine. ICONN can now solder flexible circuit boards at their plant at a lower cost than overseas.

A final challenge is gaining new customers through increased industry exposure. To achieve this goal, the company is redesigning its Web site for search engine optimization, and increasing its use of social media.

“Once we get a customer, it’s not a major challenge to retain it,” affirms Regole. “The reason is our customers like us and the high level of service

we provide. Prospective customers typically ask us: What can you do for us? Our candid response is: What do you need us to do?” **A**



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