Reprint

NRI Electronics

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By Fred Noer

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

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

The comparatively high number of projects is typical at NRI and reflective of its employees' attention to detail and their drive to improve all aspects of NRI operations. Everyone's effort at NRI coincides with its quality policy: "Through company-wide empowerment, we are committed to continuous improvement in order to satisfy the expectations of our customers."

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

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

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

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

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

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

Conversely, Anoka, whose building measures 12,000 square feet, does mostly PCBs, both surface mount and through hole, and electromechanical assemblies. Manufacturing of harnesses, simple ones that are short and contain up to three wires, started there last August.

A variety of PCBs is built, in quantities from one to 1,000. The boards can have up to eight layers and 700 parts. BGA and flip-chip capabilities are available. The electromechanical assemblies are in the $10 to $2,500 price range and could have as many as six potted PCBs, seven wiring harnesses and a power board assembly.

Besides assembly, capabilities include cutting, stripping, crimping, ultrasonic welding, pinning, induction soldering, hot stamping and inkjet marking, potting and braiding up to three inches in diameter. Engineering, packaging, kanban and a dock-to-stock program are among the services.

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

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

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

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

Should a product be returned, it is subjected to the Eight Disciplines (8D) system, which is consistent with continuous improvement. Mark Van Osdale, Rochester production manager the past year, stated that following 8D involves several people in the company, including Jeff Martinson, customer program manager in Rochester.

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

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

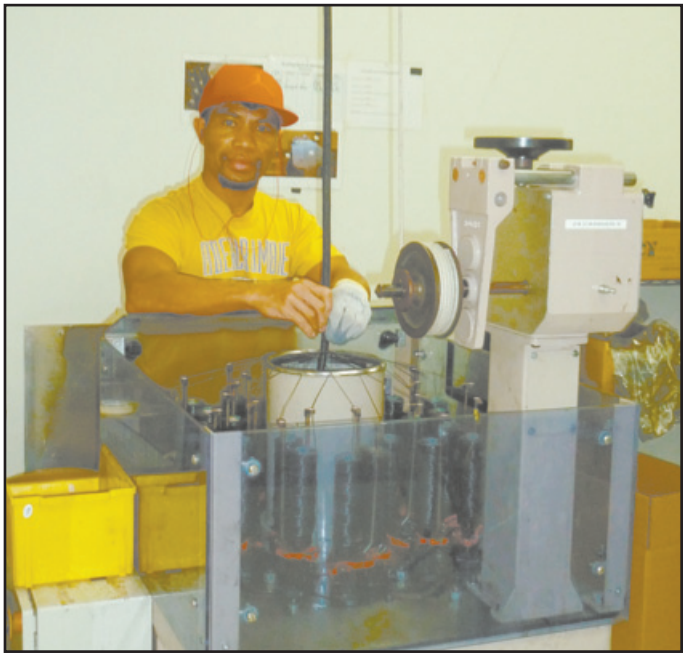
Two technological components integral to those processes are Microsoft Dynamics and HarnWare software. According to Martinson, Dynamics links all product documentation to part numbers, and HarnWare designs harnesses.

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

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

Serving the customers are 70 employees in Rochester and 30 in Anoka. All work first shift except 12 on second in Rochester. Production employees number 80 and administration 20. The total has stabilized the last three years after a 30-percent drop in 2009.

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



Sokun Thim of NRI Electronics working on one of the nine braiding machines.

Of particular significance is Toikka. Before he started Neotech Research, which was NRI's predecessor, he specialized in product development, engineering and prototyping. He established an R&D center for Honda in Ann Arbor, Mich., that did development engineering and prototyping for off-road vehicles. Toikka communicated directly with founder Soichiro Honda. During his career Toikka also worked at Schaper Toys in Minneapolis.

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

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

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

Benda emphasized the atmosphere of openness. Meetings are held twice a year at which all employees are present to hear about financials and continuous improvement goals. Departments hold regular meetings, and executives gather frequently to discuss key performance indicators such as on-time delivery, quality, scrap and employee hourly utilization.

Because lean and Six Sigma characteristics are incorporated in NRI operations, continuous improvement is stressed.

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

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

For example, a production employee suggested a different process for cutting convoluted tubing that matched tubing and cutting wheels by color.

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

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

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

The company staff's work has meant growth in 2012 of 4.2 percent, down from 14.6 percent in 2011 but matching 2010. The best year recently was 2009 with 16 percent. It began a period of rebounding from the economic trauma of 2008 when business declined 45 percent and eventually prompted closing a facility in Eveleth, Minn., at the end of 2009.

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

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

salespeople and four customer service reps.

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

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

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

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

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