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AirBoss to open U.S. plant

By Mike McNulty
Rubber & Plastics News Staff

NEWMARKET, Ontario—AirBoss of America Corp. will open a manufacturing plant in the U.S. in early 2010 to expand its defense and first response production operation.

The company also plans to come out with its next generation chemical, biological, radiological and nuclear overshoe within the next several months. The new version will be completely molded without seams, according to President and CEO Robert L. Hagerman.

AirBoss' new plant, initially spanning about 20,000 square feet on a plot of land that allows for expansion, will be located in Burlington, Vt., he said. A majority of the new boots will be produced at the facility.

It's slated to open in January and initially will employ about 15-20 workers. Cost of the project was estimated at between \$5 million and \$6 million at this stage.



Hagerman

The Newmarket-headquartered company had hoped to open the building sooner but was unable to get delivery on five new presses ordered for the facility until the end of November, Hagerman said.

Both the employee and machinery numbers will grow significantly when the new boot moves into the production phase, he said.

The work force could grow to as many as 50 while the number of presses required likely will jump to between 16 and 20.

At that point, the Burlington plant may double or triple its size, he said, adding that it's likely it will produce CBRN gloves in the near future.

Planned growth

The new site gives AirBoss two primary manufacturing facilities—the other is in Acton Vale, Quebec—along with compounding factories in Kitchener, Ontario, and Scotland Neck, N.C. Products also are made at the Kitchener facility while the site in Acton Vale does some rubber mixing.

The expansion move has been in the planning stage for more than a year, See **AirBoss**, page 23



Christopher Schaedewald, engineering director for Eaton Corp.'s Fluid Conveyance Division, explains all the steps in the traditional hose manufacturing process. He is stationed at the division's technical center in Maumee, Ohio. A special section on current trends in hose manufacturing begins on page 10.

RPN photo by Bruce Meyer

From beginning to end

Eaton prides itself in knowledge of hose technology at every step

By Bruce Meyer
Rubber & Plastics News Staff

When a hose customer takes delivery on a new product, the only real concern is that the hose performs as advertised.

There likely is little thought given to all the development and technical work that occurs before the product becomes a hose. That includes such steps as development of raw materials, making sure the product can be manufactured efficiently, and testing to ensure the hose meets expected per-

formance parameters.

"The end user sees the finished product and what it's capable of doing," said Jeffrey Finch, vice president of Eaton Corp.'s Fluid Conveyance Products unit. "The design team sees it from its elemental state in terms of compound material, or a specific type of wire. They see all the building blocks."

Finch is based at Eaton's Fluid Power technical center in Maumee, Ohio, where the company has laboratories for rub-

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Michelin, USW reach tentative pact

By Brad Dawson
Rubber & Plastics News Staff

LEXINGTON, Ky.—Michelin North America Inc. and the United Steelworkers have reached a tentative agreement on a new contract for workers at the company's BFGoodrich tire manufacturing plants.

The two sides reached accord in Lexington early on the morning of Aug. 15, not long after a midnight deadline had been extended 24 hours, and signed the agreement later in the day. Spokespeo-

ple for Michelin and the Steelworkers provided few details pending ratification of the contract, but a company spokeswoman did confirm the tentative pact is for three years.

The agreement was examined by the executive boards of the affected locals—USW Local 351L in Tuscaloosa, Ala., and Local 715L in Fort Wayne, Ind.—during the week of Aug. 17, with the voting dates for members to be decided later, a union spokesman said.

A committee made up of USW mem-

bers representing workers at not only Michelin but also Goodyear and Bridgestone Americas Inc. sites was to review the agreement during the week as well, according to a USW Web site.

A third unionized BFG tire plant in Opelika, Ala., is scheduled to close in the fall. Michelin and the Steelworkers reached a closure agreement for members of Local 753L in Opelika several months ago, the spokeswoman said.

The original three-year contract cov-

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Sil-Pro grows

Medical component maker invests \$100,000 into expanding extrusion capabilities at its Delano, Minn., operation . . . Page 3

He shall overcome

Ben Chouchaoui faces down many obstacles to build Windsor Industrial Development Laboratory into a success . . . Page 6

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Mike Beining, senior engineer for new product development, shows off the results of the company's "Super Flex Project." The Six Sigma black belt was asked to study what impacts the flexibility of a hose. Based on the tests, Eaton designed a hydraulic hose (shown drooping in front of Beining) that is two times more flexible than previous lines without sacrificing performance.

Eaton

Continued from page 1

ber and plastics material, a pilot plant to work out the bugs on product manufacturing, and full-scale testing facilities.

"Our capability exists from the very basic chemistry all the way to the finished product," he said. "We use Six Sigma to our advantage to really help us shorten our time to market and to meet or exceed industry and customer expectations. And we're able to develop products that can easily sequence right into our production environment."

What it boils down to is that Eaton has taken a lot of the "black art" that rubber traditionally has been known for and turned it into a science. "We understand what makes the products work and we can transfer that knowledge easily across product lines," said Christopher Schadewald, engineering director for Eaton's Fluid Conveyance unit.

Starting with chemistry

Lead chemist Aaron Clark, one of two resident chemists on staff, has been with Eaton for just two years, but his learning curve has speeded up by having two staff members with about 35 years of experience—one on the rubber side and the other in plastics.

The rubber side of the lab includes a laboratory-size Farrel-brand Banbury mixer along with a two-roll mill. It also includes a standard press and DeMattia flex tester, which tests the overall robustness of the material, Clark said.

The plastics room has a twin-screw extruder where resins are made into pellets to be used in the on-site injection molding machine.

"We have plastics compounding and

rubber compounding, and then they meet in the middle of the lab for material characterization," Schadewald said.

While the rubber expertise dates back to its purchase years ago of the Aeroquip hose business, the plastics know-how came more recently from its acquisitions of Saint-Gobain Performance Plastics Corp.'s Synflex unit in 2005 and of Arrow Hose & Tubing Inc. in 2007.

Finch said having expertise in rubber and thermoplastic hose is a definite advantage for Eaton. "We can take our material expertise, and it gives us different things to test and develop, and see if there's a hybrid type of combination that results in a better product," he said.

It's also important that the firm has fully integrated those acquisitions, right down to the work in the lab, according to Troy Lutz, engineering supervisor for hose and fitting product development in the firm's Off-Highway Products Group.

"We don't do plastics development separate from rubber development," Lutz said. "It's all done in the same place by the same engineering team, and tested and validated by the same lab tests and procedures."

Within its lab, Eaton has a full range of equipment that, among other things, identifies the breakdown of a formulation, measures weight changes and shows what the physical properties are.

"You can test all the constituents, including the wire and fabric reinforcement," Lutz said. "By the time we get it to the manufacturing plant, we know it's going to work."

Clark said the one piece of equipment that has had the biggest impact on the lab's effectiveness was the addition of an Instron material testing machine that includes an environmental chamber. This allows the lab staff to heat the sam-

ple up and then cool it down as needed.

"Traditionally, rubber labs use a standard Instron at room temperature," he said. "But most of the time the materials are being run at higher temperatures. Now we can run the test at the temperature it will be operating under."

Pilot plant

The equipment at the pilot plant area in Maumee is highly configurable, Schadewald said. With Eaton making a range of hydraulic, industrial and thermoplastic hose, the flexibility of the design allows the firm to make most of the products there.

On a normal hydraulic hose, the process starts with a nylon mandrel. Then it's to the rubber extruder for production of the inner tube. The facility also includes a two-deck wire braider and a one-deck fabric braid machine for reinforcements.

"All the wire must take the same amount of load," Schadewald said. "If you get one wire taking more than its share of the load, it will fatigue quickly and break, and that leads to hose failure."

The hose then goes back in the rubber extruder for application of the cover, and the product is wrapped and put in an autoclave one reel at a time for curing.

"With the capabilities at the tech center, on a typical hose build, you can make the hose in the morning, test it in the afternoon and have the results the next morning," Schadewald said.

Finch said the pilot plant also allows the firm to tweak any element in the design of the product. "We don't want to utilize production resources for design," he said. "We do that here. If we do it right, we only have to do it once."

Full-scale testing

The testing area boasts a wide variety of equipment to run experiments on fin-

ished hoses.

A shaker table simulates conditions encountered by products used on trucks, along with vehicles that use rural roads extensively or continually cross railroad tracks; an impulse machine runs a square wave test; a burst test machine ensures that the hoses can perform at four times normal operating pressure; and an environmental room tests air conditioning hose used on trucks, agricultural vehicles and mobile equipment.

The environmental area allows for humidity control and can be programmed from very low to very high temperatures. "It's not just about keeping the refrigerant in; it's keeping moisture out," Schadewald said. "It can simulate internal pressures, external temperatures and road conditions."

Lutz said the setup of these tests isn't random. Eaton employs a field engineering staff that goes out with customers to witness the environment in which the hoses are used. "They work with customers and collect vibration, temperature data and customer feedback," he said. "A lot of their input goes into product development."

Schadewald added that while industry standards often call for testing to a certain level, Eaton normally goes beyond that, testing products to failure. "If we shut down testing, we won't know exactly how far it will go," he said. "It's difficult to do statistical analysis without running to failure."

Putting it all together

One example of the result of Eaton's technical know-how is something it dubbed the "Super Flex Project."

Mike Beining, a senior engineer in new product development and also a Six Sigma black belt, was given simple marching orders in late 2008: see what can be done to make a hydraulic hose more flexible without compromising product performance.

Finch said the genesis for the project is the growing trend toward designs that give less space for hose. That means greater flexibility is needed to allow for ease of hose installation.

Beining looked at all aspects of the hose, including such elements as the inner tube, cover, insulation and reinforcements. "I did a statistical analysis to see what makes the hose flexible," he said. "I determined what variables have the greatest impact and what we could change."

That resulted in a hose developed less than a year later that is two times more flexible with equal to or better performance, according to Beining, who declined to reveal exactly what was tweaked in the product.

Finch said the more flexible hose is now being rolled into Eaton's product offering. While it initially will go to mobile equipment, off-road and select industrial applications, the design of the experiment will make it adaptable to other hose sizes and styles.

Eaton's fluid conveyance group stresses its overall abilities in its advertising, using the tagline, "Breadth, Depth & Eaton," according to Raja Rajagopalan, group product manager for hose and connectors. "That's what we go to market with," he said. "We have the entire portfolio and technology."

And even in down economic times such as these, the company hasn't pulled back on its development activity, Finch said.

"What we've done is better define the list of things we're working on. We have more people working on fewer things so we can bring them to market faster," he said. "But our commitment has never been stronger because, in the end, it's what differentiates our products from the others."

EMPHASIS Hose Manufacturing

Eaton training center covers all hose types

By Bruce Meyer

Rubber & Plastics News Staff

MAUMEE, Ohio—At Eaton Corp.'s operations in Maumee, the company has training down to a science.

Its training center is split into two separate areas—one dedicated to product training for its fluid conveyance business and the other for its hydraulics operations. Each side has a classroom for book—or theory—learning, as well as a hands-on laboratory.

The classes for fluid conveyance product training are given only to authorized Eaton distributors or Eaton employees. "We want our employees to have access to the same training as our distributors so they have the same knowledge of products," said Christopher Jeffery, senior training specialist for Eaton's Fluid Power Group.

The firm normally offers two to three classes a month, most at Maumee but some also on the road. For example, it was conducting an Aeroquip-brand class in Denver during August because there were enough distributors in the area to make it cost-effective to take the class to them. "The downside is they lose out on the hands-on part of the class," he said.

Training can be geared toward the different product areas Eaton participates in, including hydraulic, industrial, specialty and thermoplastic hose products. The lab includes all the needed assembly equipment and cutting stations, and each student receives a sample bag of hoses they will be building in class.

"We go through the operations of all the machines and cover assembly from low-pressure to high-pressure spiral construction," Jeffery said.

The classes in Maumee on the fluid conveyance side last 3½ days. Quizzes, practice exercises and a final test at the end of class are part of the routine, with students needing to score 70 percent or better on every-



RPN photo by Bruce Meyer

Christopher Jeffery, a senior training specialist for Eaton, demonstrates a hose assembly operation at the firm's training facility in Maumee, Ohio.

thing they've done for the week to earn the certificate of completion. "It keeps people engaged and paying attention, so when they complete it, that certificate means something," he said.

And for the distributors, the training is needed as part of being a certified Eaton distributor. "As you get to the higher tiers of select distributors, training is a requirement that they have to fulfill to be that top-tier distributor," Jeffery said.

Distributor attendees pay \$450 for the training, a fee that basically covers class materials, on-site lunches and other costs. Jeffrey Finch, vice president of Eaton's Fluid Conveyance Products unit, said the training unit

isn't meant to be a profit center, but that doesn't mean it won't have impact on the firm's bottom line.

"It's a profit center from the standpoint that the more knowledgeable about Eaton products (attendees) are, the more likely they are to push the products," Finch said. "They can take the technology and they'll put it into terms for the customer that translates the value-benefit equation."

Training ranges from Level 100 for general product overview, to Level 200, the nuts and bolts of product assembly for anybody involved with the product, up to Level 300 and 400 courses for product specialists calling directly on customers.

While the fluid conveyance side is only for employees and distributors, the hydraulics systems side of the training center is open to anybody in the industry. Prospective students run the gamut from plant maintenance mechanics to U.S. military personnel working with hydraulics, and even those using competitive products.

"These classes are conducted much like you'd find at a university or two-year technical school," Jeffery said.

He said the hydraulics courses can last one to two weeks, with much information compacted into a short period of time. Classroom instruction focuses on such issues as specific hydraulic circuits and how everything is hooked up. "Then they come out to the lab area and each trainer can be hooked up so students can understand such things as pressure drops and what the different valves and components do," he said.

Eaton publishes several textbooks on global hydraulics systems that are made available to universities, tech schools and two-year colleges for use in their training classes. The firm also has portable hydraulic trainers that can be sold to schools for training purposes or used by Eaton to do on-site customized training.

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