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# Electrical Apparatus

More than Motors

**Expanding  
by acquiring a  
single-phase shop  
Electric Motor Technologies  
of Cincinnati**



**WEFTEC preview  
EASA convention report  
The limits of motor efficiency  
Electric vehicle show preview  
Exiting a family business  
When plants close**

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# Entering a new phase



Andy Butz, co-owner of Electric Motor Technologies of Cincinnati, inspects a six-pole permanent-magnet servomotor at the company's primary facility.

***By buying a shop that services and sells single-phase motors, Electric Motor Technologies of Cincinnati is building on recent growth:***  
***by Kevin Jones, EA senior editor***



**C**INCINNATI—Electric Motor Technologies was recently declared to be among the best places to work in Cincinnati, and it shows. It seems that everyone at the company's two Cincinnati facilities is upbeat, some joking, all freely offering their greetings. Questions are answered with enthusiasm. Employees laugh and mug for the camera. Small talk is happily engaged in—but not, as far as one can tell, to the detriment of the work being done.

The company had just been named one of Cincinnati's Top Workplaces by the *Cincinnati Enquirer* when *EA* visited the business this past spring. In the end, the paper bestowed the honor on 126 companies and organizations.

"These companies have been recognized based solely on surveys about the workplace completed by their employees," according to Top Work Places. Electric Motor Technologies—or EMT, as the company is commonly known—was ranked #48.

The honor has been a long time in coming. EMT is observing its 20th anniversary this year, and the company has come far since *EA* last visited, in 2005.

Back then, as we noted in "Building a new business with bold ideas" (*EA* April 2005), the company had only recently moved into the building it has occupied since, and it was new to field service and servomotor repair. Today

the company repairs servomotors from across the U.S., and field service constitutes one of seven divisions.

There have been other significant changes as well. Last year, as reported in the October 2018 *Electrical Apparatus*, EMT bought Wheatley Electric Service Co., a specialist in the repair and replacement of single-phase motors located a few miles away in Norwood, a suburb of Cincinnati. That acquisition has launched EMT into a market the company was previously unfamiliar with.

EMT's purchase of Wheatley Electric—now known as EMT Norwood—came about almost by chance. In the past, when EMT had a single-phase motor to repair, the company would take it to Wheatley. "We were their biggest customer," explains Andy Butz, one of the two co-owners of EMT. One day, Jim Elsbrock, who owned Wheatley Electric along with his wife Dorothy, told Butz they were retiring and asked, "Are you guys hiring? We'd like to find a place for our employees." Butz, in consultation with his partner, Dwaine York, replied, "Why don't we

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At EMT's St. Bernard shop, Brad Hartman works on a d-c motor for an extruder application.

#### A NEW PHASE continued

look at buying your business instead of just hiring your employees?"

One benefit of a merger would be consistency and continuity: Wheatley Electric's customers wouldn't need to go looking for another servicer and seller of single-phase motors. For customers, the same service on single-phase motors would continue to be provided seamlessly.

A deal was struck, and nearly two years later, the plan appears to be working. Customers of the former Wheatley Electric have remained loyal to the business. "We wanted to call it Wheatley" in order to maintain the consistency of the shop's identity, says Butz, but he and York soon realized that operating two separate shops under different names would create accounting complications.

The Wheatley sign remained on the building for a while after the sale, but customers were receiving EMT invoices, which caused confusion. So EMT gave customers time to become accustomed to the change and then replaced the Wheatley sign on the side of the building with an EMT sign.

The most challenging thing about the acquisition, according to Butz, has been updating the Norwood shop's outdated

computer system. It was so old-fashioned that it was still using a dot-matrix printer. EMT, on the other hand, uses MotorBase, the "comprehensive motor shop management system" from SpringPoint Solutions that handles job management, quoting, accounting, inventory, motor test data, and personnel matters. There was also a need to increase the Norwood shop's inventory level.

At the same time, there were certain upgrades EMT needed to make to its own operations. The original EMT sales staff is new to approaching hospi-

tals, schools, and the like to sell single-phase HVAC maintenance and replacement services. Wheatley Electric had no outside salespeople, so the EMT sales staff has had to learn the HVAC business and introduce themselves to maintenance people at schools and other institutions—"all those people they used to drive by in the past," says Butz.

The first thing a visitor encounters upon entering the Norwood shop is a customer service counter with racks of belts and fan blades on the walls. Obviously there's a lot of walk-in trade with electrical contractors, HVAC contractors, and commercial and residential customers. The shop's sales are roughly 60% repair and 40% new products. Business tends to be seasonal, with more swimming pool and spa pump motors in the summer and more industrial heating motors in the colder months.

Since the acquisition of the Norwood shop, EMT has added four employees there. "Everything seems to be going very well," says Butz. "No regrets at this point." The company operates a third shop, in Middletown, Ohio, a town about 35 miles north of Cincinnati.

There are no immediate plans for further acquisitions, but that doesn't mean EMT isn't looking to grow. "The next step we're going to have to take is to add on to this building," says Butz, referring to the company's primary facility. The expansion is necessary for the growing servomotor business.

#### Servomotors and more

The servomotor business is not only growing but is rapidly changing as well. "You have to keep up with the new technology" in order to remain competitive, says Butz. "Everything changes." Several factors are driving this change, he says. One is the expanding use of plant automation. Another is that machine tools are increasingly incorporating servomotors.

When EMT first got into the servo repair business, servomotors were most widely used among auto manufacturers. Now that machine shops are shifting to CNC machines, servicers like EMT are seeing servo repair orders from machine shops as well. Tools and machines that didn't formerly incorporate them, such as spot

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Electric Motor Technologies now operates three facilities: two in the Cincinnati area and one in Middletown, which lies halfway between Cincinnati and Dayton.

—Electrical Apparatus map





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*In the servo machine shop at EMT's main facility, Jeremy Sears machines a bearing bracket for a servomotor.*



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welders, are increasingly servomotor-driven.

While many of the company's other services are marketed only within a particular geographic region, its servomotor service is still a specialty service marketed nationally. Many of these servo jobs come from other motor shops, and the market appears stable and full of opportunity for those who can prove their competence.

But proving that competence can be difficult. At a recent convention of the Electrical Apparatus Service Association, EMT learned that some members of the association had been burned by servo servicers doing substandard work. These shops were leery of accepting servomotors for service and outsourcing them, because work they

had no control over might reflect badly on their own business.

"A lot of people got into servomotor repair and found it was more difficult than they thought," says Butz, explaining the unevenness of the quality of repair. "It's not inexpensive to get into, that's for sure." And becoming good at servo service isn't just a matter of developing the expertise and making a financial investment; you also need to accumulate manufacturers' data, which servo makers aren't eager to share. EMT has now been accumulating that data for nearly 20 years—and it has the fat binders full of spec sheets to prove it.

EMT works with servomotor end users in other parts of the U.S., such as Florida and California. This work may come by way of a manufacturer in

Ohio, for example, that has plants elsewhere around the U.S. Giving a boost to EMT's servo repair business is the company's website, *servomotorrepair.com*, which happens to be an obvious search term. Often, people randomly searching for servo repair online stumble upon EMT, leading to a business relationship that otherwise wouldn't have come about.

### Breadth of services

Servomotor repair, of course, is just one of many services EMT offers. The company's seven divisions, representing the company's breadth of services, are:

- Field service
- The primary motor shop
- Servomotors
- EMT Middletown
- EMT Norwood (formerly Wheatley Electric)
- EMT Power Services
- New product sales

The main Cincinnati facility—situated in a village called St. Bernard, within the greater Cincinnati area—concentrates on fractional horsepower motors up to 3,000 hp, limited only by the shop's lifting capacity of 40 tons. All of the company's machining, from all three facilities, is done at the main St. Bernard shop.

The St. Bernard location also has an outside service crew that will diagnose motors on-site, remove them, and bring them into the shop, where they will be subjected to laser alignment and vibration analysis as routine steps in the repair.

"Maintenance crews [at manufacturing plants] are getting smaller and smaller," observes Butz, "so they're asking us to come in" and remove machinery that in-house crews in former times might have removed themselves. Still, in most cases, a customer will remove the motor for pickup by EMT.

Sometimes a customer will find a spare after he has sent a motor in for repair. In such a case, EMT will usually scrap the motor and not charge for whatever repair has already been done. Some service companies might charge the customer for work done in cases such as these, according to Butz, but EMT does not. The policy is good for long-term relations.

EMT employs a total of 72 people at its three locations, and together they cover a wide swathe of southern and central Ohio. The Middletown and

—Electrical Apparatus photos by Kevin Jones and copyright 2019 by Barks Publications, Inc.



In the servo shop at the St. Bernard facility, Jim Horton winds a servomotor's stator.



Norwood shops have six and eight employees respectively.

EMT acquired the Middletown business in about 2000. The shop—formerly Marconi Electrical Service, Inc.—is about 20,000 square feet in area, has a five-ton crane, and can service motors up to about 200 hp. It primarily serves the Middletown, Dayton, and Springfield, Ohio, areas.

Acquiring the Middletown shop “enabled us to get more work out of the region north of us,” says Butz. If they’re busy at the Cincinnati shop and slow in Middletown, they might shift work—or an employee—from one location to the other. “It doesn’t take much to keep them busy,” observes Butz, “but you also don’t need guys standing around with nothing to do.”

EMT has five full-time outside salespeople. One covers the northern region, out of Middletown. The other four divide the east, south, and west regions among them. Typically, a salesperson is involved in a job from start to finish. “The salesperson gets paid when we get paid,” says Butz. The benefit is that EMT doesn’t have to try to get money back from a salesperson if a job, once completed, is rejected by the customer.

Each month, Butz and his partner Dwaine York review the performance of each division. “If there are no issues, we say good job,” says Butz. “Or we say this or that needs to be improved.”

### Stable industrial base

A freight rail line passes just across the street from EMT’s primary facility, but unlike similar neighborhoods in



Katie York takes the monthly physical inventory at EMT’s St. Bernard facility.

other cities where old railroad tracks sit unused and rusty, the rail here is used frequently. It seemed that freight trains were passing about every half hour the day *EA* visited. (For more about the stability of industrial neighborhoods and the fates of some towns that have lost their industrial bases, see “Made in America: the rise and fall of factory towns,” by *EA* Special Correspondent David Miller, beginning on page 29 of this issue.)

Electric Motor Technologies has the good fortune of being situated in a location that’s not only vibrant but also has

an industrial base that’s diverse and stable. Chemical plants constitute EMT’s largest market segment, as they have for some time. Steel companies also figure in the mix. There are quite a few suppliers to the auto industry in the area, and “we’ve got a little bit of paper still,” says Butz. Thanks to this diversity, “We don’t see a lot of ups and downs.”

Another significant industry served by EMT is household products, represented locally by the St. Bernard Soap Co. and a Crisco plant, both just blocks away. St. Bernard is still a vibrant in-

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## Single-phase versus three-phase: a difference in marketing as well as design

If the most significant divide among electric motors overall is between a-c and d-c motors, then the most significant divide among a-c motors is between single-phase and three-phase.

Like many motor service shops of its size, Electric Motor Technologies of Cincinnati specializes in the service of three-phase motors. With its acquisition of single-phase specialist Wheatley Electric Service last year, EMT has expanded into single-phase motor service and sales.

What’s the difference? In EMT’s case, the difference is as much about marketing as it is about the nature of the current that powers the machines the company repairs and the magnetic field that causes those machines to rotate.

Explaining the difference between single- and three-phase motors is a daunting task. It took years for theo-

reticians to explain the advantages of three-phase motors when Nikola Tesla introduced them 120 years ago.

In brief, a three-phase induction motor, the most widely used electric motor for industrial applications, draws three-phase power from the utility to induce a rotating magnetic field in its stator. This causes the rotor to spin as the motor’s magnetic core constantly tries to “catch up” with the rotating magnetic field. The lag between the rotating fields, or “slip,” is just one of several losses all induction motors are subject to.

These losses are physically impossible to eliminate and are the reason that 100% efficiency can never be attained. As a wag at Baldor Electric Co. once put it, “slip happens.”

Single-phase motors, on the other hand, usually are found in settings

where three-phase power is unavailable, usually in commercial or residential buildings or in light industrial plants.

Instead of rotating, a single-phase motor’s magnetic field alternates between poles. The rotor, upon starting, must be nudged in the right direction by a starter, usually one or more capacitors.

Recent developments have brought about single-phase motors in larger horsepower ratings and with greater efficiency, capable also of driving a variety of applications without the need for variable-frequency drives or phase converters.

If a shop works with both single- and three-phase motors, the service and sales of the one can serve as a foot in the door to offer a customer the service and sales of the other. For many, it can be a wise marketing move.—KJ



In the St. Bernard shop, company co-owner Andy Butz (right) goes over the day's plans with shop coordinator Alan Crowley.

**NEW PHASE continued**

dustrial zone. Stability has been the hallmark of St. Bernard over the years, with the soap and the Crisco plants operating without interruption for more than a hundred years.

The St. Bernard Soap Co. plant used to be operated by Procter & Gamble. In fact, it's where Procter & Gamble began, in the 1830s. The plant still manufactures Zest, Ivory, Oil of Olay, and Safeguard soaps, but today it operates as a subsidiary of Trillium Health Care Products, Inc. Procter & Gamble may have left the St. Bernard soap plant, but it hasn't abandoned Cincinnati; its global headquarters is in a shiny new high rise downtown.

The St. Bernard Soap plant has 11 or 12 lines, Butz estimates, each with about 100 motors. There are also air compressors at the plant. "We take care of all of the motors over there," he says. The plant's proximity to EMT is convenient for the customer. When the soap plant has a motor emergency, "they just throw the motor in a golf cart" and bring it over to the EMT shop, Butz says. The last time EMT did an inventory of the soap plant's motors, there were about 500 of them.

Next to the St. Bernard soap plant is the Smucker's Crisco plant. The popular vegetable shortening was introduced in 1911 by Procter & Gamble, but the Crisco brand was spun off and sold to the J.M. Smucker Co. in 2002. EMT does the same sort of work for the Crisco plant as it does for the soap plant.

It's difficult for visitors to get into the two plants, because security there, as at nearly all manufacturing plants, has become much tighter over the past couple of decades. Safety requirements at plants are also much tighter than they used to be.

Before doing service work for a manufacturer, a company like EMT must comply with the manufacturer's safety standards. Usually this means submitting a safety manual and an OSHA rating. "It's getting harder every day" to comply with and document these safety measures, says Butz. At some plants, outside service personnel must spend an hour in a safety class. Service providers must produce proof of insurance as well. This is true of all manufacturing plants EMT works with.

**Past and future**

Before moving into this neighborhood, Electric Motor Technologies had been located in Reading, Ohio, a town about 12 miles north of Cincinnati. Originally the company had six employees.

The building in which EMT is currently located was built in 1920 as a hotel for railroad workers. It was also, possibly, a brothel. The hotel was established by a friend of Tom Gamble, who co-founded Procter & Gamble with his partner, James Procter.

The hotel was also once the site of a double murder, when a robber shot the bartender on the hotel's first floor along with a man who came downstairs in response to the gunfire. The murderer escaped, and the crime was never solved.

So much for the building's colorful past. What about the future of EMT, and of the electromechanical service industry generally?



A visitor to EMT's Norwood shop might meet Sew, affectionately known as Sew-Sew, a shy but friendly pooch.

For one thing, "motors are never going to go away," in the opinion of Butz, but "I think things are going to go more high-tech." With space at a premium, plant managers don't want to store motors. Plant staffs continue to be slimmed down, so maintenance managers want to gain a sense of how long a motor will run, but with more easily understood predictive maintenance data.

Thermoscans and vibration analysis are figuring more frequently in predictive maintenance, according to Butz, in part because people who aren't maintenance specialists can understand them. The trend is to give users a simpler report that is easily comprehensible.

Butz is increasingly seeing sensors on air compressors linked to the Industrial Internet of Things. "That's the wave of the future on motors," he predicts. Customers want to see motor temperature and vibration reported in real time so they can take preemptive action to prevent downtime.

Butz mentions one major motor manufacturer that markets a line of motors with a built-in sensor. It's a start, but you still need to download the data; the data isn't reported in real time. The challenge, Butz says, is monitoring position sensors for reliable reporting.

On a typical vibration check, you need to check numerous points on a motor. If a temperature or vibration monitor is integrated by the manufacturer into the machine itself, how should the monitor be positioned? Should there be several of them on a single machine? This is one of several design questions that remain to be settled.

Another new technology that's rapidly evolving but presenting new questions is the electric vehicle, an area in which Electric Motor Technologies has had some experience.

The company has done some work on three electric buses for the City of Dayton, pulling old stators and putting in new ones. EMT didn't repair the old stators.

All buses, electric and conventional, have hydraulic systems powered by motors and air-conditioners, Butz points out, so there's arguably an opportunity for electric service in them as well, however limited. As for the field overall, Butz believes "it's too early to say" if there's opportunity in electric vehicles.

But as uncertain as the future may be, Butz and the rest of the crew at EMT are confident that they can confront what lies ahead—and thrive. **EA**