

Speaking Of...

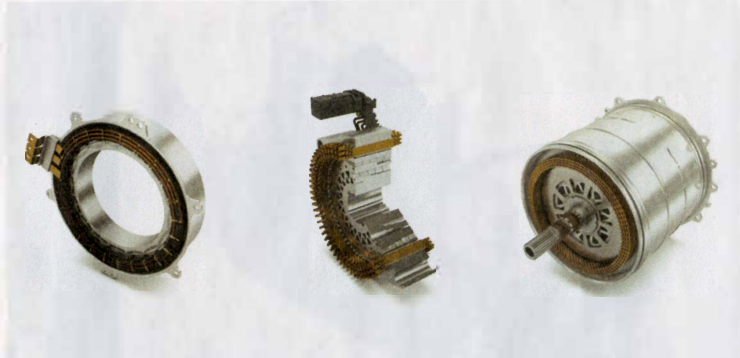
The rarest deal on earth

Bearing manufacturer **Schaeffler Group** continues to push innovation, not just in the products it creates but in its business dealings as well.

The global automotive and industrial supplier announced April 19 that it has solidified a five-year contract with Norwegian company **REEtEC** “for the purchase of rare earth oxides” – a truly original deal that required special European Union approval.

“The aim is to make electric motors for hybrid modules, hybrid transmissions, and all-electric axle drives even more sustainable,” Schaeffler said. “Powerful permanent magnets manufactured using rare earth metals like neodymium produce optimum magnetic flux in electric motors. In [the] future, Schaeffler will procure these metals from REEtEC AS, which uses a sustainable production process.” The partnership, set to begin in 2024, will also reportedly supplement Schaeffler’s 2021

Schaeffler’s five-year contract with Norwegian company REEtEC is a truly original deal that required special European Union approval

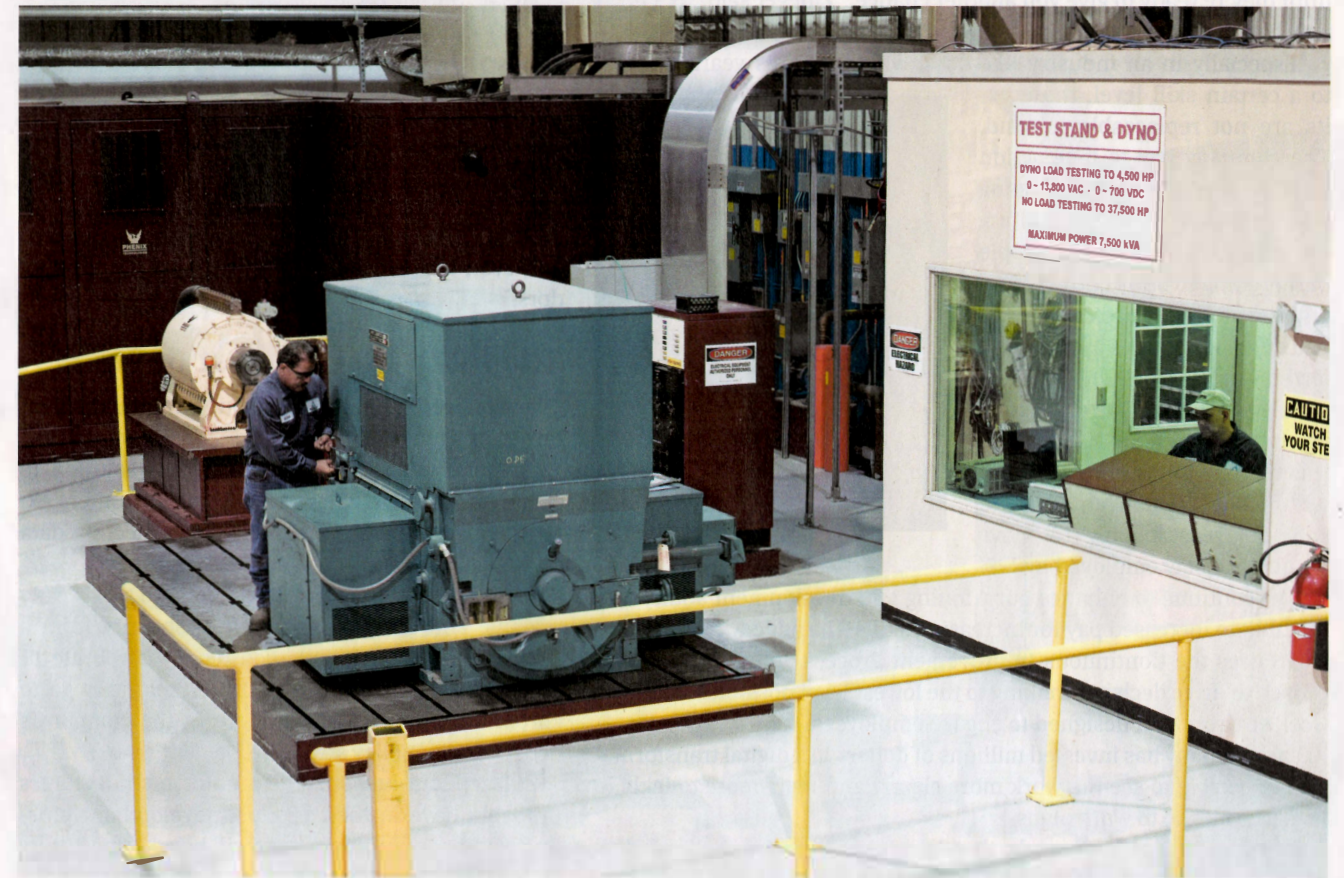


Beginning in 2024, Schaeffler Group will procure rare-earth oxides from Norwegian manufacturer REEtEC. — REEtEC photo

e-bike technology, which was hailed as “revolutionary” by electric vehicle experts as it used no chain. (See “Come on and Take a ‘Free Drive’” from the October 2021 issue of *Electrical Apparatus*.)

“In REEtEC, Schaeffler has gained a highly innovative partner that uses a novel and especially sustainable process for the production of pure rare earth elements,” says Andreas Schick, Chief Operating Officer at Schaeffler AG. “Rare earths play an important role in the automotive and industrial segments. Schaeffler is focusing on achieving sustainability along the entire value chain and is systematically gearing its activities to the use of materials produced cleanly and sustainably. Through this partnership, we are also securing our supply of neodymium iron boron magnets for electric motors.” Schaeffler has been producing electric motors on a large scale since 2021 and offers its customers power classes ranging from 20 kW to more than 300 kW. — Charlie Barks **EA**

Trends in industrial maintenance



Comprehensive testing is just one of many services IPS offers to its nationwide customer base. The company has invested millions of dollars in its digital transformation. — IPS photo

As service companies become outsource partners, they’re providing customers with more digital expertise and supply-chain reliability

By Carol Brzozowski, EA Contributing Writer

From technology to HR to supply chain issues, industrial services companies are responding to trends that either present challenges or create a positive impact on serving customer needs while sustaining profitability.

Two companies - IPS of Greenville, S.C., and Tekwell Services of Knoxville, Tenn., and Cartersville, Ga. - have not only identified current trends but also defined pathways to leverage them for successful business outcomes.

Employee hiring and retention

As with most industry sectors, “it’s a fundamental fact that many of our customers are battling the same challenges around finding people that are qualified in skilled craft,” John Zuleger, IPS president and CEO, told *Electrical Apparatus*.

While the challenge is not new, “our experience since March 2020 and continuing now for more than two years is that we’ve seen an acceleration of retirements,” he added. “Some employees may have indicated to us they wanted to continue to work another two to three years before the Covid pandemic, but instead decided to accelerate their retirements because of the threat of Covid or threat to their health-compromised family members.”

End users will increasingly look to companies such as IPS to be outsource partners, putting significant value on providers that deliver quality and responsiveness and serve as a trusted advisor, Zuleger said.

“In some cases, if industrial service companies don’t have a plan around recruiting, onboarding, training, and retaining employees, then the end customer is going to see the effects of the challenges of managing through the loss of their most experienced technicians and skill craft,” he added.

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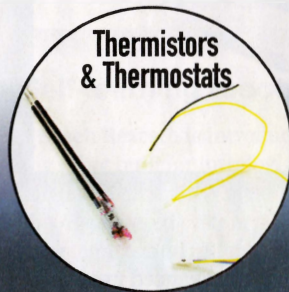
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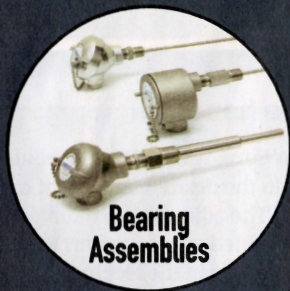
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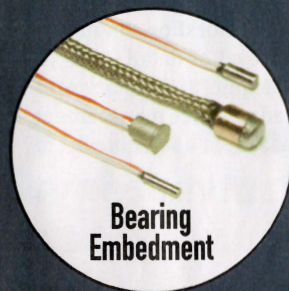
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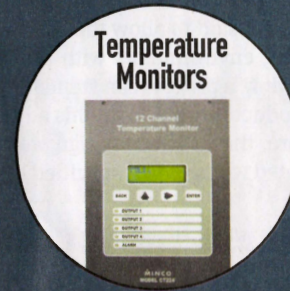
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MAINTENANCE TRENDS continued from previous page

That may mean a company gets one shot with the end user and if they don't like the work product, "you're out for some period of time until they're ready to give you another chance," Zuleger said. "It's not a new trend, but it's definitely stronger than ever."

"Especially in an industry like ours, where it takes years to build to a certain skill level, those ex-its are not replaceable in kind. The company has to take action from an investment and training standpoint and foster an inviting and engaging culture. The people part is going to be a central differentiator as it relates to choices the end customers make in their preferred service provider."

Zuleger said one advantage IPS has in addition to its scale is that it is the only player in its market with a North American network, so employees looking to move around can stay employed by IPS.



John Zuleger

"We continue to enhance our training and development ability and link that to increased pay for increasing skills," he added.

IPS uses the Continuous Improvement Process Solution (CIPS) approach to drive decision-making to the lowest level possible, creating a work environment designed to engage employees.

The company has invested millions of dollars in a digital transformation to be able to see the work more clearly and react more quickly to its performance to work plans.

Others who have not made that investment or are challenged in doing so will struggle with the rising number in employee turnovers, Zuleger said.

"We have to market ourselves to a younger group of workers," Zuleger added. "They're going to want to see all of this in an employer. They're going to want to look at your social media feed, and they're going to draw conclusions about your company and culture based on your presentation and decide off that if they are going to want to work at your company."

A recommendation goes a long way, he pointed out. "If your friend works there, even better - but the interview process has been much more about selling your company," Zuleger said. "You have to market yourself to prospective employees as much as you are evaluating their employability."

Ultimately, "we could talk about technology trends and design trends with electric motors, but ours is a service business," Zuleger said. "If you don't have people, you don't have the ability to offer services. Finding people is the number one issue facing all companies in our industry."

Tekwell Services' Steven Coope, ISO CAT III vibration analyst and operations manager, concurred.

"In our industry, it is becoming ever more difficult to find experienced new hires," said Coope. "Retention is a top priority. We may find an experienced mechanic, but one who works on cars. This leads to pay matching to get the employee trained and up to speed with the many



Steven Coope

variations of electric motors and the components they drive. It is important for future success to be cultivated through vocational/technical training, or even an apprenticeship program."

Supply chain reliability

"Lead times are becoming the determining factor of when customers can have their repaired/replace-ment assets back in hand," said Coope. "This is leading us to rethink our inventory in the hopes of forecasting repairs to prevent lead times being doubled and even tripled due to long lead times from vendors."

The Industrial Internet of Things

"There's been a lot of buzz about the Industrial In-ternet of Things," Zuleger said. "There was a time where everyone was scrambling for a solution to offer customers. We have seen some customers exper-imenting by adding sensors and collecting data on critical assets."

"We have not seen a platform emerge that's truly scalable and provides the kind of security from a cybersecurity standpoint required by corporate IT departments. It seems a lot of IoT solutions go to corporate security and die there in the company's cybersecurity policy structure."

Zuleger said he concluded motor manufacturers probably have in their product develop-ment pipeline significant solutions that will be an opportunity for a service provider down the road to support af-termarket services.

Motor OEMs have a significant advantage to offer IIoT solutions because most of the process indus-tries have sophisticated distributed control systems

to manage complex processes and collect data, he said, adding as they add sensing to electric motors, the data will be collected and tracked to the control param-eters in their DCS systems.

"At the end of the day, you can collect a bunch of data, but some-one has to evaluate it," Zuleger said. "So artificial intelligence may help to identify negative oper-ating trends. The biggest chal-lenge in the growth of IIoT is to offer solutions that are accept-able to a company's cybersecurity plan. That gives an advantage to

original equipment manufacturers and sophis-ticated industrial software providers."

"Many of our customers are installing a wide variety of smart sensors on their assets to avoid downtime," Coope said. "It is critical employees are

Please turn to page 44



Tekwell Services' shop foreman, reliability engineer, and winder are getting set up to PdMA online, vibration, and load test a motor. The motor is being transported to test pad. This photo illustrates the comprehensive testing required prior to motor delivery. — Tekwell Services photo

The meaning of ‘above NEMA’

When applied to electric motors, the phrase is even less clearly defined than the words ‘small,’ ‘medium,’ and ‘large’

By **Richard L. Nailen, EA Engineering Editor**

A basic characteristic of any electric motor – a-c or d-c, induction or synchronous; any voltage, whatever its performance – is its physical size classification, or “frame size.” At least for induction motors, the sizes all of us are most familiar with, are what NEMA describes as “medium.” That’s bigger than “small” yet smaller than “large.” Few terms in the a-c motor standards lexicon cause more confusion than the seemingly simple definitions of those “small,” “medium,” and “large” induction motor sizes.

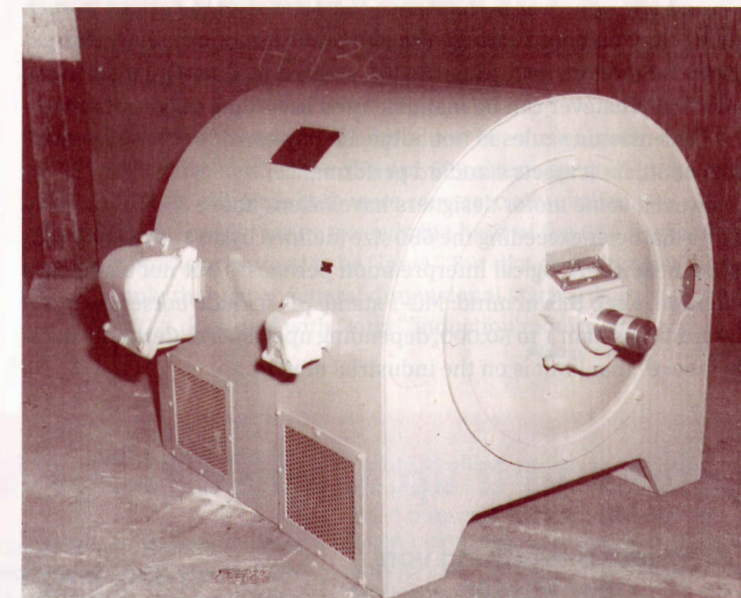
Industrial motor users are most familiar with the second category. Anyone working with home appliances most often encounters the first category. The third category is found in mining, milling, refining, paper-making, power generation, and many other industrial applications, including horsepower ratings from a hundred to several thousand.

NEMA standards define those physical sizes in various ways. What’s hard to find, though, is a clear definition of the commonly used description “above NEMA,” which advertisers have used from time to time in offering “general purpose” a-c motors. MG-1 has defined “General Purpose Motor” as “an induction motor, rated 500 horsepower and less,” without regard to speed (polarity). The primary condition of that definition is that such motors are “for use under usual service conditions” unrelated to any operating situation, rather than in some specific application (such as a type of driven machine requiring a special duty cycle, or restricted to such demanding loads as a centrifuge). A general-purpose motor may still be safely applied to many drives imposing unusual starting requirements, load variations, or other specialties.

The simple, more general description “standard motor” has one of three possible meanings for most of us:

1. In dimensions, electrical characteristics, and mechanical performance, it meets all applicable NEMA and IEEE standards.
2. Only in dimensions does it meet all applicable NEMA standards.
3. Only in electrical performance does it meet all applicable standards.

Technically, unless all of those conditions exist, the motor cannot be fully “standard.”



Is this a “large motor”? Not at all; the rating is only 250 hp, 6 pole, in a “Weather-Protected Type II” enclosure. Nor is this a fully “standard” motor; its basic dimensions match nothing in any published standard. — Electrical Apparatus file photo

Can a “NEMA standard rating” be built in a frame size other than the standard one? Of course. Will it still be a “NEMA standard motor”? No. Many such machines appeared on the U.S. market when the “weather-protected” enclosure design was developed more than a half century ago with rapid growth in outdoor facilities of the petrochemical industry. One motor manufacturer practice was to identify that construction with a prefix “W,” such as “Frame W687.” No NEMA standard applied to that – or to the dimensions of any “weather-protected” enclosure. That’s one way of consistently identifying what might be termed a “standard non-standard” product. No one appears to have objected; after all, such motors form only a small portion of the market.

What “above NEMA” means, then, can be that either or both of these conditions applies:

1. Horsepower/speed combinations exceed anything in NEMA standards, or –
2. Physical size – dimensions – exceed those defined by MG-1 in Frames 680 and smaller.

One of the most common deviations from those published requirements is some modification designed for such out-of-the-ordinary applications as:

1. Motor-mounted heat exchanger.
2. Special shaft extension length or diameter.

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The company cites U.S. Dept. of Energy statistics indicating predictive maintenance saves eight to 12 percent over preventative maintenance costs and upwards of 40 percent over reactive maintenance costs.

The AWS Equipment Health & Performance Optimization solution partners include Shoreline IoT and Seeq. Deployment partners include AWS Professional Services and Softserve.

Equipment monitoring

Data collection and analysis “is the most critical part of any reliability program,” Coope said. A large percentage of Tekwell’s customers incorporate reliability programs at their facilities to minimize unplanned machinery downtime.

“As a repair shop, the accuracy and professionalism of our reporting and analysis maintains and grows our customer base,” he added. “This allows us to work directly with customers and gain their trust through critical asset troubleshooting and repair.”

Increased virtual technology use “has become a component of reliability at many customer facilities due to low staffing, such as collecting vibration data and uploading to the cloud to be analyzed,” Coope said. “We have also been leaning on virtual ‘instructor-led’ training and certification courses since Covid.”

Equipment downtime is another prime consideration. Customers see it costs more when operating dictates “run to failure,” said Coope. “With reliability programs and technologies in place, planned downtime with ready spares are producing an increase in production numbers. Planned inventory and a good reliability program are key to minimizing equipment downtime.

“Well-rounded maintenance practices are implemented more widely than ever before,” Coope continued. “As production goals increase, so does the likelihood of unplanned equipment failure. Updated maintenance and reliability practices are being used as a countermeasure.”

Industrial services consolidation

“Industrial services – depending on the sector – is still a very entrepreneurial marketplace,” Zuleger said. “There are thousands of providers across the spectrum of industrial services. It is continuing to be a highly unconcentrated marketplace.

“We are seeing an emerging consolidation wave that’s in the early stages. Several first-, second- and third-generation entrepreneurial businesses are now realizing their succession plans to hand the business to the next generation are challenged. IPS will be among the companies who will continue to add to our service network and capability by acquiring well-run entrepreneurial industrial service businesses.”

EA



At today’s industrial service companies, traditional skills such as electrical and mechanical repair must be offered along with emerging skills having to do with machine monitoring and data management. — IPS photo

MAINTENANCE TRENDS continued from page 42

trained to properly install and service these sensors as well as correctly interpret the data they send to resolve issues as they arise.”

Most customers are seeing a large decrease in unplanned downtime as a result, he added.

Amazon Web Services recently introduced a division that focuses on predictive maintenance for industrial companies.

It serves as an end-to-end, field-to-cloud solution integrating real-time performance data with maintenance system data and promises to ensure efficient equipment maintenance applications, enabling operators to transition from costly reactive or time-based maintenance schedules to maintenance based directly on asset health.

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