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[20]



FEATURE ARTICLES

- [20] **Bogus Bearings Still on a Roll**
Counterfeits continue to vex big-name suppliers.
- [28] **Making the Smart Choice in PT Components**
The latest clutch & brake technology looks at reliability, cost and design specifications.
- [36] **Stober Survey Examines Manufacturing Infrastructure Updates**
How to determine if your facility needs an overhaul.
- [42] **Where We Stand**
The automotive industry is on the precipice of a shift. Here's what the future looks like and what you need to know to prepare for it.

- [46] **The One-Stop Shop for Automatic, HEV and EV Drives**
CTI Symposium USA examines North American transmission market strategies.
- [48] **Linear Bearing CAD Models and More — On the Fly**
Here's what one supplier is doing to take advantage of the mobile phone in your pocket.

TECHNICAL ARTICLES

- [52] **Baldor Motor Basics — Part 12**
The final installment in our Baldor Motor Basics series covers 50 Hz requirements, as well as motors wet or damp environments.

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[04] PTEExtras

New videos from Thomson and Motion Industries, plus an online exclusive article on mechatronics.

[06] Publisher's Page

Buyer Beware.

[08] Product News

New servo drives, gear pumps, stepper motors and more.

[34] Engineering sMART

Products and services marketplace.

[56] Industry News

Schaeffler's new automotive and industrial initiative, plus news from around the industry.

[59] Calendar

April 30-May 3: Offshore Technology Conference, Houston, TX (2018.otcnet.org);
May 7-10: AWEA Windpower 2018 Chicago, Illinois (www.awea.org); **May 7-10:** AISTech 2018, Philadelphia, PA (www.aist.org).

[60] Events

Momentum in Wind Power. Preview of AWEA's Wind Power 2018.

[62] Advertiser Index

How and where to reach every supplier in this issue.

[63] Subscriptions

Free subscriptions, anywhere in the world.

[64] Power Play

It's a Jungle Out There.



Cover photo by David Ropinski



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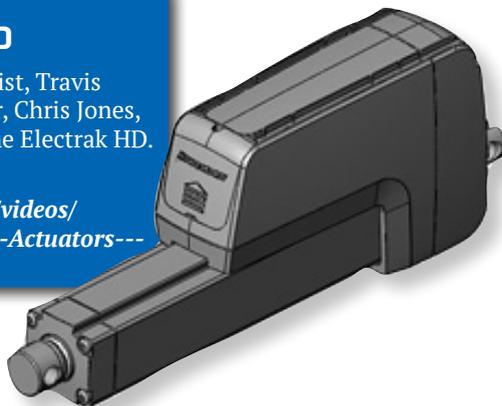
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PTE Videos

Thomson Electrak HD

Thomson Product Line Specialist, Travis Gilmer, and Electrical Engineer, Chris Jones, walk through the features of the Electrak HD. Check out the video here:

www.powertransmission.com/videos/Thomson-Electrak-HD-Linear-Actuators---Strong.-Smart.-Sturdy./



Motion Industries

With the help of NTN, Motion Industries demonstrates how to install a Sentinel Series Bearing Unit. Learn more at:

www.powertransmission.com/videos/MiHow2-Series:-How-to-Install-a-Sentinel-Bearing-Unit-with-NTN.-/



Editor's Choice

Mechatronics and the Internet of Things go hand in hand, so it's no surprise that leading mechatronics companies are coming out with IIoT products now, too. Read this online article from Associate Editor Alex Cannella here:

www.powertransmission.com/blog/smarter-mechatronics/



Industry News Spotlight:

Hannover Messe USA is getting more space at IMTS 2018 in Chicago taking place from September 10-15. Learn more here:

www.powertransmission.com/news/8804/IMTS-2018-Increases-Space-for-Hannover-Messe-USA/

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Buyer Beware



No one likes paying too much for anything. Everyone wants to get a better deal. That's why you shop around before buying a new car. That's why you look at sale advertisements before buying a new refrigerator or big screen tv. The bigger the purchase, the more you want to compare prices.

Fortunately, the Internet makes such comparison shopping fast and easy.

And the same is true for businesses operating in the industrial space. If anything, the pressure to find new suppliers is more intense for business purchasers than for individual shoppers. It's not always just about price, either. Often, it's about timing. Who can get me what I need and meet my deadline?

But there's danger out there, because nowadays anybody can sell anything, and even small-time players can appear to be big-shots online. And while you probably know enough not to buy a computer from *NefariousDude76@darkweb.net*, you may not even think twice about buying from his professional and convincing online storefront.

Industrial purchasers need to be even more vigilant. It's not just your credit card information you're protecting, but in some cases, people's lives. Much of the machinery we build could be quite dangerous if the components inside were substituted with inferior alternatives. Think automobiles, airplanes, wind turbines, or any type of equipment that requires an operator.

But even if you don't build equipment where there is a danger to people's lives, there's still a lot of money to be lost by selling equipment that doesn't meet its design specifications. Think recalls, lawsuits and angry customers.

Unfortunately, those components are out there, and you can find them online. In this issue's cover story, Senior Editor Jack McGuinn delves into the topic of counterfeit bearings to explore how big the problem is and what industrial purchasers can do to prevent fakes from ending up in their own products (page 20).

Just remember, if it sounds too good to be true, it probably is, and you might want to have it checked out by an expert.

In addition to that important topic, we also have a great lineup of articles this issue, covering a wide variety of subjects and industries. Senior Editor Matt Jaster looks at the latest technologies in clutches and brakes, allowing machinery builders to increase reliability, decrease cost and improve their designs (page 28).

Associate Editor Alex Cannella's article about the electrification of vehicles (page 42) offers insight into the manufacturing end of the business, which is well into its plans for the shift to electric that's only just beginning to occur in the marketplace. Despite their small market share, electric vehicles are more than just hype and buzz. This is happening. Those who are interested in electric vehicles should also take a look at Matt Jaster's preview (page 46) of the upcoming CTI Symposium USA, which focuses on innovations in automotive transmissions, including electric and hybrid alternatives.

Also, this issue brings to a close our 12-part series, *Baldor Motor Basics*. I'd like to express our thanks to ABB for allowing us to reprint this material, which, over the past year and a half, has been a significant part of our educational effort, providing basic information on motors to our audience. Of course, all 12 parts of the series are available on our website. All you have to do to brush up is type "motor basics" in the search box.

As always, thanks for reading.

A handwritten signature in black ink that reads "Randy Stott". The signature is fluid and cursive, with the first letters of "Randy" and "Stott" being significantly larger and more stylized.

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Voith

OFFERS A VARIETY OF TECHNOLOGIES AT HANNOVER MESSE 2018

Voith will be presenting high efficiency, dynamic hydraulic systems, self-contained servo drives, and pump technology at the IAMD (Integrated Automation, Motion & Drives trade fair) in Hannover, Germany, from April 23–27. The company will be showcasing the new self-contained CLSP servo drive, the self-contained PDSC press drive, the new variable-speed IPS internal gear pump and the established CLDP servo drive at booth B28 in hall 23. Using the new Eden application, the design of the self-contained CLDP drive is simplified and customer requirements are configured by means of a modular system. In its wide-ranging portfolio of hydraulic solutions, Voith emphasizes its great talent and experience in the area of drive technology, combined with Industry 4.0.

The independent CLSP servo drive excels with its compact design

The CLSP servo drive is a hydraulic linear axis from the Voith product family of self-contained drives. The high energy efficiency, overload protection and virtually wear-free operation are all characteristic features of Voith self-contained servo drives. The CLSP drive also has automatic, load-dependent shifting of the hydraulic transmission. This significantly reduces the connected load. As a result, the size of the motor and inverter is more compact. The CLSP consists of three main components: The servo motor, a 4Q internal gear pump, and a directly coupled hydraulic cylinder. No hydraulic power pack or oil tank is required for operating the self-contained drive. As a result, all components can be integrated directly into the servo drive. The drive is also suitable for force control and position control. In addition, the sensors installed provide the basis for complete integration into automated manufacturing systems or production facilities.

The variable-speed IPS internal gear pump improves control

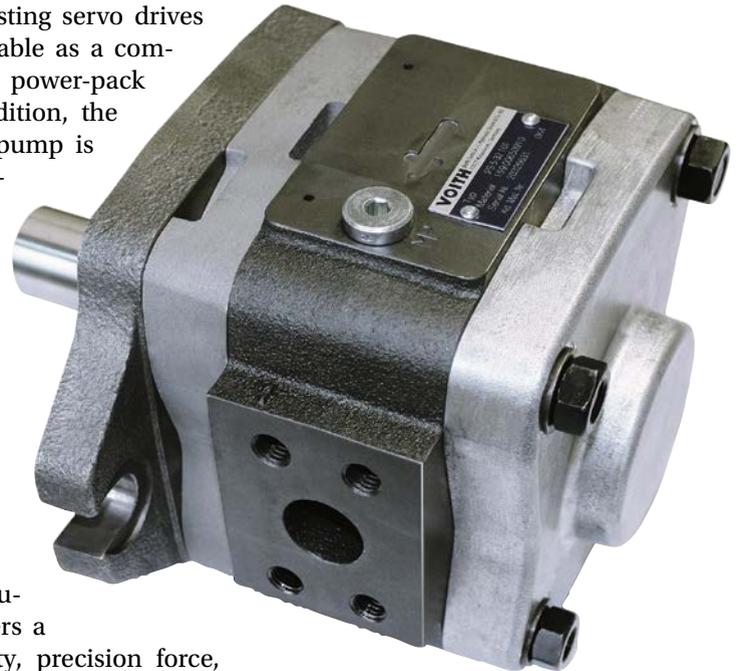
The newly developed variable-speed IPS internal gear pump meets the tighter requirements on dynamic behavior and robustness in the area of servo drives. The new variable-speed pump, with its design innovations and the use of specially developed materials, makes machinery more productive and more efficient. The pump may be installed in existing servo drives but it is also available as a complete system with power-pack technology. In addition, the IPS internal gear pump is already compatible with Industry 4.0 because it is prepared for the required sensor technology.

The self-contained PDSC hydraulic press drive increases efficiency

The PDSC hydraulic press drive offers a high power density, precision force, and position control, with wear-free operation. At the same time, it also includes automatic, load-dependent gear shifting. The maximum press force of 10,000 kN can be scaled to meet individual needs. The drive requires no classic valves. Providing control with variable-speed internal gear pumps and gear shifting leads to enormous energy savings combined with a very low electrical connected load. In addition, the unit has only a few electrical connections and does not require a hydraulic power pack. The integrated control technology also makes it possible to almost freely program presses, process parameters and motion profiles.

The SFM 20 mobile service module simplifies oil changes

The SFM 20 Service and Flushing Module has been specially developed for oil maintenance in Voith self-contained servo drives. The mobile, portable unit is matched to a canister size of 20 liters and allows for trouble-free maintenance work, while the self-contained servo drives continue operation. To do this, the service and flushing module is



connected to the drive using quick-release couplings and can replace the used oil in the drive with fresh oil in nearly no time. The required oil quality is ensured by using the integrated filter unit. The simple, logical and safe handling of the SFM 20 Service and Flushing Module guarantees a high degree of service quality with a low error rate.

The newly developed Eden calculation tool increases efficiency

With the innovative Eden calculation tool, Voith offers its clients the option of designing self-contained CLDP-series drives in advance. In this process, a large number of parameters can be changed in advance so that the ideal drive mode can be selected simply and

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The CLDP servo drive offers high performance with a long lifetime

The self-contained CLDP servo drive combines hydraulics with a servo-electric system. This drive is extremely compact, highly dynamic and facilitates significant increases in productivity both for the mechanical engineering firm and the operators of the systems and machinery. Furthermore, the drive is distinguished by its very high energy efficiency, force and position controls, long lifetime, and virtually wear-free operation. The CLDP servo drive is generally used in applications such as presses, test rigs, shearing machines, forming machines and special machines requiring dynamic response, repeatability and reliability.

PSH in combination with CSH cushion drive operates more efficiently

The PSH servo hybrid press drive was developed jointly by Voith and Siemens. It offers highly flexible pressing processes by using servo pumps for control, along with the best possible speed and force adjustment of the pressing process, replacing conventional valve and control technology. In addition, the drive with the intelligent control system can reduce energy consumption by up to 60% and, in combination with the CSH cushion die drive, even up to 80% by controlling the servo pump and using energy recovery. Productivity is significantly increased thanks to the coordinated drives.

For more information:

Voith Turbo Inc.
Phone: (717) 767-3200
www.voith.com

JVL

UTILIZES SERCOS FOR SERVO AND STEPPER MOTORS

JVL Industri Elektronik A/S, a producer in the field of integrated servo and stepper motors, is announcing yet another industrial Ethernet protocol for its integrated servomotors and integrated stepper motors: Sercos.

The new motor family, ServoStep, uses the newest technology and the advancement of the previous designs, incorporating customers' feedback. The family has the widest pallet of options in the market and will thus fit into all possible customer applications.

The JVL Sercos module is equipped with two Ethernet connectors and a built-in switch, enabling line and ring topology without any extra expensive hardware. The JVL Sercos module has several LEDs, enabling technicians and operators to get a quick status overview. There are also opto-isolated digital I/Os embedded in the module, enabling control of extra sensors etc. without external I/O modules. This minimizes the number of devices on the net and reduces cable costs.

All connectors are rugged M12 connectors suitable for the rough conditions in industrial environments. Furthermore, all registers in the JVL MAC motor are accessible via the Sercos connection, thereby enabling complete control of motor configuration and motion.

The JVL Sercos module is very easy to use and configure via a predefined setup, and commissioning is easy using the JVL MacTalk application software.



The JVL Sercos modules for MAC motor and ServoStep have all the important features from the Sercos specification. Automatic recognition of drives is supported by the FSPDrive and the Sercos Drive profiles (FSPDrive/PackProfile/SercosDrive).

Synchronization is supported enabling simultaneous operation of up to 511 motors. Hot plugging and redundancy is possible for exchanging motors without power off. Probe/capture is supported enabling use also in packaging machines. JVL delivers SDDML files so the motor is recognized as FSPDrive by Bosch Rexroth.

JVL's Sercos motors are even found and recognized as SercosDrives without the presence of a SDDML file if you "scan" from the Bosch Rexroth development environment (*IndraWorks*).

For more information:

JVL Industri Elektronik
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Stafford

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A new series of plastic covers for protecting rigid shaft couplings from hostile environments and permitting use in washdown applications is being introduced by Stafford Manufacturing Corp.

Stafford Coupling Covers are designed to protect a rigid coupling from dirt, dust, and water and screw together tightly with an O-ring seal. Suitable for washdown applications, they can be produced from various plastics and manufacturing methods to fit straight-through and reducer style rigid couplings, depending upon design requirements.

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KEB America

ANNOUNCES SAFE MOTION FEATURES FOR ITS DRIVE PRODUCTS

KEB America Inc. announces the addition of functional safety modules to the latest generation of their drive products. When paired with a Safety PLC (also available from KEB America), KEB Functional Safety Drives provide a cost-effective control and automation solution with standardized safety features.

New generation drives from KEB, like the S6 Servo Drive, feature SIL3 Safe-Torque-Off (STO) as standard. In addition to STO, Safety Module 1 adds Safe-Brake-Control and the newly designed Safety Module 3 will add safe motion functionality according to IEC 61800-5-2.

KEB drives with Safety Module 3 use Fail Safe over EtherCAT (FSoE) to control supported safety functions via the bus. Safety levels, such as limits, can be set and changed, and Safe Limited Speed and Safe Limited Position information can be transferred via the network. These features can improve reaction time in e-stop scenarios and reduces the need for separate



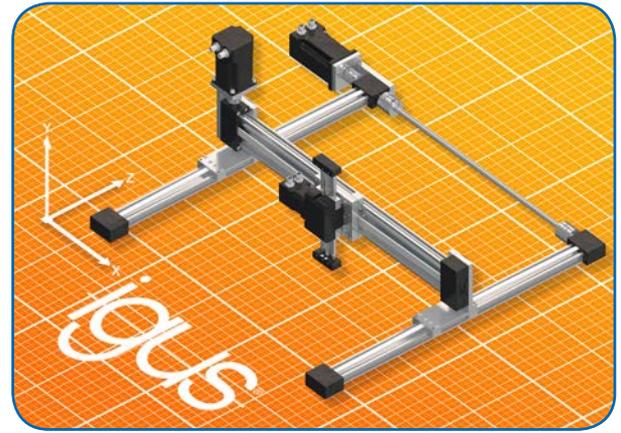
Igus

DRYLIN E-LINEAR ROBOT OFFERS COMPACT AND COST-EFFECTIVE AUTOMATION SOLUTION

Since products need to be manufactured quickly and cost-effectively, the pressure to automate production processes is greater than ever. To meet these growing requirements, Igus has developed a new, compact linear robot that is shipped from stock as early as same-day and offered at a low price of \$2,165. The self-lubricating and maintenance-free drylin E linear robot is suitable for a wide range of applications, from pick & place technology to medical devices with strict safety requirements. The small, complete solution can carry loads of up to 2.5 kilograms (5.5 pounds) at maximum speeds of up to 0.5 meters-per-second (1.64 feet-per-second). "In the robot, the drylin ZLW toothed belt axes and drylin GRW gear rack axis ensure accuracy, and the sliding elements made of high-performance plastic ensure self-lubricating operation," said Matt Mowry, drylin product manager at Igus.

Mounting brackets for system profiles are also available. The robot is shipped ready to connect with NEMA17/23 stepper motors and encoders, making it easy to mount the system.

In addition to the new drylin E linear robot, Igus also supplies line and



protective devices or additional wiring.

Function Safety Drives from KEB America are part of a full range of safety products that include Safety PLCs, Safe I/O modules, and Safety PLC Programming software as well as motors and brakes.

Integral gearmotors from KEB are offered with Safe encoder options, and can include a spring-set brake with microswitch. KEB's TA Series of servo motors also has a spring-set brake option, as well as Safe feedback in single and multi-turn variants. The available spring-set (or spring-applied) brakes provide power-off brake engagement and are ideal for safety critical applications.

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tool. Depending on customer requirements, axis length and various motors can also be configured with Igus energy chains and cables.

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Tsubaki

DELIVERS ATTACHMENT CHAIN INNOVATIONS

The attachment chain is one of the unsung heroes of the industrial world, being critical to the movement of a diverse range of products along the production line. From the food and beverage sector to pharmaceuticals, and from packaging to automotive parts production, attachment chain is critical to the efficiency and reliability of the production line.

Selecting from a range of standard and custom attachments allows the chain to be customized to the precise needs of the conveying application. Options include extended and folded link plates, extended pins, and other fittings which are attached to the basic roller chain to provide a highly tailored engineering solution.



With regard to maintenance or overhaul of attachment chain, factors such as installation time, maintenance activities — for example re-lubrication or replacing chains because of elongation — and the shorter lifespan of a budget chain all impact on total cost of ownership, quickly adding up to significantly increased MRO costs. With its history of innovation, Tsubaki's argument has always been that attachment chain should be regarded as much more than a commodity product, with a correctly specified and well-engineered attachment chain solution adding value to the conveying application.

The characteristics of the conveyed materials and the working environment are different for each application. Because Tsubaki's attachment chain is available with the same added value and solution providing features as its drive chain, engineers have the freedom to build tailored systems that precisely meet the needs of the application. For example, the food industry typically requires corrosion resistant parts, which can be provided by the Tsubaki Neptune series for carbon steel chains, or fully stainless steel chains and attachments where required. Where a maintenance-free solution is important, Tsubaki's Lambda range is also available with a wide range of attachments, eliminating the need for re-lubrication and contamination risks to finished products.

Attachments are available for both single and double pitch chains. Let's look in detail at the various basic parts, and the specification considerations that can have a performance, and therefore an MRO implication.

The A attachment is the most commonly used, having a folded link plate that extends out on one side of the chain, forming an L shape. When A attachments are installed on both sides of the chain, they form a K attachment. Slats or jigs can then be installed over the chain. Variants of the A and K attachments are the SA and SK, where the link plate is extended. The D attachment is an extended chain pin where components such as trays, cross bars, and other fittings can be connected to the chain to convey products. The extended pins are subjected to bending and shearing forces.

With the GK-1 attachments, a hole is added to the center of both link plates, enabling fittings to be attached between two (or more) parallel chains. This type of attachment is often used when cross rods with larger diameters than the maximum applicable diameters of a hollow pin chains are used.

For single pitch chains, many of these attachments are also available with W designations, where the width is equal to the width of the link plate.

Tsubaki stocks an extended range of standard components, and offers a build to order service. The company can also tailor make an attachment chain in any specification, including custom manufactured attachments. Special designs might include specific dimensions, such as non-standard assembly holes.



Tsubaki has recognized the individual requirements of different applications with a number of specialty attachment chain options as well. For example, there are specially tailored chains for applications such as can processing and book binding. The packaging sector can take advantage of flat-topped chain, thermoforming gripper chain or special extended pins. For tray packing applications in the beverage industry where machines require pushers to be fitted to the transport chain, Tsubaki has developed a bespoke solution in which the attachments are mounted by an engineered extended pin whilst bringing lubrication free advantages, reducing wear and contamination.

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Otto Motors

RELEASES OTTO INDUSTRIAL API

Otto Motors is proud to officially release the Otto Industrial API, solving one of the major hurdles in manufacturing today: achieving a fully connected and optimized smart factory. The Industrial API addresses the challenge of machine-to-machine communication and full industrial automation by simplifying the process of connecting equipment and programmable logic controllers (PLCs) to Otto.

“Otto Motors is really setting the bar high for system accessibility and ease of integration in their market. This new API allows *Ignition* to seamlessly access the data as OPC tags and integrate them with our built-in components and scripting,” said Don Pearson, chief strategy officer, inductive automation. “We are excited to see how this API can remove connectivity barriers that have prevented some people from utilizing self-driving vehicles in the past.”

As a collaborating company with Inductive Automation, Otto Motors integrated *Ignition* software as part of the Industrial API architecture. *Ignition* is a software platform with a feature set that include the translation of different protocols to the ones needed to speak to PLCs within manufacturing environments; therefore, contributing to a closed loop automation system.

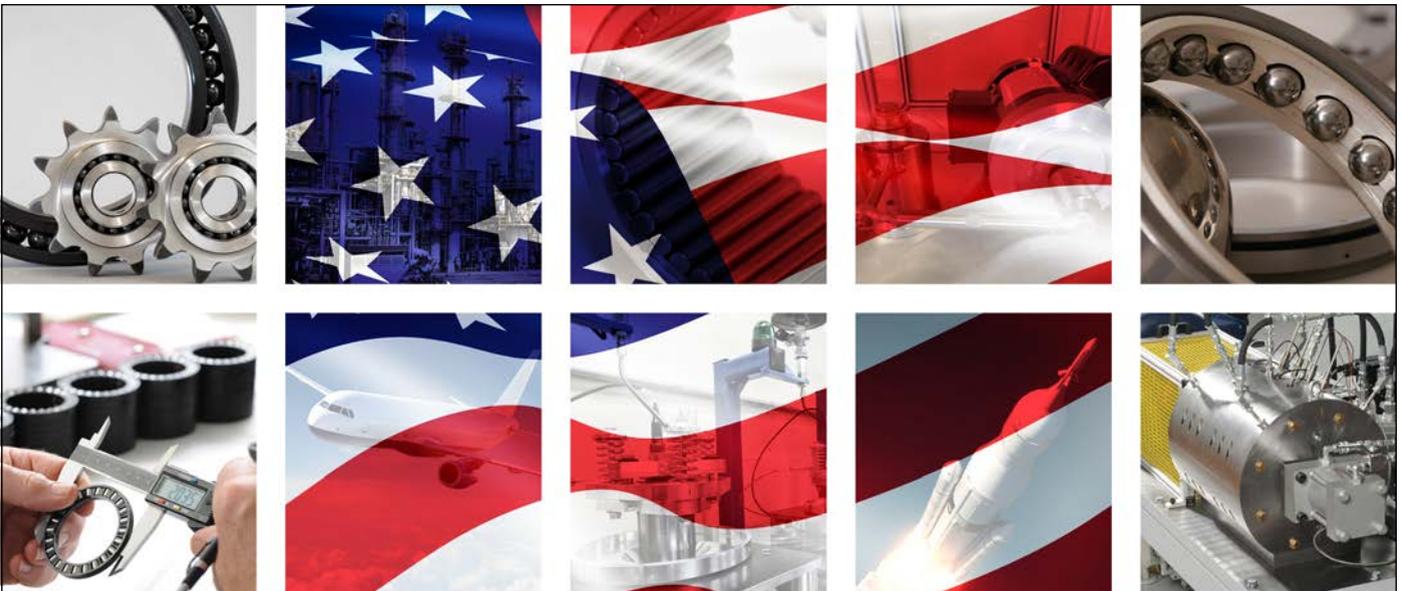
“The industry has long struggled with the challenge of connecting industrial machines built by different companies,” explains Simon Drexler, director of product, Otto Motors.



“Pieces of equipment from the same company generally communicate easily with each other but creating a connection that enables data to be exchanged across products from different vendors can be complicated, costly, and time consuming—and sometimes impossible. This problem is, at best, a barrier to attaining the benefits of a smart factory that many companies aspire to. At worst, it’s a severe limitation on productivity.”

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Yaskawa

EXTENDS PERFORMANCE OF SIGMA-7 SERVO SYSTEMS

The Drives & Motion Division of Yaskawa America, Inc. recently announced the addition of a complete line of 400 Volt servomotors and amplifiers to its flagship series of Sigma-7 servo systems, extending the performance advantages of Sigma-7 products to all types of industrial users.

The new 400 Volt offering includes a completely new amplifier design that offers unique advantages to machine builders and end users seeking to upgrade a 400 Volt motion



control system. The amplifier has a new book-style form factor built around a single standard height and two standard widths. This makes control cabinet design and configuration easier and more predictable. Installation ease is also enhanced by the presence of wiring connections on the top and bottom of the amplifiers, allowing the routing of wiring above and below the amplifier and eliminating the need for terminal board breakouts.

The aim of the new product is to bring the motion control industry's highest performance to the greatest number of users worldwide. "For our customers, every extra measure of improvement brings a big boost in productivity," said Scott Carlberg, product manager for the company's servo system line. "Our 200 Volt Sigma-7 products are already making a significant difference to customers' bottom lines, and our customers who standardize on 400 Volts have been eager to put the same productivity advantages to use."

The initial launch will include servomotors and SERVOPACK amplifiers to 15kW scheduled for release in 2018.

For more information:

Yaskawa America, Inc. — Drives & Motor Division

Phone: (800) 927-5292

www.yaskawa.com/products/motion/sigma-7-servo-products

Güdel

INTRODUCES TMF-6 TRACKMOTION FLOOR FOR FANUC M2000IA ROBOT FAMILY

Güdel, a global manufacturer of linear motion modules, robot track motion units and gantry robots and components, is pleased to announce the market introduction of the new second-generation TMF-6 TrackMotion Floor for the expanding class of super-heavy-payload robots.

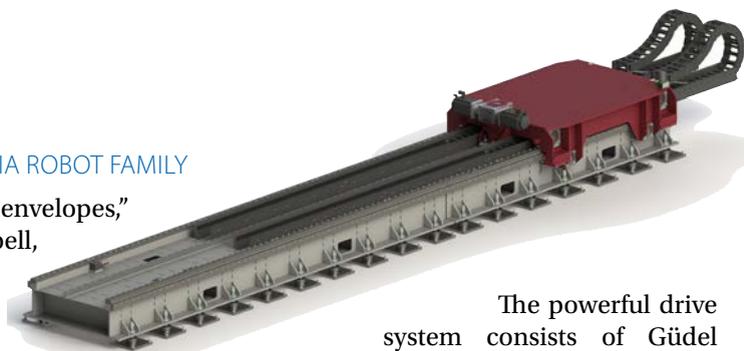
The newly introduced Güdel TMF-6 floor-mounted linear motion module has the capacity to carry robots with total dynamic load of up to 13,300 kg. This TMF-6 module is also capable of carrying static payloads up to 20,000 kg per carriage. Currently, the FANUC M-2000iA series of robots includes four models with payload capabilities ranging from 900 to 2300 kg. Güdel's TMF-5 model is used for smaller super-heavy robots currently on the market.

"Key integrators and end users are pushing super-heavy robot applications and are now seeing the need for comparable robot floor tracks to

maximize work envelopes,"

said Joe Campbell, vice president of sales and marketing for Güdel. "At these payloads, the demand for highest quality, performance and durability is critical, and Güdel's proven linear motion technology delivers."

The linear floor track cost-effectively and reliably extends the work envelope of these super-heavy-payload robots, which can be a critical component in justifying the significant price point of the machinery. These massive robots are ideal for transferring extremely large and heavy items such as truck and tractor frames, automotive bodies, loaded pallets and large castings, where being able to linearly shift the robot along the floor means extended reach and handling capabilities.



The powerful drive system consists of Güdel gearboxes, Güdel heavy-load guideway systems and Güdel racks and pinions, all made in Güdel's dedicated Swiss production facilities. The Güdel cam follower on guideway system features replaceable cam follower cartridges designed to facilitate quick change-out. This cam follower system is also very durable in dirty manufacturing environments. The TMF-6 can be configured with up to two robot carriages as standard. Like other Güdel TMF sizes, the TMF-6 can be extended from the shortest length of 3 m to up to 100 m.

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Bogus Bearings Still on a Roll

Counterfeits continue to vex big-name suppliers

Jack McGuinn, Senior Editor

When a Rolex knock-off one day disassembles on its owner's wrist—caveat emptor, you get what you pay for. And when—say Walmart—gets stuck with a counterfeit \$50 bill, it is duly noted and life goes on. But when a counterfeit bearing finds its way into the guts of a piece of heavy machinery, or a medical device, or a production line—the ramifications can be significant, if not deadly. Bearings are much like gears—they're everywhere. Which ups the ante that there exist numerous applications possibilities for counterfeit bearings to impact performance and outcome. Consider the potential result of bearing failure in a high-balling locomotive; or a surgical tool used for brain surgery; or in a heavy-duty crane operating in the heart of Manhattan. Indeed, when speaking of counterfeit bearings, the you-get-what-you-pay-for bromide couldn't be more accurate.

About now, however, you might be asking yourself—when was the last time I actually heard of counterfeit bearings being responsible for a severe accident? Well, you won't hear

about it in the mainstream news media, but documented mishaps do indeed occur. Here are three true-life scenarios that are presented on SKF's website (skf.com):

Steel mill discovers 1,000 counterfeits

On suspicion that a non-authorized dealer had supplied them with a large quantity of counterfeit SKF bearings, mill management asked SKF to conduct an inspection. The mill reported that after two to three hours of operation, the replacement bearings were performing so poorly that the mill's maintenance team was forced to shut down the machinery, dismount the bearings, and remount the older bearings. After inspecting more than 1,000 suspect bearings, SKF technicians concluded that they were in fact counterfeit, thereby helping the mill keep a costly mistake from becoming even more expensive.

Unplanned shutdown at petrochemical plant

For one unfortunate petrochemical processor, it took an emergency shutdown to reveal that it was being supplied



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These counterfeit bearings are being destroyed. Courtesy of SKF.

with counterfeit SKF bearings. Following just two days of operation, one of these bearings failed in a crucial application, forcing the costly, unplanned shutdown. After a complete analysis, SKF confirmed that the bearings were counterfeit. In cooperation with an SKF authorized distributor, the counterfeits were quickly replaced with genuine components.

Marine vessel finds repairs almost worse than problem

After only 14 hours of continuous operation, a generator on-board a marine vessel began experiencing such extreme vibration that it had to be shut down. As the generator had just undergone repairs, the crew was immediately suspicious. Fearing the worst, the vessel's maintenance team removed the suspect bearing and sent it to SKF for a rigorous bearing failure analysis. SKF confirmed that the bearing was counterfeit, which nearly caused the "repairs" to be worse than the original problem.

Commenting on the above, Christopher Napoleon, president/chief engineer of Napoleon Engineering Services, says that "For most industrial applications the greatest concern is loss of equipment uptime and the loss of revenue while maintenance crews diagnose the problem and repair the equipment. For the end user, that is typically the greatest risk. There are always the concerns about personal injury, but I suspect they are relatively small in number compared to reduced bearing life and loss of return on investment due to poor performance."

So given an absence of severe injuries or fatalities due to counterfeit bearings, this is one occasion where "it's all about the money" is relatively good, if not incredible news — especially when you consider that it took only some defective o-rings to bring down NASA's Challenger space shuttle, killing all seven crew members.

How difficult is it to identify counterfeit bearings? It would seem learning to do so can't be that complicated — or is it?

"It's oftentimes quite difficult to identify a counterfeit bearing," says Napoleon. "The quality level of some of the plants that are engaged in counterfeit production can be outstanding. I've seen product that is equal to, or better than, the original manufacturer, but the internal design was different," proving that the product was counterfeit. "It's not always that the quality is poor," he continues, "It could be a different grade of steel or different design intention that separates a counterfeit bearing from the brand name. Bearings are actually very complicated and there are many attributes that can identify separate suppliers. However, if someone is intent on counterfeiting a major brand name, and they work hard at reverse engineering the bearing design, manufacturing practices, marking, packaging, etc., it can often be difficult to identify the knock-off version."

"Counterfeit bearings are very difficult to identify and it requires a trained expert to do so," seconds Tina Åström, SKF director group marketing, communication & brand protection. "The counterfeits have a very high level of resemblance to genuine product, where the most obvious visual features

are copied, such as colors and logo types.” But just as with “nice” packaging, a “nice” looking bearing “is no guarantee that it is genuine.” Åström points out that “SKF offers our customers a verification support through the SKF Authenticate app, where SKF experts will verify authenticity for them within 24 hours. The best way to safeguard authenticity is to buy from distributors authorized by SKF (see list of authorized SKF distributors at www.skf.com).”

Something else to wonder about is why there is a surfeit of counterfeited bearings around the world compared to, for example, counterfeit commodity-class gears.

“Bearings are mostly sold according to the standards and brand name catalogues, while gears are mostly custom made—even though there are several companies selling standard gears,” according to Dr. Joe Liou, senior scientist at ABB, Inc., USA, whose comments here are his own and not necessarily attributed to ABB USA.

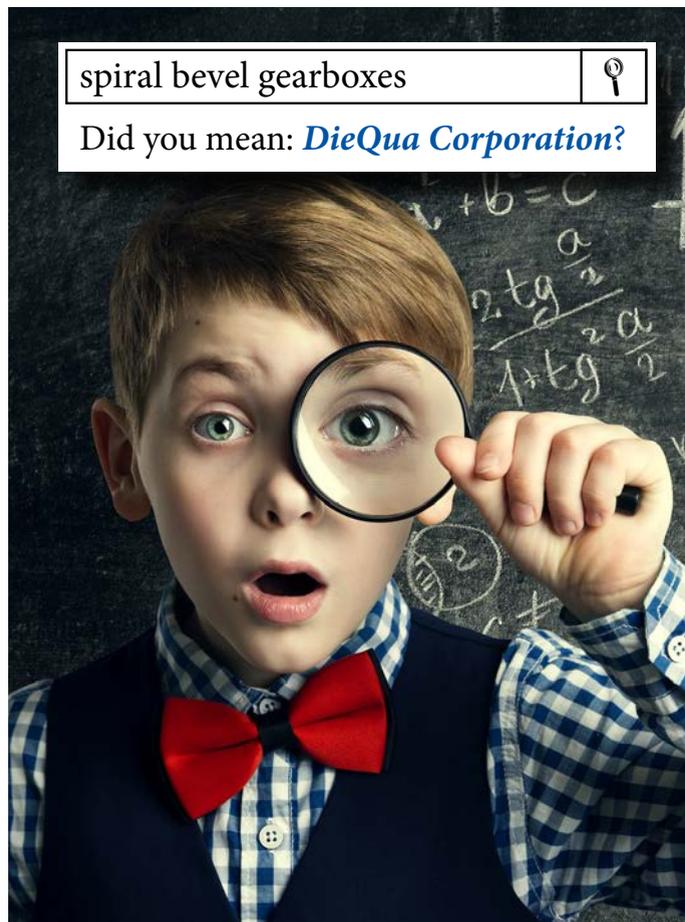
“Bearings are more prevalent than gears and perhaps other components because there is a much larger selection of standard bearings out in the market,” says Napoleon. “Bearing catalogs are full of standard bearings types and sizes. There are hundreds and hundreds of them. But there is the same number of standard gears out there. Bearings are often considered a commodity; it’s typically easier to replicate a commodity than a specialized product. The problem is that a bearing is not a commodity. There are many technical aspects of a bearing that can and will bite you if not attended to. That’s one of the reasons why the major suppliers are so

adamant about ridding the market of counterfeit.”

As for SKF’s Åström, “Bearings are not more counterfeited than other mechanical components,” she says. “All premium brands are being counterfeited. Unlike many other producers, SKF has taken a conscious decision to be open with the existence of counterfeits. SKF feels that it is our obligation to protect our customers by informing about the existence of counterfeits, the risks of using counterfeits and that the best way to safeguard authenticity is to buy from distributors authorized by SKF. We also provide free-of-charge verification support through the Authenticate app. This could possibly be perceived that bearings might be more counterfeited than other mechanical components, but that is likely not the case.”

What drives the continuing existence of counterfeit bearings? Why haven’t they been eradicated by now? Does the extreme competitiveness of the global economy compel some companies to cut corners by knowingly buying bogus bearings?

“No,” says Åström. “A bearing is a critical mechanical component in any machinery. The selection of bearing is based on the machine characteristics, e.g. temperatures, speeds and loads. There are many bearing manufacturers on the market, each listing load capacity, etc. of their products and the end user can decide which bearing manufacturer they shall buy from. (One) should instead compare counterfeit bearings with pharmaceuticals that would contain a medicine of uncertain origin or active ingredient(s) to treat an illness. In addition we do not see any price difference at end



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Destroying counterfeit bearings prevents them from entering the marketplace. Courtesy of SKF.

user level between counterfeit and genuine products. Less-serious distributors gain financially through knowingly buying counterfeit products and selling them to end-users with much higher margins.”

“I don’t think for a minute that legitimate OEMs are searching out counterfeit product to put into their equipment to gain competitive advantage,” says Napoleon, adding, “There is no gain for them. If they say that they use SKF or Timken bearings when they aren’t, and the product fails prematurely, they cannot go back to SKF and Timken and expect them to stand by a product they didn’t supply. If they are looking for a lower-cost bearing, then there are plenty of lower-cost suppliers out there to begin with, so there is no real benefit in my mind; it will come out in the wash anyway. Lastly, if the counterfeit supplier is actually a good bearing manufacturer and the product provides good service life, why then go knowingly down the path in an illegal means. Simply purchase the product under the real brand name and do business as it was intended to be done. I believe that in most cases there are brokers or unauthorized distributors involved in the counterfeit business, and the OEM is often not intentionally purchasing counterfeit product.

On those apparently rare occasions when injuries occurred due in part to bad bearings, who is ultimately liable? It would appear to be difficult to determine who holds the smoking gun.

Responds Liou: “Manufacturers, retailers and traders. For example, in this video—<http://abc13.com/news/>

federal-agents-raid-bearings-warehouse-in-sw-houston/192795, the warehouse is responsible for the physical harm.”

Napoleon, while stipulating that he “cannot answer this question from a legal liability standpoint,” says that “when a bearing fails, a manufacturer needs to trace that bearing back through the purchasing process to determine the plant of manufacture and the timeframe in which it was made. When they can’t track the bearing through the approved sales agents, a red flag goes up. Concurrently, engineering might start to evaluate the bearing failure and put significant time and energy into assessing the cause of the failure. All of this takes time and costs money. This is another reason why major brand name manufacturers want to crack down on counterfeit production. There is a significant cost associated with these efforts assessing product that is not their own. If it is proven that the product is not made by the brand name manufacturer and they have taken steps to protect their product integrity, then the responsibility falls back to those that sold the counterfeit product. But remember—the sellers are typically not legitimate businesses and they don’t have insurance and other means of protecting against catastrophic events. Very often the liability falls on the OEM. That is why OEMs typically have very detailed bearing qualification programs to protect themselves.

Åström states unequivocally that “It is the producer of a product that has liability. If the product is not made by SKF, SKF cannot be held liable. The end user should always contact their supplier.”

Some say that there are in fact “counterfeit” bearings out there that are as good as legitimate bearings. Which begs the question—at what point does “counterfeit” simply mean “cheaper than name brands?” Sort of like the lesser-priced, private label foods found at grocery stores everywhere—or getting an oil change at the neighborhood auto repair shop instead of at the pricey vehicle dealership.

For SKF’s Åström, “It sounds very odd! We have never seen those types of statements. We have seen it with luxury goods, but that is completely different. There are many manufacturers of bearings, and the price differs. Some bearings are even sold without brand. The customer should get what they paid for, and not a bearing with unpredictable quality “dressed up” to look like an SKF bearing. Premium manufacturers like SKF have invested heavily in their manufacturing processes to obtain a high and stable quality level.”

“Yes indeed there are counterfeits that are equal to or better than the brand name,” says Napoleon. “I was involved in a case identical to this; an OEM was being forced by their customer to prove the life of the bearing they had designed into the application. They solicited help from the brand name bearing manufacturer. Upon their evaluation of the product they noticed that the ball complement of the product that had their name on it was not consistent with what their plant manufactured. It was a counterfeit bearing. The OEM called me because the counterfeit bearing was already qualified, through testing, into the application and they wanted me to evaluate the counterfeit bearing against the brand name

bearing. The counterfeit bearing was equal to or better than the brand name—even though it had a different internal design. The reality of situations like this is that the manufacturer of the counterfeit bearing is actually taking the easy way out in order to make a sale. Their product was good enough to work in the application, but instead of selling themselves to the OEM on the merits of their own quality, it was easier to use illegal tactics to secure an order.”

Despite the in large part successful efforts of the majors like SKF, Timken, NSK, etc.—along with the support and assistance from trade groups like the WBA (World Bearing Association) and ABA (American Bearing Association)—in policing counterfeiters, it seems that the counterfeiters continue to survive—if not thrive. Is dealing with the ongoing production of counterfeit bearings now simply an accepted cost of doing business?

“It’s certainly a cost for doing business,” Napoleon affirms. “They don’t like doing it, but it is less costly than the engineering time to evaluate product that might not be theirs and legal fees to fight liability cases that have pulled them into a fight that could jeopardize their brand name. It’s a terrible cost to do business, but a proactive approach is typically more cost-effective than the reactive alternative of defending the brand.”

Says Åström: “Yes, it is true that SKF and some others are very actively supporting law enforcement in their efforts to go after counterfeiters. Counterfeiting of premium products has always existed, and will continue to exist as long as there

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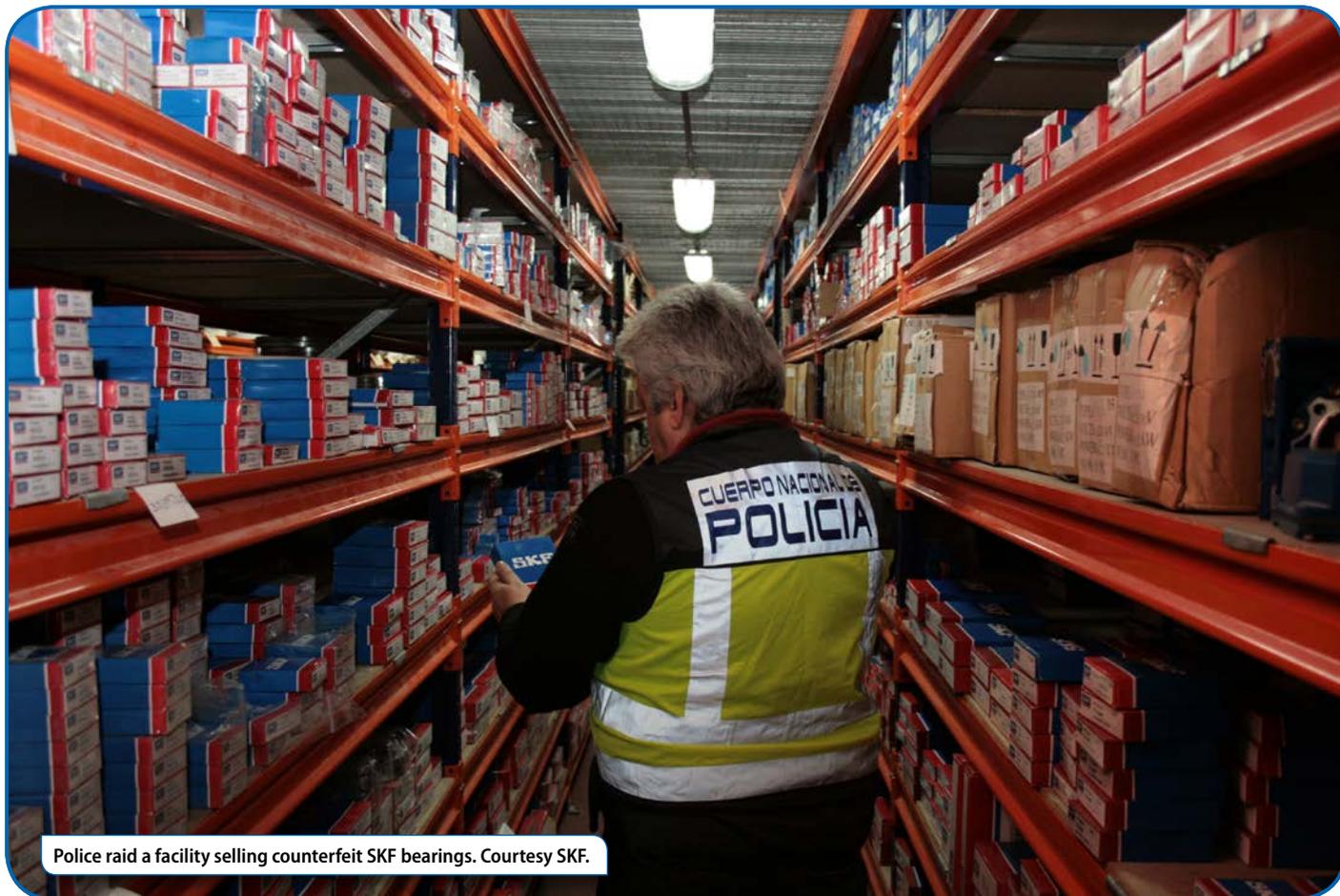
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Police raid a facility selling counterfeit SKF bearings. Courtesy SKF.

is a possible market. That is why SKF is working actively to reach out to customers to make them aware of the counterfeiting situation. We see a large decrease in the amount of counterfeit in geographies where end-users have been made aware (to understand) the importance of selecting reliable suppliers and/or use the SKF Authenticate app to validate their purchases. In Europe it has decreased considerably, compared to 4–5 years ago, and in other markets we see a dramatic effect after law enforcement actions combined with media exposure.

The shipping industry (sea, air, rail, truck) is a major component of any business in the world market. While it might be unfair to consider, is there anything that shipping companies could do to help deter counterfeit bearings?

“Shipping companies should take a stronger responsibility for what they are actually carrying,” says Åström. “They should blacklist logistic companies and forwarders that have been caught transporting counterfeits. That would push back the responsibility to the forwarder to assure what they are transporting. Customs authorities also play an important role.”

Liou, on the other hand, believes it is “difficult for shipping companies to determine if their customers are shipping counterfeit bearings.”

And what of deterrents? And who is responsible for devising and enforcing them? The answer may include a bit of a surprise in that China has been very aggressive in policing counterfeiters.

“(Policing) varies between country to country, but generally not (sufficiently),” says Åström. “Chinese authorities are taking the matter very seriously and have convicted many people to long prison sentences, while in Europe, for example, the conviction rate is rather low in combination with low penalties. Generally we do not think that stiff penalties will improve the situation. As end-customers (become victims of fraud), the most effective (policy) is to make them aware of how they may best avoid counterfeiting and/or to validate their purchases free-of-charge using the SKF Authenticate app.

With all of the sophisticated tools available today, why aren’t companies’ quality control efforts having sufficient success in identifying them?

“Counterfeits are very difficult to identify and require trained experts,” Astrom says. “Especially (given the fact that) the counterfeit packaging very much resembles genuine packaging and hence the problem is not likely to be detected until a mounting occasion where (counterfeits) might result in mounting problems. However, it might not. And so the counterfeit bearing is mounted into the machinery. As already stated, end-users should select their suppliers carefully and check www.skf.com to see if a distributor is authorized.”

“Assuming that ‘companies’ are OEMs who are purchasing bearings, OEMs are not bearing specialists or bearing designers,” Napoleon points out. “They don’t know what to look for and inspect to know if a bearing is good or bad—let alone know whether it’s a counterfeit bearing or not. That’s not the

area of expertise of an OEM. In large part, only the aerospace industry owns the design rights to a bearing that they use. The industrial industry typically allows the bearing manufacturer to design the correct bearing for the application, but that information is not always passed on to the OEM. That is why it is so important for an OEM to have third-party or independent inspection and testing performed while qualifying a bearing supplier. (In this way) the OEM knows what makes a bearing work in the application and can empower them so that they can perform audits of the product they are purchasing to know that it is still the same source. This auditing is both on the technical aspects of the bearing but also on the commercial side of product distribution and to ensure that no one is illegally penetrating the supply chain.”

At the end of the day it seems that counterfeiters’ expertly executed packaging rip-offs of major bearing suppliers are central to their continued existence.

“Yes — the (counterfeit) packaging has a very high degree of (resemblance) to genuine packaging,” says Åström. “This is where many counterfeiters ‘invest’ to create a superior impression, (thus avoiding) that the buyer will suspect that it is counterfeit. However, good looking packaging does not make up for the unpredictable content inside the package.”

Napoleon believes that “The greatest enticement is making money the easy way, although they put a lot of effort into making the bearing and the packaging nearly identical. But that effort is still easier than creating brand recognition. That is the fundamental issue behind any counterfeit issue. Brand recognition requires intense effort and a long time to create within a regional market — let alone a global market. SKF has been in business for over 100 years. The counterfeit producer is trying to make a quick buck without the effort and cost of 100-plus years of effort on all fronts— product development, application experience and expertise and, obviously, marketing. The counterfeit organizations are cutting that time and expense out of their business model, so any cost associated with creating an identical product — right down to the packaging — is worth the effort and results in a payoff at the expense of the brand name manufacturer who has worked for a century at creating brand awareness. **PTE**

For more information

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The Latest Clutch & Brake Technology Looks at Reliability, Cost and Design Specifications

Matthew Jaster, Senior Editor

In order to specify a clutch or brake for any industrial application, you start by making inquiries like a hardboiled detective. The job is all about asking the right questions. Is the brake or clutch smart? Is it suitable for the application? Will the component provide the longevity and durability the end customer is looking for? How will it run under certain environments or operating conditions? *PTE* has talked to some of the key clutch/brake providers to see what products and technologies are in demand as we enter the next phase of smart manufacturing.

Warner Electric

EXAMINES THE COST OF PRECISION

With many industries embracing the latest technology such as the Internet of Things (IoT) or Industry 4.0, it can be easy to overlook some of the simpler and more cost-effective solutions. For packaging and labelling, maintaining both precision and product positioning is extremely important for high quality results and does not necessarily require the latest in servomotor design.



Solenoid activated wrap spring clutches are much simpler to repair or replace, and the process can be completed with minimal downtime.

The inevitable march of progress brings with it many innovations and solutions that save time and energy. However, adopting new technology at face value may not always be the most cost-effective solution. One good example is the introduction of servomotors and variable speed drives into assembly and packaging lines; while certain applications will benefit, others are better suited to a simpler approach.

Keep it simple

Wrap spring clutches and brakes offer a simple and effective means of providing accurate, non-accumulative error indexing and positioning. Furthermore, for their physical size, wrap spring clutches can transmit considerable amounts of static torque.

The most common applications involve multiple starts and stops within a single revolution: such as printing presses, postage machines, conveyors and packaging machines. Operating continuously, these machines rely on the product position being exactly the same week after week, without the need for compensating actions or adjustments.

By working closely with a manufacturer it is possible to determine the most suitable dimensions and configuration for the wrap spring clutch; thus creating a solution that will deliver not only accuracy and repeatability, but also reliability and



For packaging and labelling, maintaining both precision and product positioning is extremely important for high quality results.

lower running costs. However, they are not a panacea and each application should be carefully assessed to ensure the most effective operation.

Think it through

Original equipment manufacturers (OEMs) and end users can all benefit from making the most appropriate choices when it comes to building and installing a new commercial processing machine. The initial costs of technology using the latest innovations are much higher and will directly affect the price point of the new equipment. In contrast, given the right operational parameters, a more simplistic approach can deliver significant cost savings as well as a far less complicated maintenance routine.

In addition, once the machine has been installed, the customer will be responsible for carrying out any repairs. Repairs to servo motors and their drive systems require highly skilled maintenance staff and replacement parts can be quite costly. In contrast, solenoid activated wrap spring clutches are much simpler to repair or replace, and the process can be completed with minimal downtime. In these circumstances, the maintenance costs associated with simple technology are a fraction of those attributed to the latest

Mach III

RETURNS TO ROOTS WITH NEW MINIATURE LINE



Industries such as packaging and labelling are cost-conscious and as such require the equipment that they use to be cost-effective and reliable with minimal running costs.

drives and their associated controls.

Assessing the application

Processing systems that have a high cycle rate, above 10 per minute for instance, will satisfy the first step of the assessment process. From this point it is necessary to analyse the load inertias and speeds as well as identifying potential sources of friction that will affect cycle rates and repeatability.

At this stage OEMs and end users can benefit from the expert advice that is available from Warner Electric, which is part of the Altra Industrial Motion Corporation. From individual components to complete processing lines, Warner's technical support team can offer experienced advice on the best solution in terms of reliability and cost effectiveness.

Industries such as packaging and labelling are cost-conscious and as such require the equipment that they use to be cost-effective and reliable with minimal running costs. By assessing each component within a process it is possible to determine the most suitable design and integrate it into the finished product.

For more information:

Warner Electric (Altra Industrial Motion)
Phone: (800) 825-6544
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Mach III has added 10 new miniature products. The additions include: a spring engaged brake, an air engaged brake, five air engaged clutch configurations, and three mechanical torque limiters. The products are reminiscent of the tiny torque limiters that Mach III's founder, Raleigh Becknell, assembled at his kitchen table with the assistance of his wife back in the 1960's.

According to Ron Ashbrook, Application and Design Director, the development of these smaller sized products was driven by client demand. "Over the past couple of years we've had many inquiries from machine designers for products with half inch and smaller shafts and light torque capacities. In some cases, these were new machine designs. In others, the



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Partnering with QualityReducer to provide Gearbox repair, rebuilding and reverse-engineering.

engineers were seeking replacements for products that performed poorly, became too costly, or had inordinately long lead times.” After developing a number of custom designs for these clients, it made sense to expand the Mach III catalog line to include these smaller sizes.

General Specifications:

- Imperial shaft sizes from 0.3125 (5/16) to 0.500 (1/2) Inch
- Metric shaft sizes from 7 to 12 mm
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- Outside diameters between 2.58 and 3.28 Inches
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Full specs and 3D models can be found at the website below.

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Mayr

BRAKES INCLUDE MODULES FOR INTELLIGENT MONITORING AND CONTROLLING

Monitoring modules of the latest generation, a technologically leading friction system and consistently-observed safety principles—safety brakes by Mayr Power Transmission are equipped for the challenges of the Industry 4.0. The complete system increases the productivity of machines and systems through predictive error detection and maintenance. Mayr’s

Brake Technology 4.0 stands for intelligent monitoring modules including the ROBA-brake-checker and the ROBA-torqcontrol monitor.

Permanent brake monitoring and predictive maintenance

The ROBA-brake-checker module operates without sensors. Instead, it analyzes current and voltage and recognizes the movement of the armature disk. Thus it knows the condition of the brake. In addition to the switching condition, the module can also deduce the temperature, wear and tension path or tensile force reserve, i.e. whether the magnet still has sufficient force to attract the armature disk. Using the new module, a significantly larger number of processes can be depicted during the monitoring of the safety brakes. On reaching the tensile force reserve, the ROBA-brake-checker emits a warning signal, early enough so that a defined operating time of the brake is still possible. Within this time, the machine operator can undertake specific maintenance in coordination with their work process—maintenance with foresight, so to speak. The

ROBA-brake-checker is now available in a design for AC voltage. In addition, another version of the module will also in future take on the supply of the brake, and as a result, replace the rectifier. Switching condition monitoring and brake control are therefore combined in one device.

Braking movements gently and in a controlled manner

For applications, which require braking torque control in addition to status monitoring, Mayr Power Transmission provides the braking torque control module ROBA-torqcontrol. It shares the features of the ROBA-brake-checker and can also change the level of the braking torque in operation through purposeful influencing of current and voltage. As a result, devices and machines can be evenly and gently decelerated. The ROBA-torqcontrol module permits the development of control loops and brakes movements intelligently—the ideal basis for its use is in smart, interconnected machines.



The brake control module ROBA-SBCplus performs reliable switching time monitoring.

Nexen

OFFERS PROFILE GUIDE RAIL BRAKES IN ADDITIONAL SIZES

Nexen Group, Inc. Profile Guide Rail Brakes are now available in a wider range of sizes: 15 mm to 65 mm, and are fully compatible with an even wider range of guide rail manufacturers including: THK, NSK, IKO, HIWIN, INA, SKF, Star, Bosch, Accu Tech and Schneeberger. As a result, they provide great first fit and ideal redundancy in a wide range of OEM and after market applications. Profile Guide Rail Brakes provide fast engagement at 0.049 to 0.080 seconds, high static holding force to 2,600 N (585 lbs) and can be combined to provide higher holding forces as needed. They also offer maintenance-free operation.

“Nexen rail brakes are a versatile solution that can be easily retro-fitted in the field, as well as designed into original equipment,” says Hank Schilling, motion control product manager, “and with brake body geometry that perfectly matches the guide rail bearings, coupled with an adjustable shoe gap, Profile Guide Rail Brakes are quick and easy to install.”

The Nexen Rail Brake design offers low backlash, accurate positioning, and reliability. They are suitable for



holding a load in position while failed reducers or motors are replaced. They also allow for the use of smaller drive systems because the brakes position and hold a load that might otherwise over power the drive system. The Rail Brakes clamp onto the center of profile guide rails to provide positive braking and holding in all axes without touching the bearing surface of the rail. **PTE**

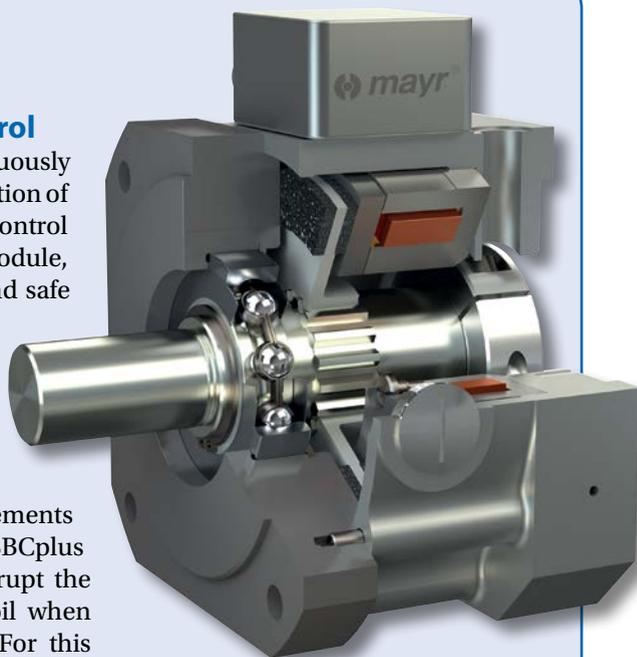
For more information:

Nexen Group, Inc.
Phone: (800) 843-7445
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Reliable brake control

Another module to continuously monitor the switching condition of the brakes is the safe brake control ROBA-SBCplus. In this module, Mayr offers safety brakes and safe brake control in a complete package. This module has been developed in collaboration with the company Pilz, especially for applications which have to fulfil safety requirements for workers. The ROBA-SBCplus module must reliably interrupt the current in the magnetic coil when the brake is switched off. For this purpose, the module operates with wear-free electronic semi-conductors, and as a result achieves practically unlimited switching frequency and switching reliability. This brake control module performs reliable switching time monitoring.

Furthermore, an integrated plausibility check is conducted through the evaluation of the release monitoring signals. The evaluations of the switching states and the return



Mayr Power Transmission is already offering safety brakes equipped for the challenges of the future.

signal therefore permit reliable error diagnostics. This permits creep errors—which influence switching times—to be detected faster and more efficiently.

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Warner Electric

SORTS OUT TORQUE REQUIREMENTS FOR BUCKET CONVEYOR

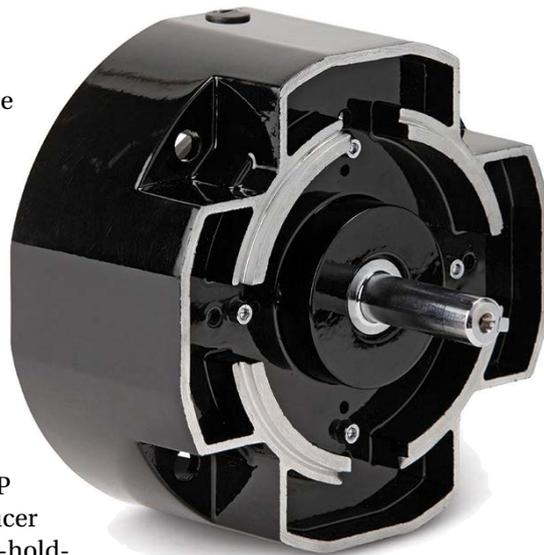
A conveyor OEM was looking for a reliable braking solution for a bucket conveyor unit being built for a West Coast dry food manufacturer. Bucket conveyors feature a chain drive containing a series of buckets that pick up material on one side, transport it vertically, and deposit it at another level. Therefore, all of the load is on the ascending side of the system, creating an inherently unbalanced load. As a result, designers typically include backstops to prevent back driving in case of a power loss to the drivetrain. However, some systems need to be able to address material build up or, as in this case, to remove and clean the buckets for sanitation purposes.

In an empty system as buckets are removed, an unbalance is eventually created on the descending side of the system, which could allow the conveyor to accelerate in the direction of drive. Since the backstop freewheels in the direction of drive, it cannot restrain the forward moving drive. Therefore,

a brake is needed to hold the system safely in the direction of drive during the cleaning process.

Working closely with the OEM, Warner Electric engineers defined the correct amount of torque needed for the application. They determined that an EM210/ERS 68 spring set/electrically released brake could be located between the 5 HP 215TC frame motor and reducer that would exceed the load-holding requirement. By positioning the brake on the input side of the reducer, the ratio of the gearbox multiplies the brake force, allowing for a smaller and simpler brake than would be needed if the unit were mounted on the slow-speed side of the gearbox.

The brake is powered (disengaged) when the motor is on and engaged whenever the motor is off and the power is turned off at the brake. This



functionality allows the operators to jog the system forward to access and remove buckets in a safe manner. **PTE**

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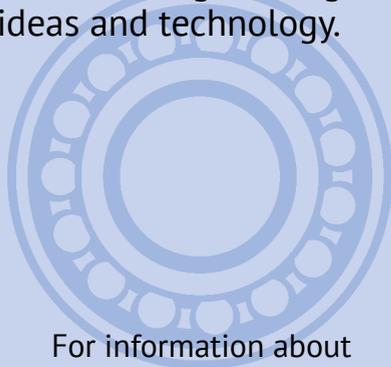
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Stober Survey

Examines Manufacturing Infrastructure Updates

Matthew Jaster, Senior Editor

Updating your shop floor with new equipment and personnel is standard trade magazine fodder today—and for obvious reasons.

Any feasible upgrades can make a significant impact on a company's bottom line. So you'll find an article or two (or three or four) in our industry that will examine the importance of investing and upgrading in your personnel and your machines.

Stober, a company specializing in motion control and power transmission, recently published the following article to help plant managers determine if a manufacturing infrastructure update is necessary. Following the article, there's a Q&A with Scott Alles, manufacturing manager and Landon Garrison, manufacturing engineer at Stober.

Does Your Manufacturing Infrastructure Need an Update?

Some original equipment manufacturers in the U.S. may be operating with machinery and processes that can be as old as 50 to 70 years old. And with the surge in improved manufacturing technology, gauging and machining over the past 30 years, factory managers should conduct a manufacturing infrastructure update every 10 to 15 years, says Scott Alles, manufacturing manager at Stober Drives, Inc. in Maysville, Ky.

The average impact of unscheduled downtime in the process industries alone is \$20 billion, or almost five percent of annual production, making minimizing unscheduled downtime attributable to automation one of the best ways for industrial organizations to improve their return on (automation) assets (ROA), says Craig Resnick, vice president of ARC Advisory Group of Boston, a leading technology research and advisory firm for industry, infrastructure and cities.

"Manufacturers often keep old equipment operating by buying spare parts off eBay," says Resnick. "They are looking to justify a reason to upgrade and replace aging equipment, but they need a measurable return on investment to get funding approved for upgrading."

So how can a plant manager tell if his or her factory floor needs a manufacturing infrastructure update? Alles has created a five-question survey to help you decide.

1. When was the last time your manufacturing infrastructure was upgraded?

There are more than 250,000 firms in the U.S. manufacturing sector, and the vast majority are considered small, with less than 500 employees, according to the U.S. Census Bureau. In fact, about three-quarters of those firms have fewer than 20 employees. When you're busy meeting deadlines every day to make products for customers, it can be difficult to consider your infrastructure, Alles says.

"Just new lights and climate control

alone, with an HVAC upgrade, can boost employee productivity and morale," says Alles. "About three years ago, we were experiencing errors between the shop floor and the lab, especially during Kentucky's hot, humid summers. It was a constant struggle to have workers turn out what they thought was an excellent product, but inspectors were telling us the products were wrong-- especially when you run a tight tolerance to the micron level. We found that a relatively simple fix such as new lights and investing in climate control with HVAC reduced rejected parts and created a better working environment for employees. This has not only boosted employee productivity and morale, but also reduced gauge correlation errors. And the climate control helped tremendously with the humidity."

2. Are your employees cross-trained to run machines on the factory floor?

Cross-training can be a big asset in increasing productivity, says Alles. Team leaders should be able to step in and run a machine if a worker is sick





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or on vacation. At Stober, for example, 50 percent of employees can run more than one machine.

“Another key to increasing productivity is an apprenticeship program,” says Alles. “Our apprenticeship program allows us to build a

talent pool. Normally when we hire a new employee, it takes six to nine months for him or her to be able to run a machine alone. But recently an apprentice-turned-fulltime-employee was able to begin operating a machine by himself within four weeks. Then he

went on third shift, where employees tend to have less technical support than during the day. It’s been a win-win for him and Stober.”

Over the next decade, nearly 3.5 million manufacturing jobs will likely be needed in the U.S., yet two million may go unfilled due to a skills gap. Additionally, 80 percent of manufacturers report a moderate or serious shortage of qualified applicants for skilled and highly-skilled production positions, according to Deloitte and the Manufacturing Institute.

“We need to get more young workers trained for these jobs,” says Alles, “and they need to be motivated and eager to work.”

3 Are employees being used efficiently on the factory floor?

The technology explosion over the past few decades has made manufacturing leaner, with fewer employees performing more sophisticated tasks. “Having an operator standing at a machine programming for two or three hours is not



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efficient,” says Alles. “New CAD-CAM software can allow programming to be done while a machine is running. This can produce hours of work and keep productivity levels high.”

4 How would you rate your machinery’s accuracy and repeatability?

How accurate is your machinery? Does it hold tolerances? If it doesn’t, it may be time to look at new solutions. “With many manufacturing processes, components tend to wear down over time. Gearing, for example, is an important, never-ending need,” says Alles. “We perform capability studies for our customers on our equipment to make sure our machines and processes produce products that meet their accuracy needs.”

Stober not only manufactures many of its own parts, but also serves customers in the manufacturing world. Its new PS Two Speed gearbox was created to improve productivity and efficiency in machine tools. “The gearbox has the ability to create both high speed and high torque, which is ideal for lathes, turning centers and machining centers,” says Alles.

5 How would you rate your machinery’s flexibility? Can you optimize its setup time?

Manufacturers often need flexible people and machinery in order to meet customer demands. “Flexibility is crucial to Stober’s survival because we have a very short shipping time, which differentiates us from the competition,” says Alles. “Like many manufacturers, we bend over backwards to help customers. Stober has three manufacturing shifts, with two shifts focusing on dedicated processed and orders while the first shift focuses on being flexible to quickly turn around parts for customer orders.”

(Survey scoring: If you are satisfied with your answers for 4 to 5 questions: Congratulations! Your factory likely incorporates 21st century infrastructure technology and practices; 2-3: Your company is coping, but may need guidance to increase productivity by upgrading infrastructure; or 0-2: Talk

to upper management and schedule an infrastructure assessment for your factory today.)

Alles says factory managers who need additional resources on improving their manufacturing infrastructure can contact the Association for Manufacturing Excellence or visit the Stober website to see its solutions for the machine tool industry.

The U.S. faces a skills shortage over the next 10 years and skilled craftsmen, technicians, designers, planners,

researchers, engineers and managers will be in high demand, says Alles.

“If we’re going to compete with other manufacturers for employees in the coming years, Stober aims to offer workers a technologically-efficient workplace, good wages and benefits, and make products both our workers and customers can be proud of. Anything less is not the Stober way.”

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Q&A with Power Transmission Engineering

PTE: Besides taking this survey, what other signs or hints may suggest a company is in need of a serious infrastructure upgrade?

ALLES: Whenever you have a situation where there is excessive downtime, quality issues, or employee problems with high turnover or low morale, these



could be indicators that something is wrong on the factory floor.

PTE: How can small organizations compete with larger companies that have more employees, more machines and more skilled talent?

ALLES: Organizations of every size have problems. Small organizations have some advantages over larger companies in the marketplace, especially with flexibility, faster response

to customer needs and lower costs due to overhead.

PTE: Why is it so important to get involved with organizations like AME when improving your manufacturing infrastructure?

GARRISON: Organizations like AME allow you the opportunity to benchmark other companies and learn from their experiences. Experience from others can be invaluable on saving time and money. You can also potentially meet all of the key players when joining a group and networking.

PTE: What other organizations would benefit manufacturers in mechanical power transmission?

ALLES: Organizations like Society of Manufacturing Engineers (SME), LEAN Consortium and local roundtable events can also benefit manufacturers in mechanical power transmission.

PTE: What are some small, cost-effective solutions to consider if an organization can't afford an expensive infrastructure update?

ALLES: Have a local college—or other group—come in and evaluate the efficiency of your plant. Many groups will come and do a free



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evaluation. If cost-effective, you can update equipment versus buying equipment new.

PTE: What are the most efficient and productive ways to cross-train employees on new equipment on the shop floor?

GARRISON: We attempt to bargain up front for training credits for at least three people. If we can train three people who are able to operate/setup the machine, we have proven that we will be successful. Stober also uses offline training through a Learning Management System. Employees will perform prep work before the machine is delivered. We make every effort possible to be prepared to utilize the trainer's time efficiently.



PTE: Do you have suggestions for getting younger, motivated workers interested in these skilled positions on the shop floor? What can organizations do to attract future talent for these manufacturing positions?

ALLES: Stober is involved in the local community and the school systems to offer tours, participate in "Career Craze," and many other community

events to open our doors to the public. Management and engineers are members of the advisory board for an area technology school and our local university. Stober also offers pre-apprenticeships and apprenticeship opportunities within the organization. We also participate in the Kentucky Tech Ready Apprentices for Careers in Kentucky (TRACK) youth pre-apprenticeship program, which provides secondary students with career pathway opportunities into registered apprenticeship programs.

PTE: How can software, IIoT solutions and digital manufacturing tools be incorporated into a shop floor in 2017 and what are some of the benefits of this implementation?

GARRISON: Machine monitoring software and CAD/CAM offer great solutions to helping factory floors become more efficient. Machine monitoring software offers real-time productivity measurements, monitors downtimes to help justify new equipment and PM schedules, and monitors power usage and machine alarms. CAD/CAM offers flexibility so operators can operate the machine while a program is created offline; the goal is to increase spindle time. We do something similar with our *Zeiss Computerized Maintenance Management (CMM)* software. Programs can be created using a 3D model while the part is being manufactured; this helps cut at least 20 to 30 minutes off creating the CMM program.

PTE: How will manufacturing companies become more flexible and faster in the future?

ALLES: Offline programming is beneficial, but it's also important to have the ability to program at the machine. Cross training to cover absenteeism and keep employees engaged is also important. We'll also need flexible Enterprise Resource Planning (ERP) systems for scheduling. If it's feasible, build capacity into your planning. Ideally, you'd like to load your machines into two shifts to allow for downtime and influxes in the market.

PTE: How can organizations start getting to that point today? What tools will be necessary moving forward?

ALLES: All organizations will be different, but performing a gap analysis allows you to develop a plan that meets your financial and customer needs. Also, attend trade shows to learn about new tools and equipment. **PTE**

For more information:

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Where We Stand

The automotive industry is on the precipice of a shift. Here's what the future looks like and what you need to know to prepare for it.

Alex Cannella, Associate Editor

It's been the hot topic on everybody's lips for a few years, but we need to sit down and talk about electrification. At this point, nobody's questioning that the electric automobile is here to stay and will only be gaining relevancy as time goes on. The only questions are when will they gain traction and when will we have to start paying attention to this new sector of the market? The answer is sooner than you might expect. Namely, now.

Where We're At

At the commercial level, it doesn't look like electrified cars are really taking over the market. Sure, Teslas are in vogue and hybrid cars are increasingly common, but your average commuter's still probably using a vehicle with a standard internal combustion engine (ICE). From their point of view, the shift to electrification is a glacial one we're only in the very earliest stages of.

Look underneath the surface at the manufacturing sector, however, and you see a very different story. The industry shift has already begun at its roots, with manufacturers developing new disruptive programs and even restructuring their organization. New engineering departments focused on designing and testing e-drives are popping up.

"I think the sales figures show a relatively slow adoption of electric and hybrid vehicles in terms of total market volumes," Simon Shepherd, head of electrified power trains at Drive System Design Ltd., said. "But electrification is getting a lot of focus in the media and is really gathering momentum. Manufacturers are seeing it as an important, strategic thing to be involved with. And so whilst the actual growth of the vehicles we see on the road is fairly modest at the moment, the response in the industry is changing very rapidly."

"We have an interesting insight into advanced and new product programs within our customers," Jon Brentnall, president of Drive System Design Inc., added. "So on a day to day basis, we see the development of product that is typically two to four years out before it's going to hit the market. The majority of the automotive work we now do has a form of electrification associated with it in one way or another."

To the outsider, all the shuffling around in these organizations might paint the picture that they're preparing for an inevitable proliferation of electric automobiles in the future, but the reality is that the future is already here. The transformation is happening now, and if you haven't started thinking about how you're going to cater to this growing segment of the automotive market, you've already fallen behind. If you don't have a plan, it's time to make one, because people are already jockeying for a slice of that market.

This holds true across all segments related to automotive



Internal combustion engines aren't about to go extinct, but electrified cars are gaining momentum in the manufacturing sector.

transmissions; motors, drives, even gearing.

"It's inevitable because it's a reality today..." Dennis Beauchesne, general manager of ECM USA, said. "We haven't seen a big buy-in of the existing companies from a total electrification standpoint, but certainly from a hybrid standpoint, there are more companies signing on from that and doing work in those areas for hybridization programs for those vehicles. We've also seen a number of transmission manufacturers, tier two manufacturers that are helping that effort and providing electric drives, electric transmissions for those vehicles."

The universal point, no matter what industry you're in, is that if you have a hand in the automotive industry, it's time to stop speculating from the sidelines about what will happen with electric cars and to start planning for their arrival. The industry is already crowded with companies trying to stake out their slice of the newest, freshest pie, and the best time to get in and get your own is before things settle.

"If an automotive OEM currently chooses to outsource an e-drive, we've noticed that an awful lot of players will put their hand up for that business," Brentnall said. "And the leaders, as it were, the people who want to be the tier ones, are a mixture of original driveline tier ones that were more used to being a mechanical player, and then the traditional

e-machine and inverter suppliers who might also put their hand up. And then amongst themselves, they have to start feeding off one another to get a complete solution....What we suspect is that this multitude of players within the market right now will start to settle down and to potentially look to conglomerate over the next five or ten years.”

Where We're Going

So the future's here. The train tracks the industry's probably going to run on for the next decade are already being thrown down. Where do they lead?

First, before this all becomes too alarmist, electrified cars aren't going to take over the market overnight. Not pursuing electrification today might put you behind the curve, but it's not a death sentence. There's still life left in the internal combustion engine. There's no guarantee that they'll ever become completely obsolete, or even that electrification will be a new golden egg for the industry, but right now, the long arc of the market is trending towards electrification with no clear signs that it's going to change course. So the future, most likely, is going to see at least a reduction in ICE vehicles and an increase in electrified and especially hybrid cars.

The gear manufacturing industry in particular might look like it has a lot to fear from this ongoing market shift. After all, transmissions are the main component the automotive industry uses gears in, and electrified and even hybrid cars need fewer of them. But even fully electrified cars will require some form of gearing, even if they don't necessarily require as many gears per transmission system. The future isn't set in stone, but there are very few nightmare scenarios that see the gear industry become divorced wholesale from automotives. Even in the event that we one day see a 100 percent saturation of electric vehicles in the market, gears will still be relevant, if perhaps having a diminished role. Gear manufacturers don't have to worry about complete obsolescence, but there is concern about the industry shrinking.

But for every expert you find that's warning of a potential



Every component of the drive train from motor controls to gearing is going to be affected by the shift to electrification.

industry crunch, another will point out that even if the number of gears required per transmission goes down, a rise in overall demand over time would counteract the trend and theoretically keep the industry level.

There's obviously no one who can perfectly predict how the industry will shake out, but even if that industry shrinks, there will still be room for some players. The question you need to answer is which market do you want to try and be a player in: electrified, ICE or both?

If you want to be able to compete in the electrified market, then it's time to buckle down and start looking at how you're going to accomplish that. If you want to keep providing to the internal combustion engine market, you need to look at how you're going to survive a hypothetical industry crunch.

On the adaptation front, there are a few trends in what manufacturers are doing right now as they shift to developing electrified drive trains. For one, they're starting to take components that have typically been their own individual systems in a drivetrain and merging them into a single component. Putting a gearbox and a motor controller into the same casing, for example.

“More and more of those systems are becoming one or within one casing,” Shepherd said. “So the engineering is being brought together to condense those components into one complete product.”

If you're looking to stick to your guns, however, Beauchesne believes that the best path to survival in the ICE market is to focus on quality.

“The numbers will be smaller, but the quality will be necessary to be higher, so the manufacturers that are able to produce quality gears will be still able to survive; it's just a matter of volume,” Beauchesne said.

The exact timeline of when we're going to get there, however, is a bit less clear. As Brentnall noted earlier, we'll probably start seeing a lot of companies' current inaugural projects start hitting the market in two to four years, but that doesn't mean electrification is going to be reaching ubiquity in that time, and nobody's got a crystal ball to predict exactly when and how quickly that shift is going to happen. Most outlooks, however, predict that the slow march of progress will be picking up speed in about 10-15 years.

How to Get There

It might sound overly optimistic to start worrying about what's going to happen in 2030 when there are bills to be paid today, but if/when the electric car singularity does eventually come, it'll already be too late to jump onboard, because you're going to have to do some homework before you can get your own slice of the market.

In order to compete in this arena, a lot of manufacturers are realizing that what they're doing today isn't going to cut it. They're going to have to nurture entirely new competencies in their organizations, either through hiring or education, to provide an appealing product in this new market.

“[Manufacturers are] having to reskill and not just learn skills that are part of other industries, but work out how they apply to vehicles and passenger cars, developing new ways of doing things,” Shepherd said. “And new standards, new

norms are still being established.”

So what do you need to learn?

Efficiency is a key concern, and you'll have to know how to keep both electromagnetic and mechanical losses low. A firm knowledge of the finer points of electromagnetics in general is necessary, and being able to predict excitation forces is important.

Most important to have, however, is an understanding of how to integrate all the individual components and, more importantly, the varying disciplines required to make them, together. Knowledge of how the entire assembly goes together is paramount, and that includes learning how a battery figures into the assembly along with any effects that might have on the drivetrain as a whole. But just as important is understanding how and why each discipline, from gear manufacturing to battery design, works the way it does.

Even beyond individual competencies, you're going to have to wrap your head around an entirely new system of development. That means learning new testing cycles. Adapting to different safety legislations and standards that are still developing and may change in the future. Even figuring out a new development program. One of the largest challenges Shepherd and Brentnall cited was that while ICE development has a generally understood and well-practiced development cycle, best practices for electric drivetrains are still being established.

“It's rare for an OEM to develop a brand new vehicle with



ECM's Nano line is the company's leading gas quench furnace which can help you acquire the quality required to make gears that will succeed in an electrified automobile.

a brand new internal combustion engine and a brand new transmission simultaneously,” Brentnall said. “There's just too much risk in that program to hit a launch date. So typically, you pick one and you develop that new element and then introduce it into an existing vehicle, perhaps with an existing engine, and then marry it to a brand new transmission. That's pretty palatable.”

Getting into electrical drivetrains, however, requires an OEM to develop all of that simultaneously — the engine, the



If you're looking to develop products for electric automobiles, you'll have plenty to learn along the way.

mechanical drive, the battery, the oil system — they all have to come together into a cohesive whole. And manufacturers and suppliers need to at least understand enough about that whole to figure out how to get their products to fit inside it.

For gears specifically, the main focus is on making the gearing quieter. Without the hum of a combustion engine, the gears become the noisiest part of a car, and thus finding ways to make a gear run more quietly is a top priority. That means reducing distortion as much as possible, which according to Beauchesne, in turn means higher quality machining and different, better materials that are higher in hardenability and easier to quench. In short, to keep on the way that gears have already been going. This is particularly helpful for ECM, Beauchesne's company, which specializes in top-of-the-line gear quenching. Often, in order for a gear to reach the level of quality needed to reduce noise, such materials are a must for the quenching process to be effective.

This isn't a comprehensive list of all the things you'll need to learn or challenges you might face if you're thinking about designing for electrified cars, but it's a good one for establishing the scope of the project you might potentially embark on and the kind of pitfalls to consider.

And it's certainly worth putting some thought into over the next few months. Electrified cars might not be on the road yet, but the shift is already happening where it matters to us: the factories. And it's gaining momentum. For those still on the sidelines, it's time to start figuring out what to do about it. It doesn't matter if you go all in on electrification or keep providing

for internal combustion engines. What matters is that you have a gameplan on how you're going to do it. **PTE**

For more information:

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www.drivesystemdesign.com/us

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CTI Symposium USA Examines North American Transmission Market Strategies

Matthew Jaster, Senior Editor

This event, organized by the German Car Training Institute (CTI), focuses on the latest technical innovations in automotive transmissions, hybrid and alternative drivetrains with experts and suppliers from the United States, Asia and Europe. The symposium—taking place May 14–17 in Novi, Michigan—will examine current debates on economics, politics and the environment.

Topics will be examined from the perspective of technology, customers and the context of market success. Keynote speakers include Dan Nicholson, vice president, global propulsion systems, General Motors, USA, Dr. V. Anand Sankaran, director, electrified powertrain engineering, Ford Motor Company, Dr. Johannes-Joerg Rueger, executive vice president, Robert Bosch GmbH and more.

The automotive industry currently has a wide range of challenges to master. With electrification, automation and digitalization all increasing the technical complexity of automobiles, it's becoming more and more important for the various research fields involved to mesh.

Looking at Connectivity

As drives become more electrified, automotive transmissions are increasingly joining a networked system that extends out beyond the drive and vehicle. Meanwhile, growing electrification places even higher demands on E/E systems. Hence, one of the most important topics across all research fields is how to ensure functional safety in automobiles. The ISO 26262 safety lifecycle affects all stages of vehicle development, and poses big planning and development challenges for carmakers that need to integrate electronic components successively in ever-shorter time frames.

Autonomous driving will have an additional effect on drive development work. Already, satnav systems enable drivers to choose either the fastest, or the most economical route. Data about the nature of the planned route plays a key role in those decisions. Autonomous automobiles that can access that data, as well as traffic information, will play a significant role in optimizing energy management in electrified drivetrains.

In response, this year's CTI Symposium USA—which grew again last year with 660 participants—will mesh drive development with two other key topics: autonomous driving and cyber security. As part of the Automotive Week USA, it will team up with the CTI conference 'ISO 26262' and the 'CTI Autonomous Driving Summit' to provide comprehensive insights into the latest drive and automobile development trends.

A Focus on Trucks

With top-notch experts, a dedicated lecture series and three plenum presentations, trucks will be a focal point at this year's event. Electric delivery trucks could soon be a common sight in cities; local authorities would switch completely to e-busses, while autonomous truck platoons would make highways safer. Compared to passenger cars, the truck market is strong and acceptance is broad. As for cost efficiency, trucks seem to be moving faster than cars in several ways.

All over the world, automotive mobility faces a fundamental transformation in the near future. Professor Dr. Giorgio Rizzoni, director, Center for Automotive Research, Ohio State University, offers an independent scientific outlook on developments in the upcoming decade.

Taking the status quo as a starting point, his plenary talk will address key topics ranging from specific drivetrain architectures and e-motor configurations, through innovations in power electronics right up to cloud-based connectivity. Trucks are increasingly coming into focus, with the need to cut pollution in urban conglomerations adding most pressure to electrify the sector without delay.

Spotlight on Exhibitors

Here is a short list of some of the exhibitors that will be participating in the CTI Symposium USA:

AVL is a company for the development, simulation and testing of powertrains (hybrid, combustion engines, transmission, electric drive, batteries and software) for passenger cars,



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trucks and large engines. The company offers combined solutions of powertrain engineering, simulation software, and testing and instrumentation systems. (www.avl.com)

BorgWarner Inc. offers clean and efficient technology solutions for combustion, hybrid and electric vehicles. With manufacturing and technical facilities in 66 locations in 17 countries, the company employs approximately 29,000 worldwide. (www.borgwarner.com)

Continental's Powertrain division develops and produces efficient system solutions for vehicle powertrains to optimize fuel consumption. The comprehensive range of products includes gasoline and diesel injection systems, engine management and transmission control, including sensors and actuators, exhaust-gas after-treatment technologies, fuel supply systems, and components and systems for hybrid and electric drives. (www.continental-automotive.com)

Dana supplies highly engineered driveline, sealing, and thermal-management technologies that improve the efficiency and performance of vehicles with both conventional and alternative-energy powertrains. Serving three primary markets—passenger vehicle, commercial truck, and off-highway equipment—Dana provides the world's original-equipment manufacturers and the aftermarket with local product and service support through a network of nearly 100 engineering, manufacturing, and distribution facilities. (www.dana.com)

Delta Research offers prototype and production transmission components and assemblies. Throughout its 65 year history, the organization has increased its capabilities for high-precision gears, shafts, carriers, machined housings and inspection services. (www.deltaresearch.com)

Product Innovations

CTI Symposium USA holds the Transmission Expo during the week, featuring 80+ exhibitors and 700+ attendees to showcase transmission and powertrain technologies. Here are some of the technologies that will be featured at the show:

Torque Sensors from Methode Electronics Inc.

Magnetoelastic sensors are the first solution that allows measuring torque and other forces economically so that it can be integrated into high volume applications. The current status quo for force measurements—strain gauge type sensors—require extensive manual labor during application, fault susceptible telemetries and recalibration due to aging effects, making them expensive and difficult to integrate.

Magnetoelastic sensors have a number of advantages that make them ideal for high volume production applications. The technology has a small space requirement and the sensing object (e.g. driveshaft) does not need to be modified. There is no need for telemetry which makes the technology true NON-contact. Magnetoelastic sensors has exceptional long term stability and have proven their performance in many high volume applications over more than the last 10 years beside automotive in eBikes, electronic power steering and agricultural. (www.methode.com)

Hoerbiger TorqueLine Twin Cone & Disconnect Clutch

The TorqueLine Twin Cone replaces traditional multi-disc clutches, reducing drag losses by as much as 90 percent. The system offers high power density and decreases actuation forces by up to 60 percent. The TorqueLine Disconnect Clutch, optimizes drag losses by combining a traditional multi-disc with a conical friction based disconnect system: the clutch disc carrier is connected and disconnected by an integrated presynchronization element. (www.hoerbiger.com)

Nitriding and Coating Technologies with RÜBIG Industrial Furnaces

RÜBIG Industrial Furnaces is a globally active producer of customized heat treatment plants (plasma/gas nitriding and plasma coating). The Know-how reflected in the systems has been gained in the in-house job shop. With their Micropuls and Gascon technologies, RÜBIG offers the latest in nitriding and coating technologies. (www.rubig.com)

Future for Mobility

How will technology change for automatic, HEV, EV Drives? The CTI Symposium offers the technical knowledge, market strategies and international developments on transmissions and powertrain components to answer this question. From the electrification of automobiles to the quest for optimum fuel efficiency, this event will provide a roadmap to the future of the automotive industry. **PTE**

For more information:

Car Training Institute (CTI)
Phone: +49 (0) 2 1196 86-3000
www.transmission-symposium.com/usa

Linear Bearing CAD Models and More — On the Fly

Toru Kaneko, director of operations, NB Corporation of America

Smartphones are at the heart of the IoT digital transformation of industry, which is automating more engineering activity. They accelerate processes because data is instantly accessible via mobile apps, which can enhance performance with analytics and now, can put CAD at an engineer's fingertips—literally in the engineer's pocket.

The linear motion control industry is being revolutionized by mobile app capabilities; e.g. — putting products and specification information at an engineer's fingertips; interchange one manufacturer's component for another's in a design; and download CAD models right onto the phone or tablet, in seconds—whereas the average time to download a CAD model on a computer is 15 minutes.

Broken is the chain to catalogs and computer screens that kept engineers at their desks and product representatives weighed down with papers and computers. Using mobile apps, engineers can brainstorm anywhere a meeting is called, trade show presentations can be customized to a visitor's needs, spec sheets and CAD can be downloaded, printed and emailed faster than from a website.

Engineers Always Have a Mobile Phone in Their Pocket

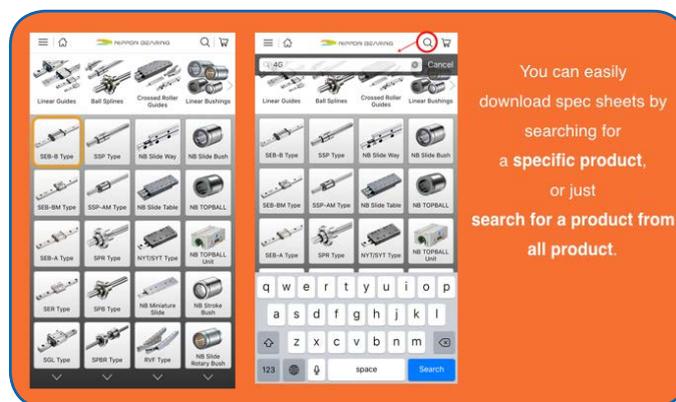
Even though design engineers may be designing on one, two, or maybe even three computer screens, they still have yet another screen in their pocket, i.e. — a phone screen. This screen is being used in motion control design to speed the incorporation of components into the design process.

Whether engineers know what component they need and just want the CAD model, or need to look up a linear guide, slide or ball spline in a catalogue, they can now do it easier and faster from a mobile app than from a website.

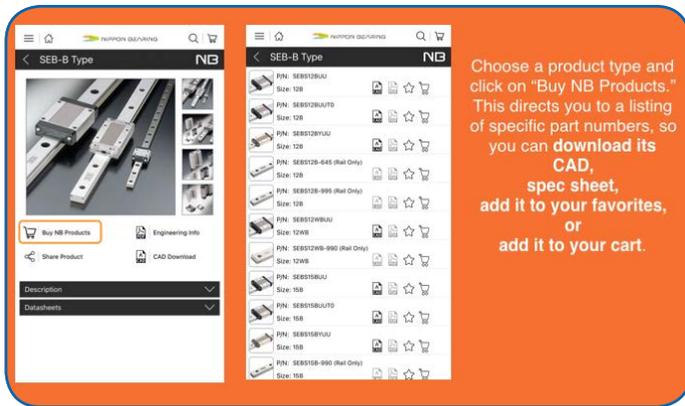


Easy Product Interchange

In fact, from an app, they can interchange one manufacturer's component for another's by entering the product number of the linear bearing into the interchange function—and up pops another manufacturer's comparable product number. All of this without taking up screen space on their computers.



You can easily download spec sheets by searching for a specific product, or just search for a product from all product.



Easier, Faster CAD — and More Compatible Formats

Downloading CAD is quick and instantly usable because it's in the native CAD format desired. So, in addition to end users not having to either recreate the 3-D model manually or start by looking at a 2-D drawing, they won't be given a format that isn't compatible with their system. Typically, the apps have over 20 native and neutral formats available.

Automated Calculations

How long will your linear guide last? On at least one mobile app there is a rated life calculator. It easily calculates the life of a specific product that the viewer has identified, such as one from NB's Slide Guide series. You can print or email the results in a PDF format.

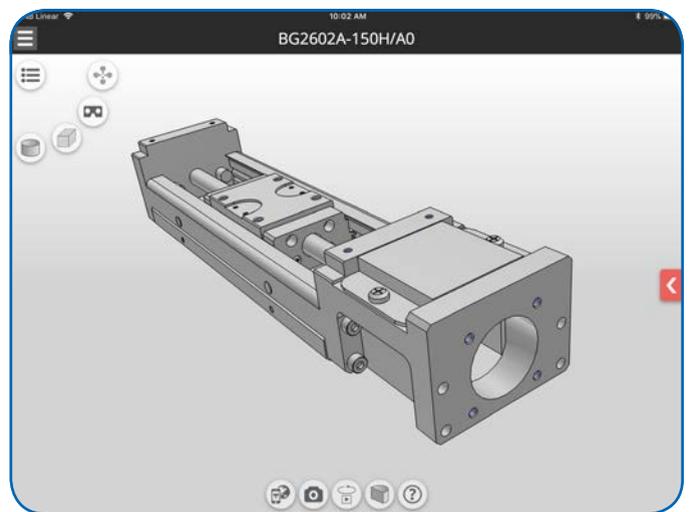


Why Mobile Is So Fast

Dan Koivisto, a technical consultant for CADENAS PART-solutions — a leading software developer and online CAD catalog provider, describes creating the CAD catalog for just such an app. "We're the engine behind the CAD, but we don't have static CAD models stored; we create them on the fly — as configured and requested by the customer. This approach is very 'lightweight' and versatile, which is why they are so accessible via mobile devices and email. This is how

'NB Linear,' Nippon Bearing's app, is able to provide instant 3-D previews and instant downloads in hundreds of 2-D and 3-D formats."

Typically, engineers will figure out what part they want aided by the app; check specifications; download the CAD model; and email it to their computer. Next, they will call or email the manufacturer to actually order it. The manufacturer forwards the order to a local distributor for quick fulfillment. If the engineers have questions, the app emails the manufacturer while they are still on it.



How to Use an App to Identify the Right Product

On the NB Linear Mobile app, you begin the process of identifying what you need by choosing a product type and clicking on "Buy NB Products;" this directs you to a listing of specific part numbers. Or, if you have a product part number, enter the part number or series name in the search icon on the top menu so you can download its CAD spec sheet, add it to your favorites, or add it to your cart.

Or Interchange One Product for Another

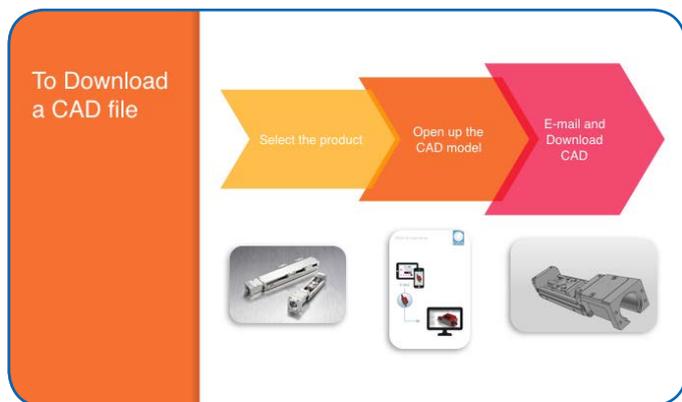
If you want to find NB's product that will be interchangeable with a different manufacturer's product, the NB Linear Mobile app lets you choose from various manufacturers. From the menu bar, select "Product Interchange." Choose a manufacturer and partially enter a part number or enter the full part number, and click "Go;" now you can download the part's spec sheet or CAD. Of course, once the NB part number is identified and entered into the CAD download function, the eCAT Viewer software by Cadenas launches and can be configured and emailed in seconds.

Sales Engineers and Distributors Benefit

Brian Pinkham, NB's national sales manager, notes that in fact some distributors no longer use NB's website; they just use the NB Linear Mobile app because it is just so much quicker.

If a distributor is using it, they already know what they are looking for. The customer can tell the distributor a part number from another company and the distributor can, for instance, use the interchange function to obtain an NB part number. He can immediately interchange right then and there on the app and send the customer a CAD within 5 minutes.

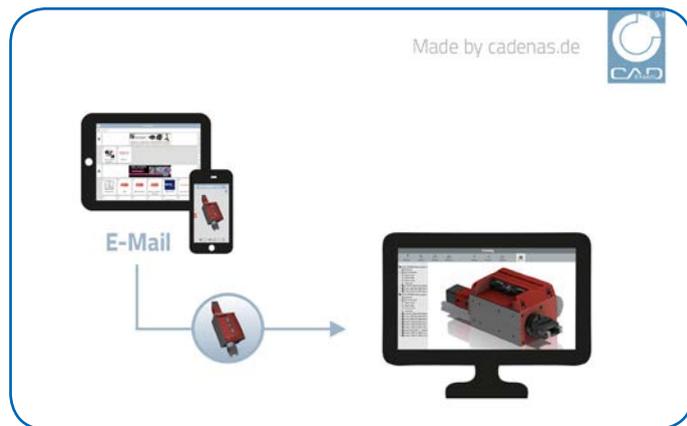
Pinkham says, "I use the app for all of my CAD, now. It's quicker to download via the app than it is from the website. I also use it for all my PDF catalog sheets. If the customer wants a copy of a catalog page, I can have it emailed to myself within 30 seconds; it's really quick. I also use it for interchanges as well. I can take a competitive part number, put it in the interchange, and it will give us our part number."



"I've downloaded CAD while with prospective customers. We've downloaded them at trade shows to show them how quick it is. We show them how you can do it on your phone or your tablet. I can have the CAD downloaded within a minute. If you know the part number, if you know exactly what you are looking for — it is really quick."

Old Habits are Hard to Change

If you think about it, smartphones are not all that old. They have effectively been around for 10 or 15 years, as we know it. The technology has been the reserve of retail brands. So utilizing and implementing mobile technologies is very new to the industrial manufacturing sector, but that's the way things are moving. Research has moved to the web; you can Google anything on your smartphone. And now an engineer can test fit a component by downloading, via a mobile app, the CAD model, which is then sent to be tested in a desktop design.



People are set in their ways, so even though using the app is faster and easier — whether you're talking about big distributors, sales engineers, or even older engineers — they are still going to their computer and downloading a PDF or going to the website for CAD. But this is going to change.

Some numbers to keep in mind:

- A \$350 billion "bring your own device" market is forecast by 2022.
- CAD downloads grew to 260M downloads in 2017 — a 25% increase from 2016.
- 700 manufacturers worldwide are using digital catalogs.
- According to Penton's *Machine Design* magazine, 76% more manufacturers will be using smart devices by 2019.

Other Functions

Of course an industrial company's mobile app provides a wealth of information beyond product specs and CAD models. Mobile apps automatically find a company's closest location. NB Linear's Mobile app has the latest news and exhibition schedule, which can be announced via push notifications. Tradeshow schedules can be added to your calendar in mobile devices. Products can be added to the favorite product list from product search and product interchange. You also may be able to access social media from the app. **PTE**

For more information

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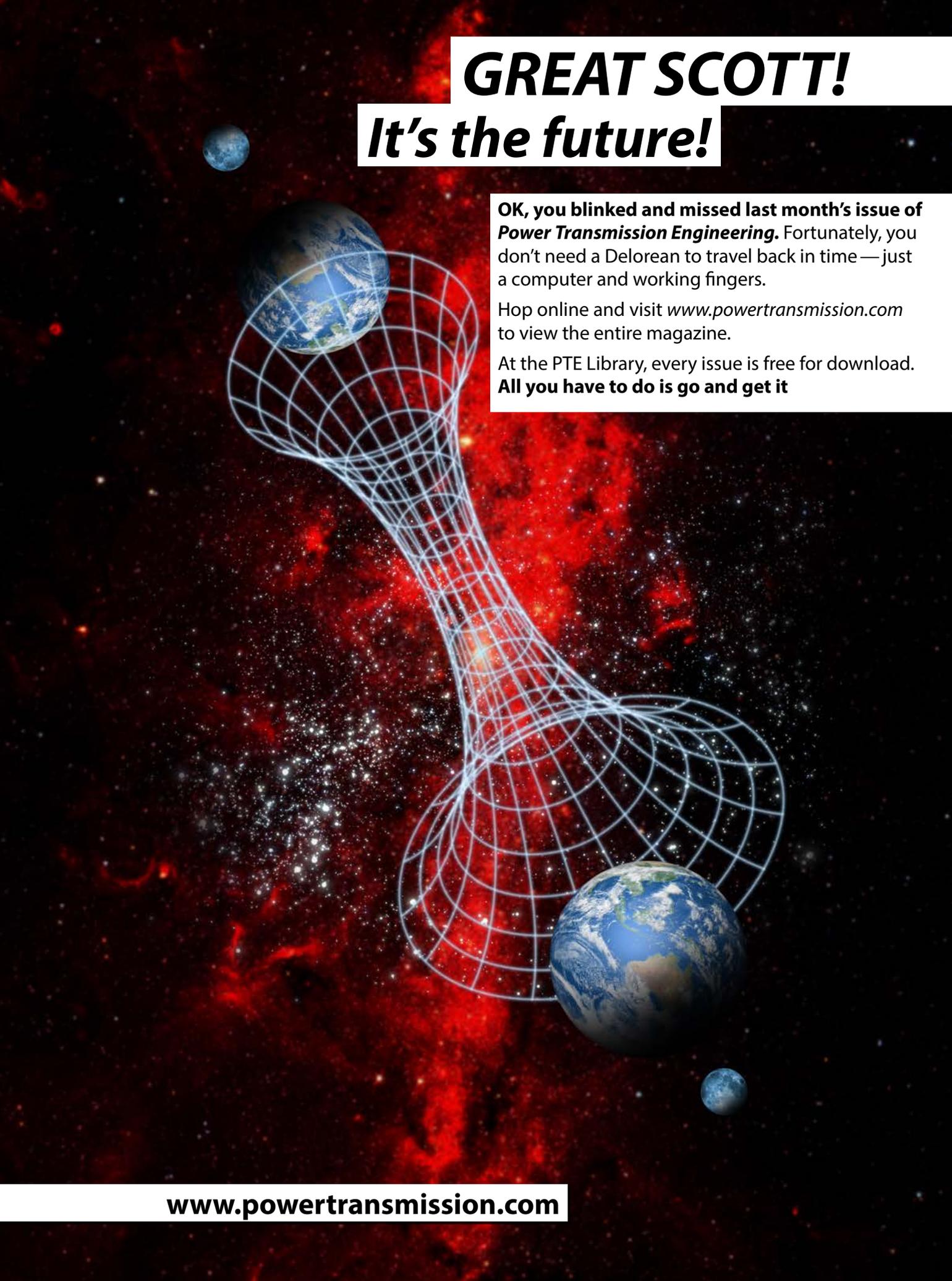
Toru Kaneko is Director of Operations for NB Corporation of America



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A wireframe wormhole structure is depicted against a cosmic background of stars and a red nebula. The wormhole is a funnel shape that narrows in the center. At the top (wider) end of the wormhole, a full Earth is visible. At the bottom (wider) end, another full Earth is visible. In the upper left and lower right corners of the image, there are smaller, distant Earths. The overall scene suggests time travel or a connection between different points in space and time.

GREAT SCOTT!

It's the future!

OK, you blinked and missed last month's issue of *Power Transmission Engineering*. Fortunately, you don't need a DeLorean to travel back in time — just a computer and working fingers.

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Baldor Motor Basics — Part 12

Handling 50 Hertz Requirements

Edward Cowern, P.E.

(Note from the editors: This 12th installment of Baldor Motor Basics brings the series to a close. We hope you found the information presented to be useful and relevant to your needs, and perhaps settled some questions for which you sought answers. Our thanks to Baldor and author Ed Cowern for their generous cooperation and expertise.)

Introduction

As American manufacturers increase exports to 50 hertz countries, there arises the problem of supplying motors for 50-hertz service at an array of unfamiliar voltages. Fortunately there are some possibilities available that make it feasible to handle many of these requirements without waiting for special designs.

The first choice should always be to utilize a stock 50-hertz motor. If the basic motor exists but needs some type of modifications, they can frequently be handled through the Mod Express (*baldor.com*) program to get exactly what is needed.

If a 50-Hz stock motor either doesn't exist or cannot be modified to match the requirement, then some other alternatives exist.

In order to provide a description of these alternatives, we must first break it into two major groups: three-phase and single-phase.

Three-phase motors. When three phase motors are required, the situation can be quite simple. One rule-of-thumb that comes in very handy is as follows:

When the ratio of volts-to-hertz stays constant, the motor can be operated at the reduced frequency and reduced voltage.

Under this condition the motor will provide the same operating torque that it would provide at its 60-hertz frequency. Please note that the stipulation—the same torque—should be remembered. An example may help

illustrate the situation.

A standard induction motor rated at 1 HP, 3 phase, 230/460 volts, 60 hertz would be checked out as follows: $460 \div 60 = 7.66$ volts-per-hertz. In this case, the matching 50-hertz voltage would be $50 \times 7.66 = 383$ volts. Thus the standard 60-hertz motor could be used at 50 hertz on voltages of 190 or 380. Under this condition of reduced voltage and frequency, the motor could be expected to generate the same amount of torque as it would on the normal 60-hertz application. In this case, it would be 3 lb. ft. of torque.

The speed of the motor would of course be lower than it would be on 60 hertz. Normally, you would expect to get a speed that is roughly five-sixths of the 60-hertz speed. In the case of a 1,725 PM motor, you would normally be 1,425 RPM when the motor is operated on a 50-hertz power system.

What about horsepower? Since horsepower is the product of speed and torque, you would expect that the horsepower output would be five-sixths, or slightly over 80 percent, of the 60-hertz rating. In order to overcome this problem there are two approaches.

One would be to select the next-larger HP rating. Thus, in the example cited above, a 1½ HP motor could be used to handle very nicely the 1-HP requirement at 50 hertz. In most cases the incremental cost of selecting the next-higher horsepower is substantially less than the cost and time involved in ordering a special unit. This de-rating approach is a sound and conservative one that can be used on virtually all applications involving open drip-proof and totally enclosed motors and brake motors. A motor selected in this manner can be re-nameplated to the new voltage, HP, speed and frequency combination. Due to the inherent, conservative designs used in Baldor motors and the normal voltage tolerances, many stock motors can be operated on

200 volts, 3-phase, 50 hertz or 400 volts, 3-phase, 50 hertz. Some can also be operated on 415-volt, 50-hertz systems. These combinations of 200, 380, 400 and 415 are the most frequently occurring 50-hertz voltages.

A second approach allows you to handle many of the 50-hertz requirements without de-rating. This is a little more involved and might normally be considered where special motors exist or where there are specific frame size restrictions that do not allow for an increase to the next-larger HP rating.

The approach in this case involves asking a few specific questions and having a reasonable understanding of the type of load that is being driven.

The basic question is this: Is the machine going to be identical in all respects to its 60-hertz counterpart?

If the answer to that question is “yes,” a second question should be asked: Are you going to allow your machine to run at five-sixths of the 60-hertz speed or are you going to change transmission components such as gearing, belts, pulleys, etc. to increase the output speed up to the normal rate that you would get if the motor were to be running on 60 hertz?”

In this case, if the customer is going to change components in the machine to maintain the performance of the machine up to the 60-hertz capability, then the approach of oversizing, as discussed previously, should be used.

If, on the other hand, the machine is identical and the customer is going to operate it at reduced capability, then the torque required to drive the machine would normally be the same torque or, in some cases, less than the 60-hertz torque requirement. If the torque requirement is the same or less, then the motor need not be de-rated since the machine's requirements have been decreased and the motor would still be a perfect match for the machine. There are also many Baldor motors that can

be operated at the rated horsepower on 50-hertz requirements without exceeding their rated temperature rise. Thus, a third option also exists — but it involves a good deal more searching to determine if a motor can be utilized to handle specific requirements.

Other voltages. Aside from the three commonly occurring 50-hertz voltages that have been described previously, there also arises from time to time requirements for others — such as 440 volts, 50 hertz. When the rule of thumb is applied to standardly available motors, it turns out that this voltage is not one that can be handled by normal de-rating processes. In this instance a special motor would have to be wound or an existing motor could be rewound by a service shop to match this requirement. In some instances, 575-volt, 60-hertz motors can be utilized to handle voltages of 480, 50 hertz or as high as 500 volts, 50 hertz. When this occurs, the normal procedures for de-rating, as listed previously, can be applied.

Single-phase motors. Single-phase motors present a unique problem, involving two conditions:

1. The winding must match the 50-hertz frequency and voltage.

2. The centrifugal starting switch must be set to operate at the right point as the motor accelerates during its starting period.

The simultaneous requirement for both of these items usually makes it impossible to utilize normal 60-hertz motors for 50-hertz, single-phase requirements. In most instances it may be possible to rewind an existing 60-hertz motor and change the centrifugal starting switch to one that is appropriate for 50-hertz operation. This procedure is fairly costly and time consuming.

A second option exists with Baldor's selection of single-phase, 50-hertz motors in the range of horsepower from $\frac{1}{3}$ to 5. These motors are specifically designed for 50-hertz operation on either 110 volts or 220 volts (5 HP, 220 volts only). They are rigid base motors in both open drip-proof and totally enclosed. When C flanges are required, footless C face 1,425- and 2,850-RPM motors are offered in a range of sizes from $\frac{1}{3}$ to 2 HP. C flange kits are available to convert stock motors from the standard mounting to a C flange mounting. Since the bases are welded on, it is not feasible to remove the base in order to

get a footless motor, but most customers will not object to having both the C flange and rigid base if they can get availability of the basic unit.

Explosion-proof motors. Explosion-proof motors present some unique problems; basically, they conform to the same rules that have been discussed previously. However, due to the UL (Underwriters Laboratory), many of these motors cannot be re-nameplated to alternate voltages or frequency. The reason for this hinges on the safety aspects of the explosion-proof designs, as well as the thermal overload coordination situation. Thus, explosion-proof, 50-hertz motors that are not typically stocked — both single- and three-phase — must be special ordered.

Many three-phase Baldor explosion-proof motors are already supplied with a 50/60-Hz nameplate.

Summary

By using the techniques described, it is possible to handle a very high percentage of the normally occurring 50-hertz voltage requirements. If you should have questions, please contact Baldor for assistance (baldor.com). **PTE**

Operating Motors in Wet or Damp Environments

When electric motors are installed in wet or damp areas, the life of the motor is almost always shortened from what would be expected in a dry situation. However, there are several cautions and suggestions that can extend the life of motors in these less-than-ideal situations.

Open drip-proof motors. Generally speaking, open drip-proof motors are not suitable for wet environments. However, there are many situations where an equipment manufacturer chooses the open drip-proof motor (probably because of its lower first cost) for use where a totally enclosed motor

would have been a better and longer life choice. If an open drip-proof motor is in place, a few suggestions can help extend motor life.

First, the motor should be shielded from the direct impact of rain, fog, snow, etc. In shielding a motor from the elements, caution should be used not to restrict air flow to and around the motor. Thus, putting a shelter over the motor is a fine idea — as long as the shelter is well ventilated or louvered so that hot air is not trapped inside.

Next, it is important to realize that open drip-proof motors are built to be mounted with a certain orientation.

For example, many open drip-proof motors have “venetian blind”-type louvers in the end housings to make water that is falling from above deflect away from the inside of the motor. This works fine — except when motors get mounted to a wall or with feet up (ceiling mounting). In the ceiling-mounted case, unless the position of the end housings is changed relative to the base of the motor, the louvers will have a funnel effect directing rain, snow and other debris into the windings to shorten the life of the motor. In these cases, end housings should be rotated to put the louvers in the proper position to fend

off rain, rather than funneling it inside.

The use of open drip-proof motors outdoors or in wet areas is not ideal. In the event of a failure, the motor should be replaced with a motor more suitable for an outdoor or wet environment.

Totally enclosed, fan-cooled. Totally enclosed, fan-cooled motors are more adaptable to outdoor and high-moisture areas and, with a bit of caution, they will work well. The following suggestions will help extend the life of totally enclosed motors.

Totally enclosed, fan-cooled motors have “weep holes” at the bottom of the end housings. Weep holes, or fittings, are put there to allow condensation or other accumulations of moisture to drain. At times, motors are mounted in unusual positions, such as with the shaft horizontal but with the base mounted on a vertical wall. In this case the weep holes are out of position by 90 degrees and the only time they could do their job would be when the motor is half-full of water. This, of course, is unacceptable. When motors are going to be used in different positions, care should be taken to reposition the end brackets so the weep holes are at the lowest point of the motor. This is especially important in applications such as the brush drives used in car washes and similar situations where water is apt to be falling on the motors continuously. In this situation some water can always be expected to enter the motor. The key to extending motor life is to give it an easy way out. On motors that are mounted at odd angles where the weep holes cannot be properly re-positioned to the lowest point, the problem can be remedied by carefully drilling a small hole at the lowest point. Caution must be taken to be sure power to the motor is disconnected and the drill bit does not touch or damage the windings or motor bearings.

Motors such as the Baldor “Wash-Down Duty,” “Dirty Duty” and “Severe Duty” are designed to seal the motor and prevent the entrance of moisture. However, try as we might, it is nearly impossible to keep all water out. It is therefore vitally important that the weep holes be positioned so that water entering the motor—either by direct impingement or by exchange of air

saturated with dampness—can drain away freely rather than accumulating.

One other source of water in a motor is condensation that can occur as a result of repeated heating and cooling cycles. For example, when the motor gets hot, the air within the motor expands and pushes out. Later, when the motor cools, fresh moisture-laden air will be drawn in as the air contracts. As this cycle repeats again and again, substantial quantities of water can accumulate. If left unchecked, it will lead to insulation failure.

Again, this highlights the importance of having the weep holes properly positioned so that water can drain before it accumulates in sufficient quantities to damage the motor.

Where motors run continuously, the heat generated in the motor by normal operation can keep windings dry. But when a motor is used infrequently and is subject to large swings in temperature, there are two methods that can be used to reduce the susceptibility to failure caused by accumulated moisture.

The first and most popular method is the use of heaters installed within the motor. In this case, cartridge heaters or silicon rubber strip heaters are placed within the motor and are turned on during the non-operating periods. The object of this method is to maintain the temperature inside the motor approximately five-to-ten degrees warmer than the surrounding air. When this is done, condensation inside the motor is prevented and the motor will stay dry. The heater method is similar to the way light bulbs are used in closets where the climate is humid to prevent mildew on clothing and leather goods.

When internal heaters are used, they are interconnected with the motor starter to turn on when the motor is not running, and off when the motor is running.

The second method of accomplishing the same result is a system called “trickle heating.” In this case a source of low-voltage, single-phase power is applied to the three-phase motor windings when the motor is at rest. This results in a low-energy, single-phasing condition that produces heat in the windings, rotor, and, indirectly, the shaft and bearings of the motor.

This system is a good one for preventing condensation in motors that are at rest. Trickle heating is particularly good where there are groups of identical motors, such as those used on aerators in pollution control lagoons.

Hazardous location. One of the most difficult motors to protect in wet and damp environments is hazardous-location or explosion-proof. The difficulty in protecting these motors arises from several factors. First, due to explosion-proof design requirements, gaskets cannot be used. Similarly, the joints between the end housings and the frame and the conduit box and frame cannot be gasketed or sealed; there must be metal-to-metal contact along these joints. This metal-to-metal contact is close-fitting but, nonetheless—it cannot seal completely. Also, in explosion-proof designs it is not possible to use normal weep holes. Thus, when explosion-proof motors get used in wet environments, moisture that gets inside the motor can accumulate and stay there for extended periods of time. There are breather drain devices that are used in some motors, such as the Baldor 1.15 service factor Class 1, Group D explosion-proof motors. These specially designed breather drains allow moisture to drain from the motor while still retaining the explosion-proof integrity. Again, as in the case of other motors with weep holes, care must be taken to make sure that the breather drains are at the lowest point on the motor.

Some of the options that are available to control moisture in explosion-proof motors are the same as those used in totally enclosed motors. Space heaters can be installed in the motors to keep the internal temperature of the motor above the outside temperature during idle periods. This is an effective way to control the build-up of condensation.

One further key to protecting explosion-proof motors—especially in outdoor situations—is to shelter them from direct rainfall. Again, as in the case of other motors, the sheltering must be done so that it protects the motor but does not restrict the air flow to and around the motor from the outside.

Summary

The installation of motors in outdoor, wet, or damp environments presents some unique problems, but by the proper choice of motor and some caution in installation, most situations can be successfully handled to yield good, long-term operating results. The proper choice of motor enclosure and features, followed closely by the proper location of the weep holes and, in some cases, use of an auxiliary heating device or system to warm the motor during non-operating time, will result in an effective life-extending solution.

Motors such as the Baldor Wash-Down Duty and Severe Duty motors are specifically designed to handle difficult situations. But even when using these specialized products, the basic cautions regarding proper orientation of the weep holes must be followed. **PTE**

For more information

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Baldor Motor Basics

You can find all 12 installments of this series on our website.

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- **April 2017 - Understanding Torque**
- **June 2017 - Fans, Blowers and Funny Loads**
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Schaeffler

MOVES FORWARD WITH GLOBAL AUTOMOTIVE AND INDUSTRIAL INITIATIVE

Global automotive and industrial supplier Schaeffler is pushing ahead with its transformation process in readiness for the future. It is doing this by means of “Agenda 4 plus One”, a program which it launched in 2016 and which has now been expanded to comprise 20 initiatives. The program is structured into four plus one categories: “Customer focus”, “Operational excellence”, “Financial flexibility”, “Leadership and talent management”, and—as the “plus One”—“Securing long-term competitiveness and value creation”. These categories are further broken down into 20 individual initiatives, including “E-Mobility”, “Industry 4.0” and “Digital Agenda”.

The objective of the “Agenda 4 plus One” program is to sustainably grow the Schaeffler Group’s value and secure the group’s competitiveness. The program will add some €300 million to Schaeffler’s earnings by 2022. It is also the basis on which the company intends to bring its EBIT margin before special items back up to its long-term average of 12 to 13 percent and achieve the financial targets set for 2020. In addition, Schaeffler will invest about a billion euros in relation to the “Agenda 4 plus One” program in order to safeguard the Schaeffler Group’s operating profitability and put it on a sustainable, long-term footing. 35 percent of the overall “Agenda 4 plus One” program, including the newly launched initiatives, has already been implemented. Worldwide there are currently about 1,000 Schaeffler employees actively involved in implementing the program.

Among the 20 initiatives making up the “Agenda 4 plus One” program are the “E-Mobility” and “Industry 4.0” initiatives in the Automotive OEM and Industrial divisions, respectively. The objective of these two initiatives is to further develop and futureproof the Schaeffler Group’s product range and service portfolio and to focus them more closely on mechatronic systems.

In its Automotive OEM division, the company has achieved a number of further E-Mobility milestones, with eight volume production orders and 25 customer projects currently under way. These developments are driven and coordinated by three competence centers, located in Germany, China and the USA. Alongside this, under the “Industry 4.0” initiative, the company intends to expand the mechatronics capabilities of its Industrial division. It will achieve this by combining all of its existing activities in a single organizational unit and supplementing them with digital service offerings. In doing this, the company has set itself the target of increasing the Industry 4.0 share of its Industrial division’s total revenue to 10 percent by 2022.

Under the “Factory for tomorrow” initiative, Schaeffler is building a 315,000 m² state-of-the-art “factory of the future” in Xiangtan, China. The “Agenda 4 plus One” program will see the company invest some €100 million in this facility. The

factory’s modular design and the use of digital technologies throughout will allow a high degree of flexibility in space utilization while at the same time reducing costs over the factory’s entire lifecycle.

The “Agenda 4 plus One” program also includes the “Working Capital” initiative, which uses systematic working capital management to optimize cash flow generation and reduce capital employed. The company has already succeeded in reducing its capital employed by €150 million through active management of its trade payables. In addition to this, Schaeffler is harmonizing its terms of payment for customers and suppliers and is optimizing and standardizing the associated internal processes group-wide.

Another of Schaeffler’s “Agenda 4 plus One” initiatives is “New Work”, a multifunctional office environment strategy that pursues the twin objectives of improving employee satisfaction and enhancing the company’s attractiveness as an employer. By delivering modern, forward-looking office and workplace design, the initiative is yielding improved internal communication and creating modern, innovative and attractive working environments. Employees have a high degree of input into office design, planning and implementation, which leads to significant increases in their satisfaction lev-



els. At the same time, the initiative is reducing the company’s office space requirement by up to a quarter, depending on the type of office space and how it is used. The “New Work” initiative has already been successfully implemented at the company’s Erlangen location, and further projects are either under way or in the planning phase.

An “Agenda 4 plus One” initiative of particular importance is the Digital Agenda. The Digital Agenda comprises four elements — “Products & Services”, “Machines & Processes”, “Analyses & Simulation” and “User Experience & Customer Value” — and its purpose is to drive the uptake and use of digital technology within the Schaeffler Group and to expand the group’s digital capabilities and competencies. This will include establishing linkages between the real and digital worlds and using “digital twins” as a key prerequisite for innovations and data-driven business models. In addition, under the auspices of its “IT 2020” initiative, Schaeffler

is investing in the expansion and upgrade of its IT infrastructure and the deployment and use of advanced IT standard solutions.

In his closing remarks at the press conference, Schaeffler AG CEO Klaus Rosenfeld made the following statement: "Agenda 4 plus One' is our program for the future, a blueprint by which we are preparing the Schaeffler Group for the challenges of tomorrow. It is broad-based and encompasses 20 initiatives, including E-Mobility, Industry 4.0 and our Digital Agenda. 'Agenda 4 plus One' is the driving force behind our transformation. Because we want to be become agile as well as quicker and bolder." (www.schaeffler.com)

Vesconite

APPOINTS STRATEGIC ACCOUNT MANAGER

Vesconite has appointed **Guenter Lorenz** as its new German Strategic Account Manager. Company CEO Dr Jean-Patrick Leger recently made the announcement. Lorenz has a background in business development, marketing and sales, and has previously worked for Canadian, Indian and European firms interested in expanding their European contribution to sales. Lorenz's key focus area will be in the pumps sector, but he will also look at growing the use of Vesconite in European agriculture and rail applications, among other applications. His duties will encompass new business development, sales and customer support. (www.vesconite.com)



Baldor Electric Company

NOW PART OF ABB BRAND

ABB will integrate the Baldor Electric Company name into its global ABB brand as a part of its Next Level strategy, which includes harmonizing different ABB-owned brands under the global ABB master brand. Beginning March 1, 2018, Baldor Electric Company, a member of the ABB group for more than seven years, will be known as ABB.

"This represents yet another great step in building a market-focused, lean organization and unifying the ABB brand across the globe," said Sami Atiya, president of ABB's Robotics and Motion division, which includes the organization currently known as Baldor. "With aligning all of our activities under the ABB brand we are delivering on our Next Level strategy to unlock value by streamlining and strengthening our portfolio."

As ABB, the organization will continue to manufacture, design and market the product brands of Baldor-Reliance motors and Dodge mechanical power transmission products

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from 15 U.S. manufacturing locations. The organization will continue to support ABB's entire U.S. motors and generators business unit, including ABB branded IEC motors, large AC motors, generators and related services from the motors, generators and mechanical business headquarters in Fort Smith, Arkansas.

"ABB has invested over \$13 billion in the U.S. over the past 10 years, this is our largest market," said Greg Scheu, president of the Americas for ABB. "The company will continue to invest in the products it makes here, as well as the people responsible for their manufacture. Our U.S.-based motor and mechanical portfolio will be included within our broader portfolio of ABB Ability digital solutions."

Starting March 1, the ABB brand will be applied to all of the Baldor Electric Company's manufacturing, sales and support facilities, box designs and marketing collateral, invoices and purchase orders, and trade show booths at GEAPS, AGG1, EASA & the Permian Basin Oil Show.

In addition to having access to the same local manufacturing, inventory and customer service, customers will also be able to rely on global support, ABB Ability digital technology and more than 130 years of ABB innovation.

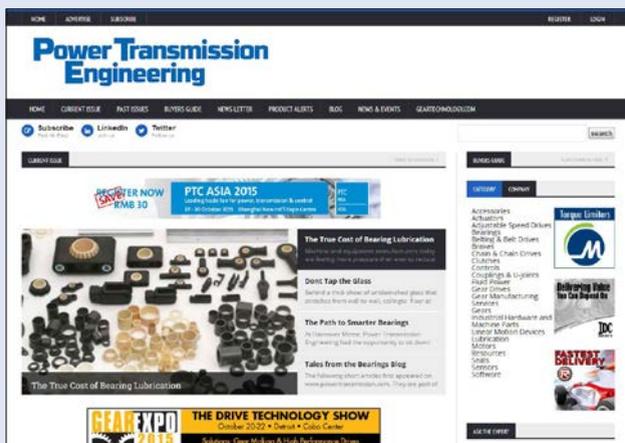
"ABB's strong backing for its operations in the U.S. gives our customers the best of both worlds," said Scheu. "Our customers can count on us to provide local support, backed by pioneering ABB technology and a global, connected footprint to ensure we partner with them wherever they may be." (www.abb.com)

Rexnord

CLOSES ACQUISITION OF CENTA POWER TRANSMISSION

Rexnord has successfully closed the acquisition of Centa Power Transmission. Established in 1970, Centa is a manufacturer of torsionally soft couplings, primarily used in the marine, industrial and wind end-markets. Strong growth in both the wind and marine industries will allow for the synergy of Centa and Rexnord products and services, creating the potential for business in previously untapped markets.

Centa is headquartered in Haan, Germany and employs approximately 450 employees worldwide. With its base of U.S. operation located in Aurora, IL, Centa has 10 subsidiaries and 30 agencies worldwide; and operates in over 60 countries. The acquisition of Centa allows Rexnord to reach a niche market by adding torsionally soft couplings to its already extensive line of premium coupling products. (www.rexnord.com)



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April 30-May 3-OTC 2018 Houston, Texas. The Offshore Technology Conference (OTC) is where the world's energy professionals meet to exchange ideas and opinions to advance scientific and technical knowledge for offshore resources and environmental matters. OTC is the largest global event for the oil and gas sector featuring approximately 2,000 exhibitors and attendees from across the globe. The event provides excellent opportunities for global sharing of technology, expertise, products, and best practices. OTC brings together industry leaders, investors, buyers, and entrepreneurs to develop markets and business partnerships. Technical highlights include updates on world-class projects, offshore renewable energy, the digital revolution, safety and risk management and more. For more information, visit 2018.otcnet.org.

May 6-9-CIM 2018 Convention Vancouver, British Columbia. Founded in 1898, the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) is the leading technical society of professionals in the Canadian Minerals, Metals, Materials and Energy Industries. The CIM Convention and Expo features 450+ companies showcasing the latest in mining equipment, tools, technology, services and products. The event includes plenary sessions intended to bring focus and start dialogue around the conference theme of "Thinking Differently." Leaders from all aspects of mining and some from unexpected tangential sectors are brought together in these thought-provoking discussions. For more information, visit convention.cim.org.

May 7-10-AWEA Windpower 2018 Chicago, Illinois. Windpower 2018 is the wind industry's premier North American event with wind energy professionals from all over the world gathering in one place. It's the most effective way for attendees to expand their knowledge base and business network. With competitive pricing and stable policy in place, the wind industry is booming. Now the industry can focus on the future and the other drivers that will propel the industry forward through the 2020s. The program will feature speakers with "disruptive" and innovative ideas that will continue to strengthen wind energy's value proposition and challenge the current way we do business. Attendees will hear about how technology advances will continue to lower LCOE, and learn lessons from other industries that are more mature or have experienced similar rapid growth. They will also receive updates on: state policy support, transmission infrastructure efforts, and emerging and growing offtake trends. For more information, visit www.awea.org.

May 7-10-AISTech 2018 Philadelphia, Pennsylvania. This event will feature technologies from all over the world that help steel producers to compete more effectively in today's global market. AISTech 2018 provides perspective on the technology and engineering expertise necessary to power a sustainable steel industry. More than 7,000 people are expected to attend AISTech 2018. Along with over 500 exhibiting companies, AISTech 2018 allows attendees to meet face-to-face with key individuals involved in the production and processing of iron and steel. The comprehensive conference schedule includes topics on metallurgy, safety, material handling, energy, maintenance and reliability, lubrication and more. The Association for Iron & Steel Technology (AIST) is a

non-profit organization with 17,500 members from more than 70 countries. For more information, visit www.aist.org.

May 7-11-NPE 2018 Orlando, Florida. NPE2018 provides exclusive access to the innovations, people, processes, science and ideas that are shaping the future of plastics. Attendees will build connections, exchange ideas and explore the largest concentration of machinery, tools, technology and professional training available in today's plastic industry. On the show floor, attendees will meet with the 2,000+ of the world's leading plastic manufacturers and suppliers to gather important information and insights on the latest equipment, products and materials for every phase of plastics production. Focus areas include 3D/4D printing, moldmaking, material science, medical parts, processors and more. For more information, visit www.npe.org.

May 14-16-SAE Fundamentals of Modern Vehicle Transmissions Seminar Durham, North Carolina. Starting with a look at the transmission's primary function -- to couple the engine to the driveline and provide torque ratios between the two -- this updated and expanded seminar covers the latest transmission systems designed to achieve the most efficient engine operation. Current designs, the components and sub-systems used, their functional modes, how they operate, and the inter-relationships will be discussed. For more information, visit www.sae.org/learn/content/99018/.

June 17-20-PowderMet 2018 San Antonio, Texas. PowderMet2018 is the International Conference on Powder Metallurgy & Particulate Materials. The conference will feature over 200 worldwide PM industry experts presenting on PM, particulate materials, and metal additive manufacturing. The event includes extended exhibit hall hours, student poster sessions, evening networking events and the return of the co-located program AMPM2018, featuring worldwide industry experts presenting on the latest developments in the fast-growing field of metal additive manufacturing. AMPM2018 also hosts a 100+ exhibitor trade show in conjunction with PowderMet2018. "Metal AM is a natural fit for MPIF as we have supported the PM industry for nearly 75 years. We're excited to offer an expanded AMPM conference that allows for more time for the transfer of technology, and to expose the metal AM sector to the greater PM industry through access to both AMPM and PowderMet conferences," said James P. Adams, executive director/CEO of the MPIF. For more information, visit AMPM2018.org and PowderMet2018.org.

Momentum in Wind Power

Coming off of a stellar 2017 for the wind power industry, Wind Power 2018 is all about carrying that momentum forward.

Alex Cannella, Associate Editor

Wind Power 2018 is here, and it's not resting on its laurels.

On the back of a successful 2017, AWEA's show is looking to carry that success forward and keep the ball rolling with the motto "Powering Forward to Reach New Heights." This year, the focus is on momentum and pushing the envelope further.

"We wanted to convey all the energy and enthusiasm and momentum that we have coming off of a really great 2017 and pushing that forward to continue growth and business success in this year and beyond," Stefanie Brown, VP of Education and Conferences at AWEA, said.

2017 saw quadruple the ongoing wind project development projects over previous years. The cost of developing wind power is a third of what it was in 2009. Wind turbine technician jobs are springing up everywhere across the Rust Belt. In short, the wind power industry is at the top of its game, and AWEA wants to spur it even higher.

As with past shows, educational offerings are an important part of that push. Wind Power's general sessions are seeing the biggest change out of any component of the show. Instead of having industry leaders present in a big panel, they'll be individually giving a series of shorter TED Talk-esque presentations throughout the event. Topics will include but not be limited to grid monetization, digitization, offshore wind and machine learning.

Some of those topics might sound a little bit out of place at a wind power conference, and that's because AWEA wants to expand the scope of their educational offerings to include more topics, many of which are becoming increasingly relevant in modern industry.

"We're going after some topics that are not traditionally covered in this type of format," Brown said. "And part of the continued strong growth of the industry—as well as this show—is continuing to innovate, and so this is an area we wanted to represent within the general sessions."

May 10, the last day of the show, will also feature an endcap on the previous two days of general sessions with a less formal town hall meeting where attendees will be able to interact with AWEA speakers, ask questions and tackle topics that are "innovative and on the forefront of the industry."

Education stations make their return in 2018. Like in past years, each station will have a mix of various presentations

ranging from individual lectures to full panels ongoing throughout the show. This year, there will be five different stations, each focusing on a different topic: Power, Operations, Project Development, Tech and the Thought Leader Theatre.

The Wind Power 101 pre-conference seminar is also back, but it's also being joined by two new pre-conference seminars. One is the Wind Power 201 seminar, which as the name might suggest, gets more in-depth into topics like project development for attendees that are more experienced in the field. Also planned is a seminar discussing the Icebreaker Wind project, the first project of its kind in the Great Lakes area.

Alongside AWEA's educational





standbys, there will be a few new experiments this year. Traditionally printed educational posters are being modernized into an e-Poster Gallery with digital posters and opportunities for poster authors to present on their work. In addition, “collaborative learning tables” will be set up in a specific lunch area on Tuesday and Wednesday. The idea is that AWEA will be soliciting topics from visitors, and based on the responses, assigning questions to different tables, and you sit yourself down at the table that has whatever topic interests you most. Other people interested in that topic sit down, as well, and you all have a topic to get to know each other over as well as something to learn about all in one.

Think one part icebreaker, one part networking with like-minded individuals, one part mini impromptu panel between yourselves.

“Traditionally in a trade show, it’s the organizers that say ‘here are the topics you need to learn about,’ and attendees don’t always have a lot of input on that,” Brown said. “So this way, they’ll be able to submit topics ahead of time to us and we can have those available.”

On the trade show floor, Wind Power expects 400 exhibitors, including 100 new companies, on the floor. Wind Power has previously enjoyed a steady stream of fresh visitors each year, but as with their educational offerings, the number of new exhibitors might be in part due to the fact that the show is

expanding its scope and reaching out to new segments of the industry.

“We’re definitely reaching out to companies that are in those segments of the industry that we’re adding in to other areas to make sure they understand that we’re going to be discussing that component of the industry and of course would love to have them for exhibitors,” Brown said.

There is going to be a new change on the exhibitor floor, as well. AWEA is introducing the Green Exhibitor Program, which is the latest part of Wind Power’s ongoing efforts to create a green, sustainable trade show. The program lays out some best practices for reducing a booth’s footprint, and in return, gives those that sign up and follow its tenets some free advertising.

“We work closely with the venue that we’re in as well as our different partners with the show and we always have a goal of exceeding the venue’s average waste diversion rate by at least 10 percent...” Brown said. “We always work a lot behind the scenes to try to make the show as sustainable as possible, but the exhibitor program is a way for us to help encourage them to be good stewards and promote their commitment to sustainability to attendees. It’s a win-win!”

Wind Power 2018 is right around the corner, and much like the industry itself, it’ll be coming in fast, roaring on all cylinders. **PTE**

For more information:

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For publication guidelines and more information, please contact Jack McGuinn at jmguinn@powertransmission.com.

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It's a Jungle Out There

Matthew Jaster, Senior Editor

Harsh environments and saltwater properties tend to make it difficult for motors, gearboxes and engines to perform consistently at a high level. So, when challenges arise, manufacturers tend to gravitate toward cost-savings solutions that will make their jobs easier. Here's a look at some applications in natural environments that have benefitted from component upgrades:

Vesconite Supports Airboats for Ecotourism

A company that specializes in African airboat ecotourism tours has switched to the hard-wearing thermoplastic Vesconite discs and holders as a support for the engine/gearbox — propeller system to ensure that its boats can cope with the rigors of an African boating experience.

The U.S. manufacturer had built the engine stands with nylon dampers encased in stainless steel tubes, explains Airboats Afrika Managing Director Chris Grosch. However, the result was a significant number of cracks in the tubes due to the constant vibrations and strain, which worried Grosch as his expeditions would often take him to hippo and crocodile-filled African rivers where it would be difficult to access maintenance facilities.



“We are not in the Everglades and you can't whip out a cell phone and call a buddy,” he says of the ease of accessing help in the United States. “In Africa, you can't do that. So then we worked out a concept of all kinds of things we deemed reliable,” he added.

Grosch's engine-mounting solution was to make a metal cup holder into which a Vesconite disc is bolted, and on which the engine sits. Through these means, vibration was lessened and steel-on-steel wear was eliminated. Vesconite also provided the advantage of being dimensionally stable and resistant to saltwater, which were boons for the tour company, which had to chisel off salt off the original water-absorbing nylon support base in the past.

Since Africa does not have the deep navigable rivers that you find elsewhere, he opted for airboats, which can provide a cruising-type experience even in shallow waters. (www.vesconite.com)



Fish Farm Saves Energy with Motor Upgrade

A Denmark-based specialist in aquafeed production has replaced an aging, damaged DC motor on its principal extruder with a Dyneo motor from Leroy-Somer, part of the Nidec group. The investment is providing the company with significant annual savings in energy costs.

Aquaculture, more commonly known as fish farming, is a rapidly growing sector. Companies such as Aller Aqua, which produces both freshwater and saltwater fish feed, are constantly looking for ways to improve its production technology and processes to benefit from this growth.

The company has a broad product range, consisting of feed for 30 species of fish. As a result, production schedules are demanding, which is why the company sought to maximize its potential gains when the DC motor on one of the company's main extruders at Christiansfeld had to be replaced.

“Aller Aqua had a particular interest in energy efficiency for its new motor solution as extruding feed stuff is a very energy-intensive process,” explained Carl Erik Niemann, sales engineer—drives and motors technology at Nidec Industrial Automation Denmark A/S. “They knew this would help boost both competitiveness and sustainable development.”

After a comprehensive evaluation of the market, the company opted for a 310 kW (2,400 rpm) Dyneo permanent magnet synchronous motor. Offering an efficiency level exceeding IE4 requirements, this option will enable the saving of at least 135,000 kWh of electricity per year.

“Beyond energy performance, Aller Aqua is now able to benefit from significant savings in maintenance costs, allied to increased machine availability,” said Niemann. “The previous DC motor featured a brush and collector system, which comprised wear parts.” (www.nidec.com) **PTE**

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