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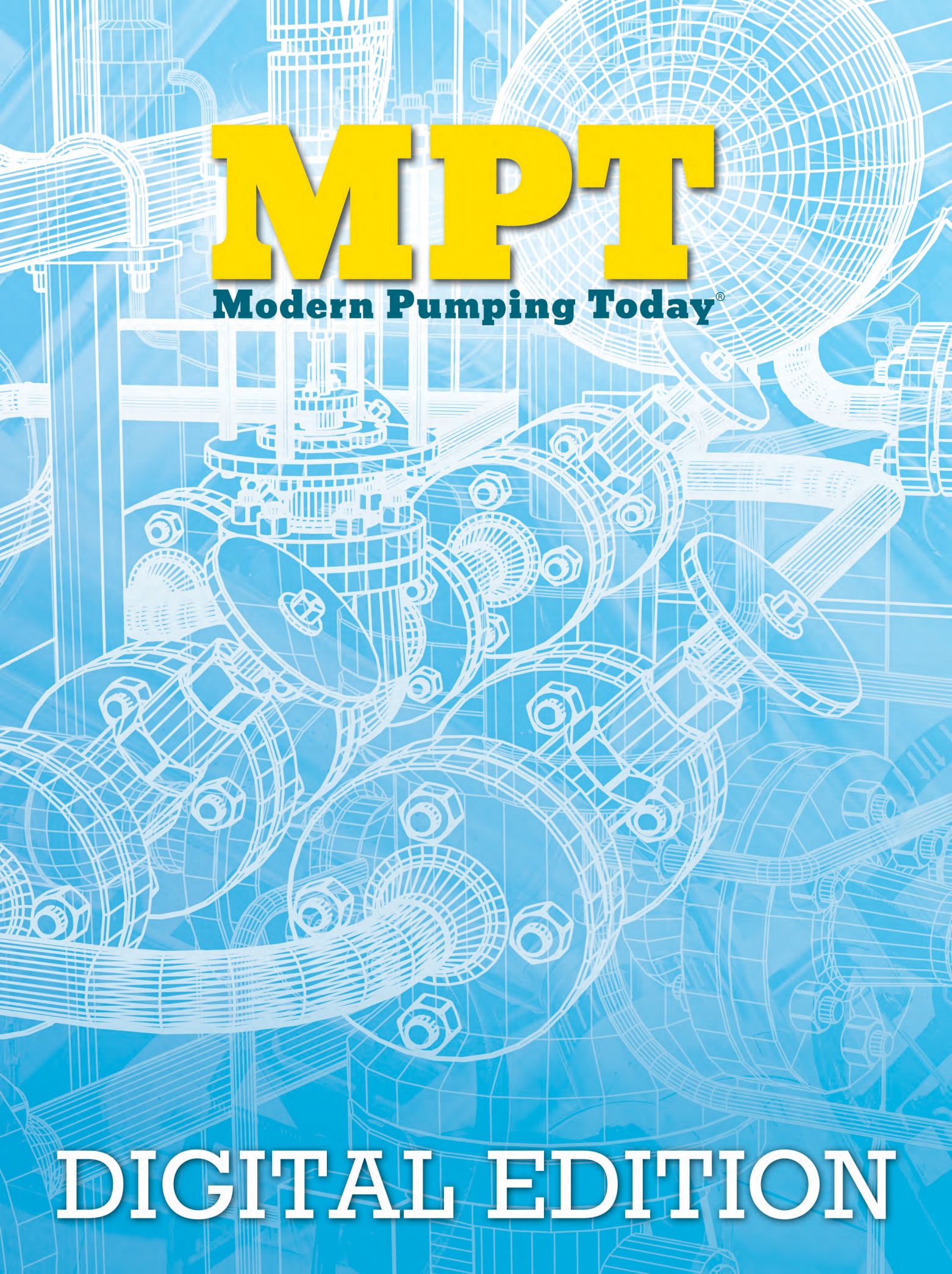

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COVER PHOTO
Courtesy of Xylem

A NOTE ON THIS ISSUE:

J. Campbell, Editor
Modern Pumping Today

Welcome to September's issue of MPT! In this month's Water & Wastewater Focus, Nick Vastine of Applied Flow Technology shares how his company provides alternatives that increase flow capacity and update infrastructure in Houston, Texas (pg. 26). As you'll see, without this infrastructure, frequently flooded process areas can create a hazard for operators and operations alike.

Also in this issue, we welcome back pump expert Heinz Bloch, who offers his assessment on the training of the next generation of subject matter experts (pg. 34). In the first part of this two-part series, Bloch provides an overview of what is needed to bring today's pump engineers up to speed in an ever-changing and demanding professional environment.

Lastly, according to the United States Energy Information Administration, there are almost one million oil producing wells in the United States, and most require the use of an artificial lift system. Greene Tweed's Lauren Rainey shares how the right materials help electrical submersible pumps stand up to the rigors of high pressures, high temperatures, and direct contact with the well fluids and contaminates (pg. 46).

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SEPTEMBER 2022

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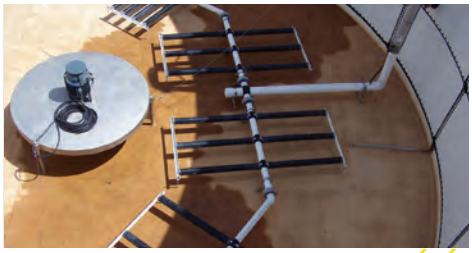

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ASAHI/AMERICA INTRODUCES NEW FIELD SERVICE TECHNICIAN

Asahi/America, Inc. announces the addition of Brad Doughty to the technical field service team. Doughty will assist customers with training and installing Asahi/America's single and double wall piping systems through thermofusion processes. This includes properly training customers how to use Asahi/America's available welding equipment with the company's piping products. He will cover all regions throughout the United States. Doughty comes to Asahi/America with almost thirty years of experience in the polyethylene (PE) industry. His experience ranges from making PE tanks and connections to providing field service for PE-related products across the United States. Doughty's addition to the field service department will help the growing need for thermoplastic piping installation and field training assistance.

The news comes on the heels of the promotion of Mark Gore to industrial business development manager for the eastern and central U.S. regions in June of this year. Gore now leads Asahi/America's sales efforts of industrial and environmental single wall and double wall piping systems and has a deep technical knowledge of Asahi/America products, successfully managing many piping installations in his previous sales territory.

GE TO INVEST $5 MILLION TO SUPPORT ITS AERODERIVATIVE GAS TURBINES BUSINESS

GE announces its decision to invest up to $5 million over the next two years to add a second manufacturing location for GE's TM 250 and LM2500XPRESS aeroderivative units for the Americas region in its existing Global Technology Center in Greenville, South Carolina. The manufacturing hub will complement the current GE manufacturing site in Veresegyhaz, Hungary. The announcement underscores the company's commitment to its flexible and mobile aeroderivative gas turbine technology, which can help manage power shortages, stabilize the grid, and support renewables growth.

GE's Global Technology Center in Greenville will significantly increase its manufacturing capability to support deliveries in the Americas, but also the global aeroderivative growth. According to Global Market Insights, the global aeroderivative turbine segment is set to exceed $2.5 billion by 2025, demonstrating that the agile aeroderivative turbine technology is appreciated for its compact size, lighter weight, quick start capability and operational flexibility. With quick start times, aeroderivative turbines are a crucial component for

renewables balancing in grid systems. Aeroderivatives can start and stop daily, further enhancing their suitability for renewable energy generation.

TSURUMI AMERICA APPOINTS NEW OPERATIONS MANAGER

Tsurumi Pump announces Michelle Ciric as its new operations manager for North America. Ciric comes to Tsurumi with ten years of experience in distribution, warehouse, and supply chain operations. She also has considerable experience in managing staff which will add tremendous help as Tsurumi is at a time of fast growth and expansion.

"As I got to know the Tsurumi team through the interview process, I was immediately attracted to the culture and positive energy of who are now my coworkers," Ciric says. "I felt the work environment was open to new ideas and that would allow me to use my experience to flourish in this role."

Ciric developed her warehouse management and supply chain knowledge in previous roles by working closely with sales, operations, customer service, and logistics teams. Her past efforts focused on creating standard work, shortening communication flows, improving warehouse architecture, material flow, and continuous improvement of order execution to drive on-time deliveries.

Glenn Wieczorek, Tsurumi America's managing director, adds "Michelle will strengthen the company's team and boost its stock availability and delivery times."

PELLA CORPORATION RECOGNIZED AS A BEST WORKPLACE FOR INNOVATORS

Pella Corporation has been recognized by Fast Company as one of nine 2022 best workplaces for innovators in the United States. This is the second Fast Company innovation award of 2022 for Pella, following their earlier ranking of No. 8 Most Innovative Design Companies.

"We've found innovation success by placing our consumers, and customers at the center of our design process. By focusing on them, we can discover what they love, desire, and have as unmet needs. Their feedback is critical in helping us deliver meaningful innovations to the market," says Jenn Tuetken, senior manager of innovation and design at Pella. "This award is also a clear testament to the exceptional talent and spirit of innovation within our organization."

Pella has long embraced a culture of innovation, amassing more than 150 product and design patents in its ninety-seven-year history. True to its roots, the company has also been recognized as No. 1 in Innovation by homeowners across the country.

The manufacturer was recognized by Fast Company in part for its commitment to a culture of innovation.

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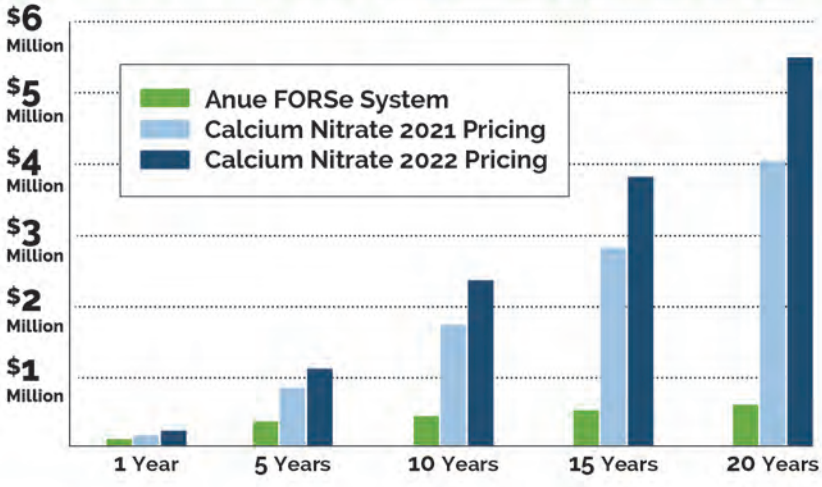

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FLOMATIC CORPORATION APPOINTS NEW TERRITORY SALES MANAGER

Flomatic Corporation announces the appointment of Blake Sargent as its Southwestern territory representative. As territory sales manager for the Southwest territory, Sargent's responsibilities encompass sales team leadership, development of new partnerships, and contributing to Flomatic's sales and business strategies. Sargent is responsible for leading Flomatic's sales agents from Arkansas to California.

"Blake is an outstanding addition to Flomatic's sales team and brings with him a wealth of knowledge and experience in the industry," says Nick Farrara, president of Flomatic Valves. "As Flomatic continues its rapid growth on a national and international level, we are confident Sargent's strong background in building top performing sales teams and partnerships will help accelerate Flomatic's growth throughout this territory."

With a proven history of sales and business management success, Sargent previously served as a sales agent for Flomatic Valves and territorial manager with DC Sales.

"I am honored to join the Flomatic Valves family and help transform their business into a better customer service experience for all as we enter new and emerging markets throughout the southwest," adds Sargent.

INNIO ANNOUNCES FUTURE COLLABORATION WITH B.GRIMM POWER

INNIO announces that it has signed a memorandum of understanding (MoU) with B.Grimm Power to collaborate on building new power plant projects in Thailand. B.Grimm has a long and successful history as a trailblazer in Thailand's private power generation industry. The MoU lays out the framework for a collaboration of the two companies to build projects in the period 2022 to 2024 within the liquified natural gas (LNG) and natural gas segment. Within the MoU, INNIO and B.Grimm will explore the development of decentralized and highly efficient power plants. The two companies will focus on jointly developing the LNG and natural gas segment in Thailand with the possibility of future projects.

Across Southeast Asia, Thailand serves as one of the most dynamic countries where secure and reliable energy supply has and continues to play a central role in supporting strong gross domestic product development and welfare for the people. In particular, B.Grimm Power currently delivers more than 2.8 gigawatts of power to Thailand, supporting strong economic growth and available power supply for the Thai economy and its people. "We are now aiming to reduce carbon emissions with the support of companies that can provide proven expertise," says Dr. Harald Link, chairman of B.Grimm.

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WEFTEC 2022 FEATURED EXHIBITORS

MPT Visit MPT at WEFTEC

WEFTEC, the premier technical and networking opportunity for professionals in the water and wastewater industry, takes place October 10 through 12 in historic New Orleans, Louisiana. This year's convention and exhibition hall expects to be a record-breaking opportunity for professionals in the water treatment, processing, movement, and reuse sectors—one you won't want to miss. If you're passionate about water and building a strong, diverse, and inclusive water workforce of the future, you need to be at WEFTEC to see where the industry is today as well as where it is headed.

Also recognized as the largest annual water quality exhibition in the world, the expansive show floor provides unparalleled access to the most cutting-edge technologies in the field; serves as a forum for domestic and international business opportunities; and promotes invaluable peer-to-peer networking among registrants. On the following pages, we share MPT's selections of Featured Exhibitors, which presents a cross-section of the industry's leading companies. Be sure to visit each at this year's convention!

ABB

Booth 6438

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation, and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 105,000 talented employees in over 100 countries.

WWW.GLOBAL.ABB

BOERGER

BOOTH 4839

Boerger designs, manufactures, and sells rotary lobe pumps, macerating technology, separation technology, and feeding technology to convey low to high viscous and abrasive media. Key applications can be found in wastewater applications including sludge (primary, WAS, RAS, digested, thickened, etc.), biosolids, grease, sewage, scum, lime slurry, alum sludge, permeate, polymers, etc. Boerger products are designed with maintenance-in-place, which allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems.

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ENVIRONMENT ONE CORPORATION

BOOTH 2709

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GORMAN-RUPP PUMPS

BOOTH 917

Gorman-Rupp sets the industry standard for packaged wastewater-handling pumping systems. Our ReliaSource® lift stations are 100 percent custom-engineered, manufactured, assembled, and tested by the experts at Gorman-Rupp. That means when you choose ReliaSource, you choose the ultimate in reliability, long-lasting operation, and value. We precision-match the pumps, motors, controls, valves, pipes, and accessories in every ReliaSource system for maximum compatibility and maximum performance—guaranteed.

WWW.GRPUMPS.COM

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INDUSTRIAL FLOW SOLUTIONS

BOOTH 6225

Industrial Flow Solutions™ (IFS), headquartered in New Haven, Connecticut, specializes in the design, manufacturing, sales, and service of wastewater pumps and controls including OverWatch® Direct In-Line Pump Systems, BJM Pumps®, Stancor®, Oil Minder®, DERAGGER™ by Clearwater Controls, and Dreno Pompe products ideal for the ideal for municipal, industrial, commercial, and residential applications. IFS is a valued partner with over 200 years' technical and application experience to support customers through the design, build, test, install and post-install processes. In the New Haven location, a state-of-the-art, in-house testing facility that is built to Hydraulic Institute standards enables comprehensive testing with rapid results. With a focus on turning customers' flow problems into flow solutions, IFS products lower costs, increase efficiencies, and minimize the environmental impact, while offering industry leading response times with a high human touch from initial inquiry to post-installation support.
WWW.FLOWSOLUTIONS.COM

CLA-VAL COMPANY

BOOTH 3905

Since 1936, Cla-Val has produced the world's highest quality automatic control valves for diverse industries. Cla-Val has strengthened operations and customer service by enhancing product lines and building state-of-the-art production facilities around the world. With major locations having dedicated training centers, the team provides exceptional industry expertise. Aggressive R&D programs have resulted in advanced electronic and hydraulic control systems that meet the challenges of complex and diverse applications. **WWW.CLA-VAL.COM**

HOMA PUMP TECHNOLOGY

BOOTH 2019

HOMA stands behind every product with a generous warranty, extensive spare parts inventory, regional authorized service centers, factory engineers and technicians who are all dedicated to the support of the entire HOMA product line. Whether your application requires a residential grinder or effluent pump, or you are handling an industrial process stream or municipal wastewater, HOMA will engineer a pumping solution for you. **WWW.HOMAPUMP.COM**

PEDROLLO USA

BOOTH 1135

Pedrollo USA is the American and Canadian office for Pedrollo S.p.A. and since 1974, a manufacturer of high-quality and high-efficiency pump and related products. These include jet, centrifugal and self-priming surface pumps, submersible pumps and motors, sump/sewage/effluent and grinder pumps, electronic controls, package systems, and accessories. Pedrollo is a family-owned and operated company with sales into over 160 countries. Pedrollo invests significantly in R&D to bring the most innovative products to the many markets we serve.
WWW.PEDROLLO.COM

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VAUGHAN COMPANY
BOOTH 4017

Established in 1960, Vaughan Company is the industry leader in reliable chopper pumps and mechanical hydraulic mixing systems. With more than sixty years of experience and four generations of expertise, Vaughan Company remains committed to giving their customers outstanding service and the most dependable product solutions in the world. Today, Vaughan chopper pumps are THE specified product for tough environments where other conventional pumps have proven to fail. Knowing every pump user faces a unique situation, Vaughan Company's local sales representatives across the country provide exceptional customer service when it is needed most. All Vaughan pumps and pumping equipment are made and sourced in the United States to ensure fast shipping, without the mark-up and wait times associated with imported systems.
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MELTRIC
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Meltric manufactures a full line of industrial plugs and receptacles, including a signature brand of UL listed switch-rated devices with push-button circuit disconnection. These all-in-one devices combine the safety and functionality of a disconnect switch with the convenience of a plug and receptacle and can be safely connected and disconnected under full load. Meltric also manufactures other safe and reliable industrial plugs and receptacles, including multipin, high amperage, single pole, and hazardous location devices. **WWW.MELTRIC.COM**

SULZER
BOOTH 3439

Sulzer is a global leader in the design and manufacture of fluid systems with over 200 years' experience in developing innovative products and services that support greater sustainability of our world's resources. With specialist knowledge in pumps, agitators, mixers, separators, blowers, and purification technologies, Sulzer offers high-performance products with excellent reliability and efficiency. **WWW.SULZER.COM**

XYLEM
BOOTH 4528

Xylem (XYL) is a leading global water technology company committed to solving critical water and infrastructure challenges with innovation. Our 17,000 diverse employees delivered revenue of $5.2 billion in 2021. We are creating a more sustainable world by enabling our customers to optimize water and resource management and helping communities in more than 150 countries become water-secure.
WWW.XYLEM.COM

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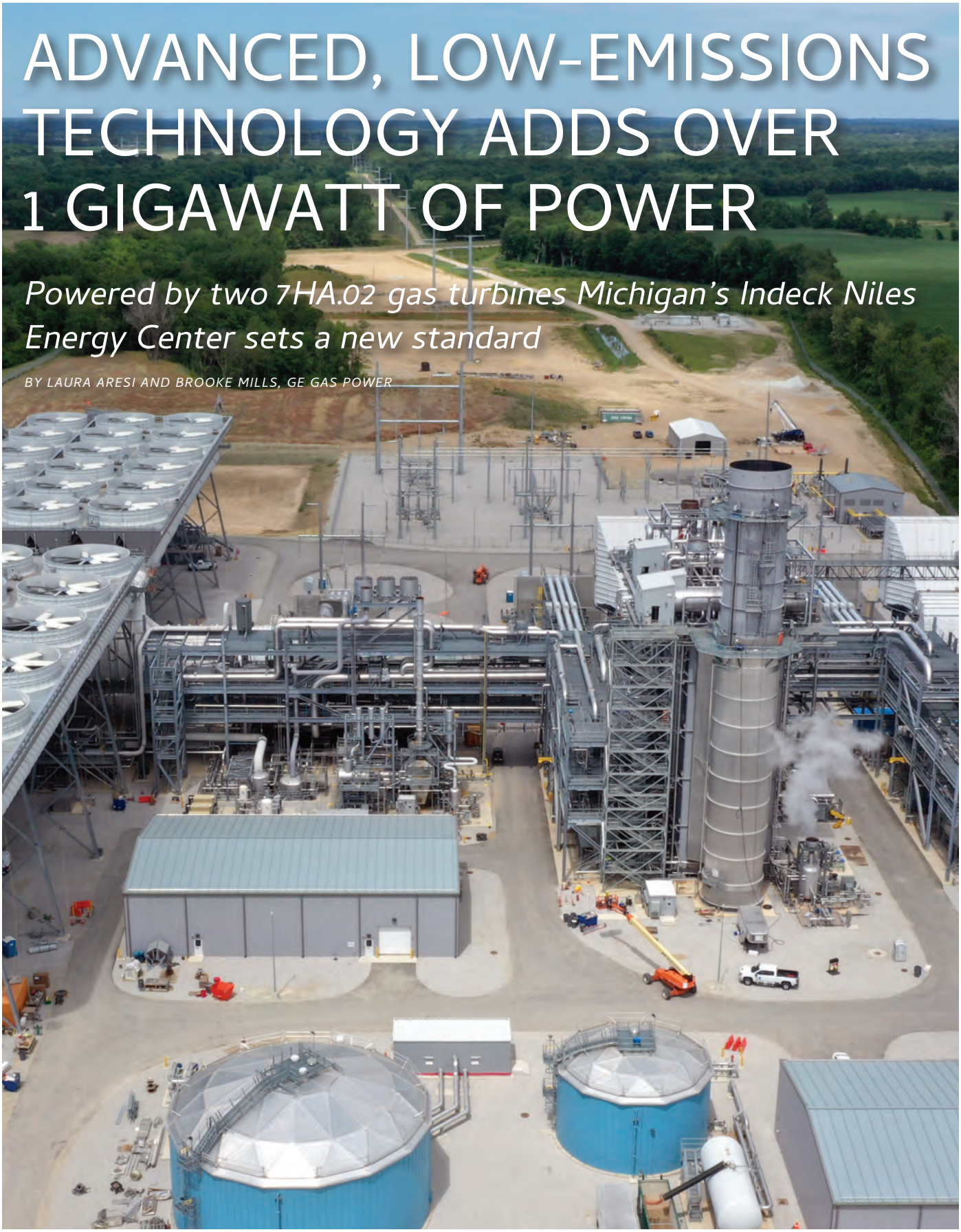
ADVANCED, LOW-EMISSIONS TECHNOLOGY ADDS OVER 1 GIGAWATT OF POWER

Powered by two 7HA.02 gas turbines Michigan's Indeck Niles Energy Center sets a new standard

BY LAURA ARESI AND BROOKE MILLS, GE GAS POWER



Located in Niles, Michigan, the Indeck Niles Energy Center must produce the energy equivalent needed to power approximately 635,000 homes and businesses. To do this, the facility partnered with GE Gas Power, who provided two 7HA.02 gas turbines, an advanced, low-emission technology that should provide the necessary contribution toward the center's energy output.

For the project, GE delivered the H-Class combined cycle plant equipment and is also expected to provide parts, repairs, and maintenance services for twenty-five years, while Kiewit Power Constructors Co. provided engineering procurement construction capabilities. The plant achieved the start of operation safely and with high standard of quality.

FIRE UP THE FUTURE

On July 1, 2022, Indeck Energy Services, Inc., along with its Korean partners KOSPO and DL Energy, officially notified the PJM Interconnection of the start of commercial operation for the Indeck Niles Energy Center. Through a contract with Kiewit, the engineering, construction, and procurement (EPC) contractor, GE provided its equipment to the Indeck Niles plant to fill the need for generating resources created by the decommissioning of older, more costly, and less-efficient coal-fired and nuclear plants in the region. "Natural gas-fired generators have the lowest carbon dioxide emissions of all fossil power generation fuels. Indeck Niles, a natural gas-fired combined cycle plant, has roughly 67 percent of the carbon emissions of a similarly-sized coal plant, and lower emissions levels for other pollutants," says Michael DuBois, Indeck's vice president of project development.

KEEPING EMISSIONS LOW

The plant, built by Kiewit, features all major equipment supplied by GE: two GE 7HA.02 gas turbines, powering two H65 generators, an STF-D600 steam turbine powering a H84 generator, and two Heat Recovery Steam Generators (HRSG), which are triple pressure reheat drum, along with a Mark* VIe Distributed Control System (DCS) software solution and services to support the availability and reliability of the plant. Auxiliary equipment installed at the power plant includes dry low-NOx burners integrated with selective catalytic reduction technology for controlling the NOx emissions.

"GE's HA gas turbines are among the largest and the most efficient gas turbines in the world, and we look forward to making a meaningful, positive contribution to reducing carbon emissions in Michigan, adds DuBois. "Equally important, we are proud that Indeck Niles transformed an unproductive site into an economic engine that creates jobs, spurs economic development, and generates revenues for the city of Niles, its residents, and the local area."

POWERED UP AND READY TO GO

The plant achieved the start of operation safely, with the highest standard of quality, and delivers approximately 1.1 gigawatt of electricity, the equivalent output needed to power approximately over half a million homes and businesses.

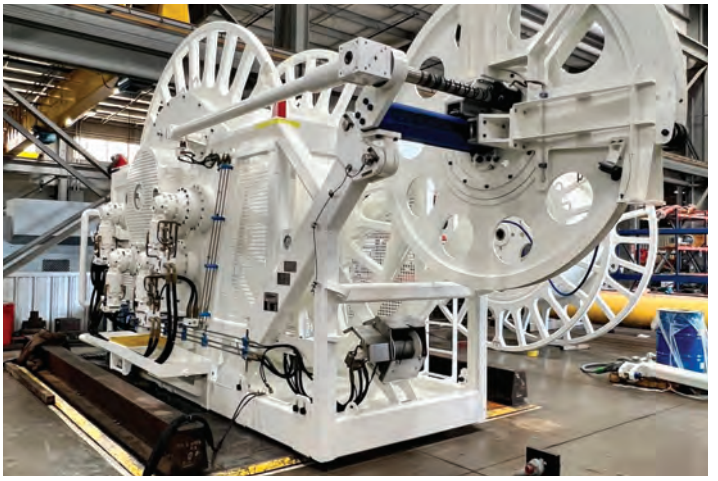
"The Niles Energy Center will have a positive, lasting impact on the community by reducing carbon emissions and providing reliable power," says Chris Turnbull, president of Kiewit Power Constructors Co. "We are proud to have served as the EPC contractor and to have worked in close partnership with Indeck and GE in delivering this state-of-the-art facility."

PART OF THE LARGER SOLUTION

As reported by U.S. Energy Information Agency (EIA), in 2020, natural gas generated the largest amount of Michigan's electricity for the first time, surpassing coal, which fell to third after nuclear power. Natural gas accounted for 33 percent of the state's net generation, while coal's share declined to 27 percent. Renewables provided about 11 percent of Michigan's electricity net generation in 2020, and wind energy accounted for three-fifths of that power.

"Gas power plays a critical role in facilitating coal-to gas transition, but it is also crucial to provide the necessary power to balance the variable nature of renewables and help ensure system reliability at all times, says Eric Gray, president and CEO of GE Gas Power Americas. "Our 7HA.02 gas turbines, which can burn up to 20 percent hydrogen by volume in the gas stream currently, with plans to transition to 100 percent hydrogen over the next decade, represent a highly efficient energy solution to achieve Michigan's emission reduction plans."

GE Gas Power is one of the world leaders in natural gas power technology, services, and solutions. Through relentless innovation and continuous cooperation with its customers, GE is providing more advanced, cleaner, and efficient power that people depend on today and building the energy technologies of the future. With the world's largest installed base of gas turbines and more than 670 million operating hours across GE's installed fleet, the company offers advanced technology and a level of experience that's unmatched in the industry to build, operate, and maintain leading gas power plants. For more information, visit **www.ge.com/power/gas.**



FULL TORQUE CONTROL WHERE IT'S NEEDED MOST

Space-saving coiled tubing reeler project for OneSubsea

BY DEAN W. CAREY, LOGAN INDUSTRIES

CLIENT CLOSE-UP: ONESUBSEA

OneSubsea delivers integrated solutions, products, systems, and services for the subsea oil and gas market. Our company offers a step change in reservoir recovery for the subsea oil and gas industry through integration and optimization of the entire production system over the life of the field. OneSubsea leverages Cameron's flow control expertise, process technologies and world-class manufacturing and aftermarket capabilities, along with Schlumberger's petro-technical leadership, reservoir and production technology, and R&D capabilities.

Being a world-class machine designer, manufacturer, field service, and repair company means meeting customer needs across an array of conditions. Recently, Logan Industries International Corporation has successfully delivered a unique, space-saving coiled tubing (CT) reeler suite for OneSubsea, designed to maximize profitability.

APPLICATIONS BEYOND STORAGE

More than simply storage reelers, Logan's CT reelers are coiled tubing winches, where the reelers provide full torque control for the tubing without the need for a standard injector head. This reduces space required compared to standard tubing reeler / injection head combination, and allows for a larger fluid storage footprint on deck. When the equipment required to handle CT has a small footprint, more deck space can be dedicated to hauling fluid, which increases profitability for the operator.

Whereas Logan has built several sets of these machines in the past with fixed drums, this is the first unit Logan has delivered with a removable drum, which means the unit footprint can remain static on the vessel while the drums can be taken to a shore base for unspooling and respooling. They are transported in a purpose-built DNV lift rated drum basket, fully secured and protected. The swap out drum also makes the machine faster to build, reducing typical assembly time for the drum and drive train from two weeks to two days.

THE NEXT EVOLUTION IS HERE

At 15,000 psi working pressure, 10,000 feet of 2-inch CT was provided on the drum, with live swivel and isolation valves on the unit. The suite of equipment provided for this work includes a spare drum, adapter to allow it to fit into most tubing service spoolers at the

tubing manufacturer's facilities, transport basket, and lifting set along with the reeler, HPU, control stand, and interconnect lines. Logan also provided a purpose-built overboarding platform with a translating / clamshell to accommodate OneSubsea's unique end connection philosophy.

Logan's team placed a work deck, dimple connector, test tool, controls, and safeguards on this overboarding platform to give the crew plenty of access to the volume of space under the overboarding point. The overboarding platform also provided a reeler deck loading spreader effect on the vessel's deck. We believe this is truly the next evolution in coiled tubing deployment offshore, and provides significantly more convenience for our customers. This is one of the most comprehensive reeler equipment suites Logan has had the pleasure to provide, and we expect it to remain in service for quite some time.

Headquartered northwest of Houston in Hempstead, Texas, Logan Industries provides precision hydraulic energy and control management system solutions within a range of industries, including oil and gas, lumber, steel, industrial, dredging, mining, and marine. Logan Industries designs, engineers, and manufactures fit-for-purpose equipment. The company provides field commissioning and field service. Logan also performs machine refurbishments and provides rental equipment. Logan backs all of this up with strong engineering and corporate support for challenging projects. Logan Industries holds several manufacturing certificates (API Q1, 6A, 8C, ASME U & R, ISO 9001:2015), and is qualified to work under API 16AR. For more information, visit **www.loganindustries.net**.

CDG, Inc. provided the forward-thinking design for Southside.

EXPANDING POPULATION DEMANDS MORE THAN COLLABORATION

New treatment plant allows sought-after Southside to keep growing

BY DAN WIDDEL, LAKESIDE EQUIPMENT CORPORATION

Growth, progress, prosperity. There's no shortage of it in North Alabama, which has seen its population grow by 30,000 over the last five years and is projected to rise by a further 24,500 by 2027. Jobs are also on the up, having increased by almost 50,000 in the past five years—with a projected growth of 33,000 more jobs, also in the next five years.

In Etowah County, Alabama's smallest yet most densely populated county, vibrant Southside (population 8,000—about an hour north west of Birmingham), is its fastest growing city, but this prestigious position held by the place described as the "loveliest village on the Coosa River" has been faced with the recent possibility of being overtaken by other fast-rising locations in the state.

ADJUSTING TO THE GROWING PAINS

With growth, naturally, comes the need for new infrastructure. Southside's old sewage lagoon system, despite decades of excellent management, had finally reached its capacity. All that growth, progress, and prosperity—but a potential halt on building more homes and attracting more business to the area—without a new wastewater treat "Everything was perfectly in order with our treatment levels," says David Fry, assistant superintendent for Southside Water Works and Sewer Board, "but we'd reached the point where there was a moratorium on the lagoon, so to keep Southside on track, the city knew it had to invest in a treatment system that would futureproof the well-being and continued success of Southside."

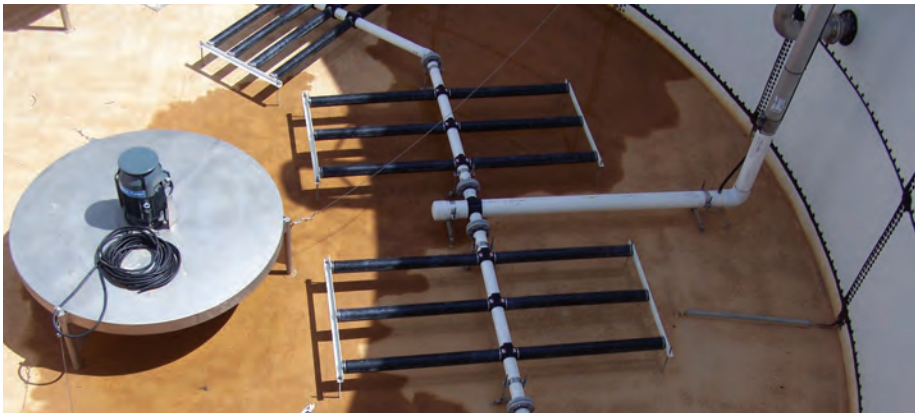
CDG, Inc., who operate across the whole of Alabama, were brought in to work with the city of Southside to find the best solution. Bordered by the Coosa River in the foothills of the southern Appalachian Mountains, the area is blessed with wildlife, as well as top quality boating and fishing,

so not surprisingly, it is very well monitored by Alabama's Department of Environmental Management.

Scott Trott, P.E., chief strategy officer at CDG, comments, "As always, we wanted to do much more than just collaborate; we wanted to build a unified team with trust, so we brainstormed long and hard with Brandon Sewell (superintendent) and David Fry (assistant superintendent) at the Water Works and Sewer Board to explore all the options."

He adds, "This included seeing how or if the lagoons could be improved, but they just can't economically and reliably meet today's environmental needs. Some poorly maintained lagoons have well-documented issues of unwanted odors, bacterial spread, and nitrogen/phosphorous overload, but the Southside Board and its predecessors had always managed the lagoon system very professionally and successfully."

Ultimately, an SBR (sequencing batch reactor) was chosen, one that was very robust—simple to operate—and could be easily scaled up for future needs. A site was identified, and after the equipment opportunities went out to bid, an SBR from Lakeside Equipment Corporation was chosen from its long-established agent in Alabama, the Eshelman Company.



Lakeside's SBR was selected for Southside.

Trott continues, "Bringing the team together, including Aaron Schmidt at Schmidt Environmental Construction, Inc., we started mapping out the project with a detailed analysis so that we all knew where we were, understood what our success would look like, and how every move we made was in that right direction."

Designed as a cost-effective biological treatment process, Lakeside's SBR benefits from a fully automated system that treats raw wastewater flow in a single basin using timed based phases to fill, mix, aerate, settle, decant, and waste sludge. It incorporates diffused

The Eshelman Company sourced most of the equipment.

aeration with mixers to provide optimum mixing and aeration for high oxygen transfer. An innovative decanter minimizes decanting intervals while extending the biological process time. The resultant clear water discharges without foam or floating scum.

LONG-LASTING AND EFFECTIVE

Ed Moore from the Eshelman Company says, "For me, the choice of CDG, Inc. and such a long-lasting and effective Lakeside SBR underlines the city of Southside's desire to do things properly. The old lagoon system was hampering the growth and prosperity of the city, so it was exciting to see Scott Trott's forward-thinking design for what was clearly going to be a very well thought out, scalable new plant that would keep Southside one step ahead of the rest for many years to come."

The new site was laid out so that capacity—peak flow of one million gallons per day—could easily be doubled by building new tanks. Initially, it would only be running at around 150,000 to 175,000 gallons per day on average—or up 300,000 gallons per day, depending on the time of year. The site required a fair degree of earth moving for it to be raised—with ample ground water to contend with – but according to contractor, Aaron Schmidt, this proved a straightforward challenge as the team quickly gelled together.

"Most of the equipment was sourced by the Eshelman Company," says Schmidt, "so being able to call upon Ed Moore's knowledge and experience was a big help. Lakeside were also always quick to respond to any questions during the ten months of construction."

It would be interesting to know just how seamless or otherwise it was when Southside's first water system was constructed when the city was incorporated in 1957 and constructed its first water system. Now, more than six decades on for its first dedicated wastewater treatment plant, CDG, Inc. through Scott Trott's design, took great care not to overbuild the new facility, putting a constant review process into place with certified personnel to see the layout from the customer's viewpoint; carefully considering heights, spaces, and repeat activities—all to make the treatment plant operator's job easier—without unnecessary obstacles.

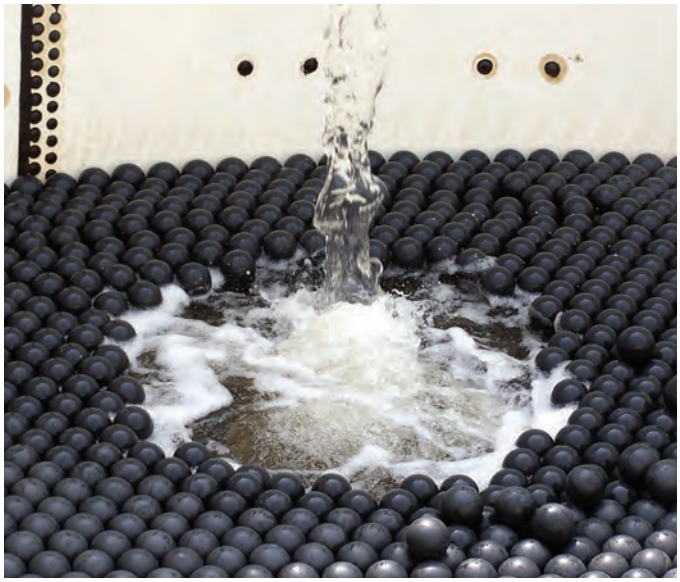
TOTAL SUPPORT THROUGHOUT

CDG's Trott continues, "With designs that aren't overly-complicated for the sake of it, Lakeside clearly understand the needs of operators, so this, together with being excellent communicators, made everything much easier and enjoyable to work on. Some companies only work well when the sun is shining, so to speak, but as always, you soon find out who you are really working with when you hit a few stumbling blocks—and I can safely say that Jim Aitkenhead and his colleagues at Lakeside were with us from start to finish—total support throughout, taking huge pride in the job. There have been no problems with the SBR. It is very reliable and effective."

Based on a thirty-five-year cost analysis, with key component assets forecast for a minimum of twenty-five years, the Lakeside SBR comprises five key stages in its process:

1. **MIX-FILL:** Raw wastewater is introduced into the basin where it is mixed with the mixed liquor suspended solids (MLSS). This phase is anoxic and can be adjusted to anaerobic for phosphorus release.
2. **REACT-FILL:** Aeration is added as the basin is fed with raw wastewater to create aerobic conditions for BOD and ammonia removal. This phase can alternate between aerobic and anoxic conditions for nutrient removal.
3. **REACT:** Raw wastewater flow is stopped from entering the basin. Aeration and mixing are controlled to provide final treatment.
4. **SETTLE:** Aeration and mixing are stopped to allow separation of liquid and solids.
5. **DECANT AND SLUDGE WASTING:** Clear effluent is removed from the surface by the decanter. Near the end of decanting cycle, a set amount of settled sludge is wasted from the system.

Brandon Sewell, superintendent for Southside Water Works and Sewer Board, continues, "From managing chlorine levels at the lagoon, there is obviously far more to a full treatment plant, but that said, the SBR is very easy to operate, with the back-up of the SCADA system and the team



The new facility is easily scalable for the future.

always ready with help if required. The Lakeside SBR was the right solution for us. It works really well."

The Eshelman Company's Moore adds, "Southside now has a delightful plant to walk around. It has a really good vibe and feel. Considering it has such a high level of design and such rugged equipment, the final cost of $4.3 million is an outstanding achievement by all concerned, especially because the new facility is so easily scalable for the future. This is a great example of a long-lasting investment for the wastewater industry."

CRUCIAL TO THE CONTINUING SUCCESS AND GROWTH OF THE CITY

Fry, assistant superintendent for Southside Water Works and Sewer Board, concludes, "The final effluent from the SBR looks just like drinking water, which is pretty remarkable when you see where it has come from. Overall, the plant is very maintenance-friendly.

"Maybe it sounds strange to some people, but the new plant is a great environment to work in—and Southside is a great place to live. This new treatment plant is crucial to the continuing success and growth of the city. Now that there is all this new capacity, Southside can welcome the building of more new homes and investment from new business."

DAN WIDDEL is regional sales manager at Lakeside Equipment Corporation. Lakeside Equipment Corporation is an engineering and manufacturing company concentrating on helping to improve the quality of our water resources. Lakeside started in the spring of 1928 to engineer, develop, and provide water purification systems to municipalities and companies throughout North America. For more information, visit **www.lakeside-equipment.com**.

RESOLVING STORMWATER FLOODING

Mitigation alternatives increase flow capacity and update infrastructure

BY NICK VASTINE, APPLIED FLOW TECHNOLOGY

The Gulf of Mexico coast averages some of the highest rainfall in the United States. As a result, cities like Houston, Texas, and their surrounding industrial complexes require ample infrastructure to avoid stormwater flooding. Without this infrastructure, frequently flooded process areas can create a hazard for operators and operations alike.

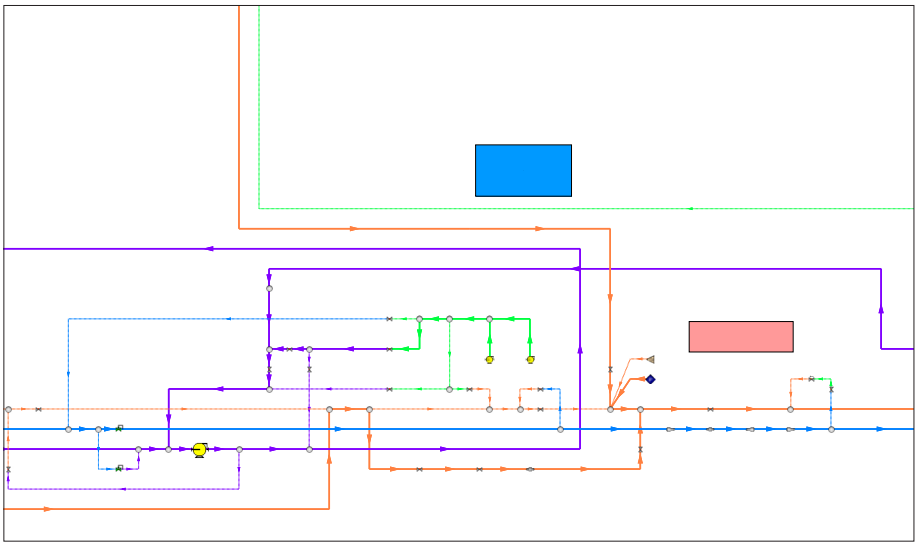
ADDRESSING FLOODING MITIGATION

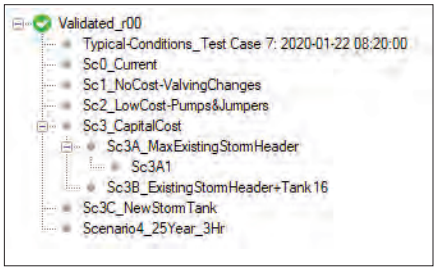
Michael Arthur, an engineer with Texas-based Hydrus Works, LLC, used pipe flow modeling software, AFT Fathom, to evaluate a failing stormwater system for a Gulf Coast refinery. While flooding mitigation was the primary concern, Hydrus Works was also providing a second opinion on a larger incumbent firm's expensive recommendations. Hydrus Works' use of AFT Fathom, and their unique data collection, allowed them to explore design alternatives across a range of expenditure tiers. These alternatives ultimately allowed the firm to shave 35 percent from the original proposed $70 million scope, a $25 million reduction while meeting client design requirements.

The stormwater system is made up of a series of gravity drains married to a network of lift stations. These lift stations generally consist of two parallel pumps feeding to a stormwater header, draining into a dedicated storage tank. The AFT Fathom model of the system annotates the various lift stations and the stormwater tank. The annotations make it evident it was shared among a team during development. The project refinery is confidential, but it is obvious the model was drawn over aerial photography of the site, easily relating the model input and results to the physical system.

MAKING THE MOST OF YOUR DATA

Like all AFT Fathom models for an existing system, a model is only as good as its input data. Arthur's initial pass at modeling drew largely from drawings and data sheets, before applying 160,000 data points to refine the calibration. Their wealth of data points allowed Hydrus Works to precisely match pipe conditions, pump operation, valve position, and





Scenario tree of the expenditure tiered alternatives.

determine other component losses through resistance curves. Many of these elements were iterated automatically through AFT's Goal Seek and Control module, accounting for degradation through design factors and pump affinity laws to reduce performance. The resulting 505-pipe model was calibrated to within 3 percent accuracy of field measurement.

With a calibrated model in hand, Arthur was able to explore diverse system set-ups across the various expenditure tiers. With Scenarios, the team could consolidate these alternatives into a single file, all building from the original calibrated model. The final scenario tree is found above. The final three capital alternatives proposed drastic updates to piping infrastructure, ultimately increasing stormwater flow capacity by more than 151 percent.

BETTER EFFICIENCY MEANS MORE OPPORTUNITY

It is apparent the team at Hydrus Works fully understands the capabilities and conveniences of AFT software. Arthur and his team took advantage of both engineering efficiency tools with Excel export and goal-seeking variables, as well as convenience tools in scenarios and workspace customization. By using AFT Fathom's full extent of features, the firm can compete with larger firms and find potentially overlooked opportunities.

NICK VASTINE is a business applications engineer at Applied Flow Technology (AFT) and holds a bachelor of science in chemical engineering with a minor in economics from the Colorado School of Mines. Applied Flow Technology (AFT) is the premier piping and ducting systems analysis and modeling software. With an unmatched combination of capability and ease-of-use, AFT software products are used in more than fifty countries and in just about any industry in which you find piping and ducting systems. For more information, visit **www.aft.com**.

FRONTLOADING COMPUTATIONAL FLUID DYNAMICS BENEFITS EVERYONE

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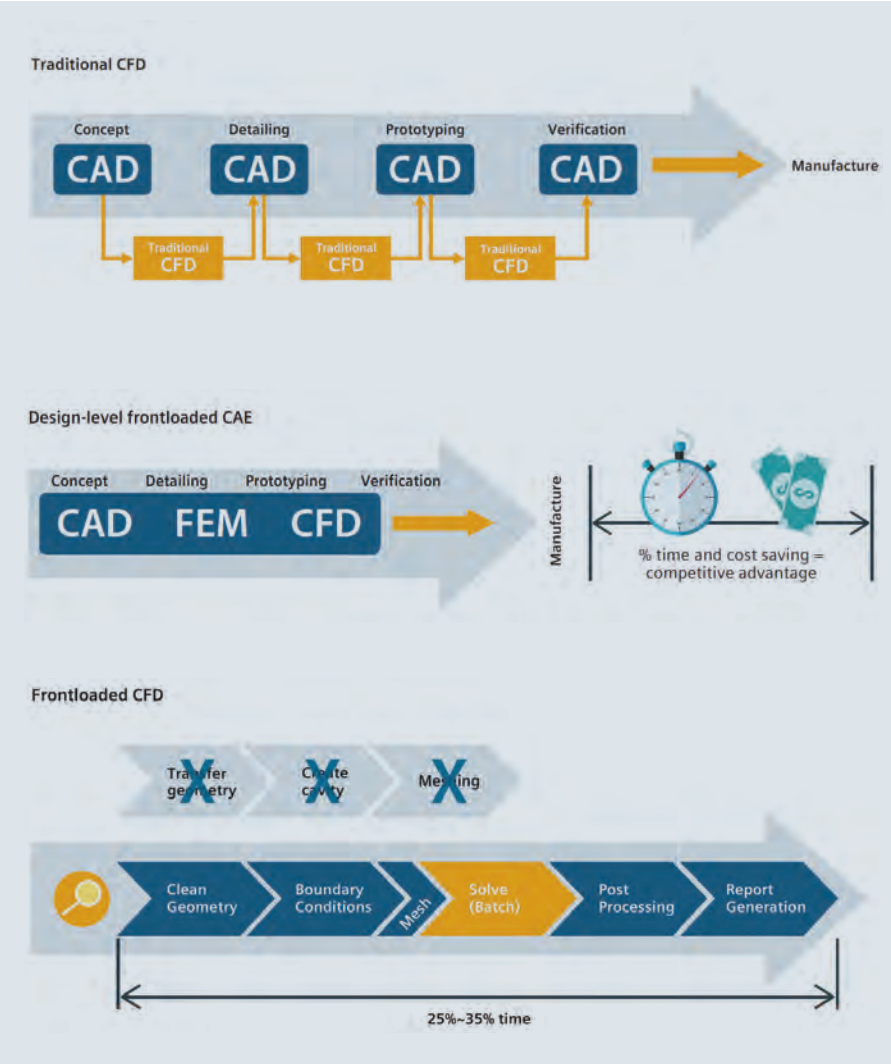
Tips for increasing engineering productivity Part 2 of 2

BY JOHN MEYER, SIEMENS



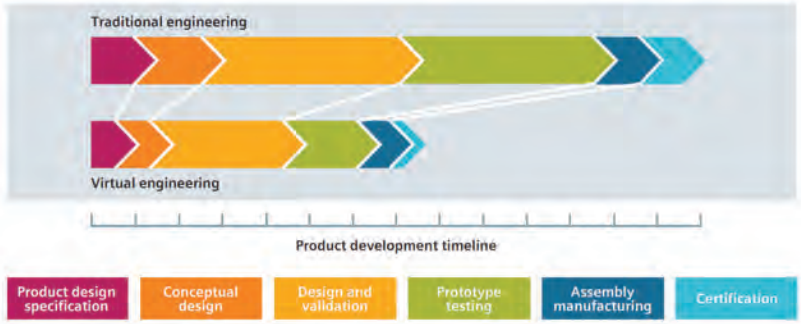
Frontloaded CFD solutions offer significant time savings.

The benefits of simulating early as a part of the design process have been documented extensively. The cost of each engineering change increases with each step from concept to production. According to the U.S. Department of Defense (as reported by the Defense Acquisition University), while 20 percent of the actual cost has been accrued, 80 percent of the total life-cycle cost of U.S. defense projects were determined by the test phase. In other words, the cost of the product was locked in by decisions made during the early concept stages when little is known about the design. Also, the cost to fix defects rose as you proceed further down the process.

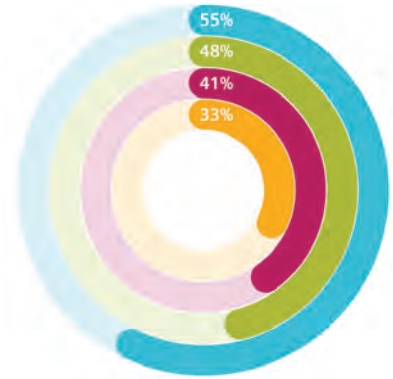
Although this data is from the defense sector, commercial entities likely face similar life-cycle costs. For electro-mechanical designs, simulating early and often is important. The right tools need to be made available at the right time so that the information can be accessed for early evaluation. This practice is called frontloading.

TIP #5

Select the right tool to frontload CFD, significantly shorten simulation time and achieve a more competitive design process.



Simcenter FLOEFD and frontloading CFD can shorten development time (source: National Institute for Aviation Research).



Per Lifecycle Insights.

Interestingly, testing a design only at the prototype stage has been proven to be very costly. According to a report by Lifecycle Insights, failed prototypes lead to project milestones being missed, extra rounds of testing and having to work long hours among many other issues.

THE MOVE FROM TRADITIONAL CFD

In last month's introduction, we started an overview of traditional CFD methods. However, design-centric CFD solutions include built-in intelligent automation. They have been developed to be simply another supported feature inside the CAD system, alongside finite element method (FEM) analyses such as stress, to help frontload CFD.

Also frontloaded CFD solutions compress analysis time significantly—some organizations have reported a time compression of 75 percent. How is this possible? Frontloaded CFD solutions offer key proven technologies that greatly reduce model preparation and preprocessing, such as the following.

First, by being fully embedded in CAD, the software uses the same native geometry for analysis. Exporting data and healing it in preparation for analysis is no longer required. In addition, the software simply slots in – it does not require you to learn a new interface nor does it require a familiarity with the interface every time the software is used. CFD analysis is simply another functionality offered by the CAD package.

Also, in fluid-flow and heat-transfer analysis, we are interested in understanding what is happening in the negative space, the empty space. With traditional CFD, additional geometry has to be created to represent that cavity. Frontloaded CFD solutions are intelligent enough to recognize that the empty space is the fluid domain so that no time is wasted creating geometry to accommodate software. This step is completely unnecessary.

Finally, before analysis can begin, the model has to be meshed. With traditional CFD, the engineer has to be fully conversant in which algorithm best depicts the flow phenomenon being studied. Frontloaded CFD solutions have a fully automated mesher that will automatically generate the best possible mesh for the problem being set up. The software has built-in intelligence such as SmartCells that make it possible to use even coarse meshes without sacrificing accuracy.

The National Institute for Aviation Research has verified the time savings offered by frontloading comparing it with traditional methods. In short, by using the right tool to frontload CFD, you may be able to significantly shorten your simulation time and achieve a shorter, more competitive engineering design process.

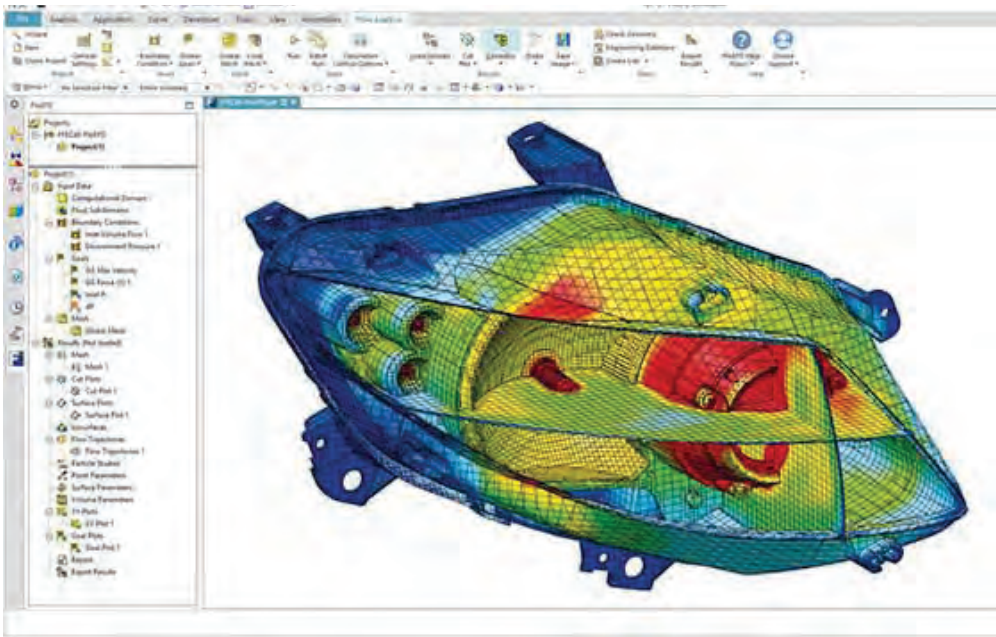
THE DESIGNER

Today's typical designer is a mechanical engineer. During the course of their education most mechanical engineers have been exposed to the principles of CFD in one shape, form, or another. But most importantly, an engineer working on the design of any product is fully versed in the background of what he or she is designing. For example, a design engineer working on the design of automotive lighting got the job because they have a background in electronics design and is familiar with the basic properties and behavior of automotive lighting. They understand that electronics generate heat and the effect of excessive heat on performance. They understand that squeezing electronics into an enclosure will create a thermal problem. They understand that many electronic components are at their disposal to reduce the heat, including heatsinks. Even the use of different materials may create a different operating environment that may change the effect of heat.

In short, design engineers are more than capable of assessing the problem, checking multiple design variants to see which ideas are the most effective, testing them, and generating a solid design. In fact, industry research corroborates that design engineers are in fact conducting fluid simulation in great numbers.

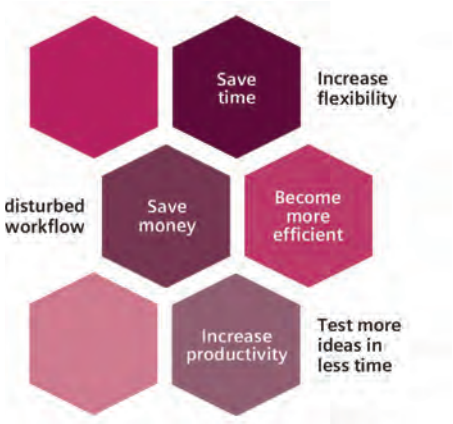
TIP #6

Using the right tool, design engineers are more than capable of assessing a problem, checking design variants, and testing trends.



WHY IS SIMCENTER FLOEFD THE RIGHT SOLUTION?

Simcenter FLOEFD technology, first introduced to the market in 1991, has been used by thousands of engineers to frontload CFD in the design process. The award-winning Simcenter FLOEFD will not disturb or require modification of the workflow. Simcenter FLOEFD simply fits into the process without any disruption. It provides increased flexibility to test many design ideas in less time—when the R&D cost committed to the project is lower and fairly flexible. It helps the design team become more efficient at discarding suboptimal ideas sooner and lets the analyst team focus on solving more complex analysis problems and complete verification faster.



PROVEN PRODUCTIVITY GAINS

Conducting analysis with Simcenter FLOEFD is significantly fast. The speed is a result of intelligent automation, use of the CAD environment, and ease-of-use. Simcenter FLOEFD is completely embedded in the most popular CAD programs. Despite its different interface for each CAD program, the experience remains the same. Designers have reported being able to use the software with less than eight hours of training, much less than traditional CFD programs which can require as long as twelve months training to use the software productively.

Because the engineer operates Simcenter FLOEFD in a native CAD environment and uses native geometry, data does not need to be transferred out of CAD and into Simcenter FLOEFD. The model is immediately available for analysis, thus saving time and effort. Wizards, plain engineering language, and extensive libraries further enhance the experience and allow the designer to setup models quickly and effortlessWly. Its automatic mesher lets the designer mesh the model with minimal intervention. In addition, the software automatically recognizes the fluid region.

Simcenter FLOEFD also makes it easy to analyze multiple variants of the design. The designer simply modifies the model in CAD, and Simcenter FLOEFD automatically attaches the previously set analysis information including boundary conditions and material properties to the new variant. Upon remeshing, the model can again be analyzed.

Speed is of the essence for enabling the engineer conduct analysis in a timely manner to keep up with the fast-moving world of design. Simcenter FLOEFD significantly saves time.

During a recent benchmark, design engineers at an aerospace company realized a 10x productivity enhancement with Simcenter FLOEFD compared to a traditional CFD package when simulating pressure loss in a complex shape channel. The traditional CFD tool required more time investment during the preprocessing stage, especially for model preparation, which included time for transferring the model out from the CAD package and then healing it. It also required significantly more time for mesh generation. During the solution phase, the traditional CFD tool needed significantly longer to solve the problem given the size of the mesh. Arguably, the solution time can be handled with brute force by throwing as many processors as possible at the problem. However, when comparing apples to apples (using the same hardware), Simcenter FLOEFD required less time to solve the same problem. When looking at the entire process, Simcenter FLOEFD required only four hours versus forty hours to complete the same task,

with the same accuracy. Needless to say, the design team is now using Simcenter FLOEFD.

PROVEN ACCURACY

Being fast is good but being fast and accurate is better. Simcenter FLOEFD technology has its roots in the Russian aerospace industry and has been in use since 1991. Its first validation was made in collaboration with the German Aerospace Centrum (DLR). It focused on the separation in a rocket nozzle and compared simulation results versus experiment, and the results proved that the technology was solid.

Since those early days, Simcenter FLOEFD technology has undergone a fair amount of scrutiny by leading aerospace and automotive organizations. Most recently the Society of Automotive Engineers of Japan (JSAE) published a blind benchmark of seven, leading, commercial-CFD, simulation-software programs to demonstrate the accuracy of each tool against validated test results from a wind tunnel. Simcenter FLOEFD again proved its accuracy in this nonpartisan benchmark.

ACCURATE AND FAST

CFD simulation as an integral step during the design stage is no longer a luxury, it is a must. Companies that embrace that change prosper. Those who do not will continue to waste precious resources.

Can your company afford to be in the latter group?

Siemens Digital Industries (DI) is an innovation leader in automation and digitalization. Closely collaborating with partners and customers, DI drives the digital transformation in the process and discrete industries. With its Digital Enterprise portfolio, DI provides companies of all sizes with an end-to-end set of products, solutions and services to integrate and digitalize the entire value chain. Optimized for the specific needs of each industry, DI's unique portfolio supports customers to achieve greater productivity and flexibility. DI is constantly adding innovations to its portfolio to integrate cutting-edge future technologies. For more information, visit **www.siemens.com/software**.

TRAINING RELIABILITY PROFESSIONALS AND SUBJECT MATTER EXPERTS

For the next generation of engineers, education starts after graduation Part 1 of 2

BY HEINZ P. BLOCH

As in all professions, there are individuals who graduated near the top of their class, and others who graduated last. Rarely would we want to entrust our health, home, children, or food preparation to the ones who "barely made it" and, since getting out from whatever schools they may have attended, have learned (or contributed) next to nothing. The author and his colleagues often append this material to our main texts for the benefit of managers whose responsibilities include the grooming or development of reliability professionals and/or subject matter experts (SMEs). We also include this material to guide individuals who quite correctly view it as one of the roadmaps to self-improvement.

After a bit of history, this series presents experience-based remedies that have allowed many engineers to climb out of the rut in which others continue to find themselves. The specifics of successful training are

given here. Specifics are important because the engineering profession finds itself surrounded by buzzwords and clever acronyms. However, many buzzwords and catchy phrases are mere consultant-conceived generalities. Some have been labeled "flavors of the month," the equivalent of feel-good quick fixes.

LACK OF RECOGNITION HAS ORIGINS

In the 1950s and when some of us graduated from engineering colleges in the early 1960s, a mechanical engineer's career was largely influenced by supervisors and managers who had moved through the same, or very similar, knowledge-based career steps. Guidance and direction given in those days was far more focused than what is being offered six or seven decades later by generalists and managerial types. The worldview of the early twenty-first century's boss is often shaped by motives and forces substantially different from those that prevailed fifty years ago. The ultimate effects of this "new thinking" are decisions that often endanger the health and safety of personnel. In some instances, decisions and indecisions have put the profitability and survivability of entire corporations at risk. Some of the most prominent names in manufacturing, transportation, and aviation have vanished, and it would serve no purpose to dig up the underlying reasons for their demise.

As we now enter the decade of the 2020s, far fewer engineers are enabled and empowered to be decision makers; also, the visibility of the profession has been diminished. A further shrinking of the overall prestige of the engineering profession has taken place over the past two to three decades. This reduced prestige is partly caused by engineers tacitly allowing a cheapening of products and services, and the profession often tolerating repeat failures. Add the fact that engineers rarely speak with one voice and have, on more than one occasion, accepted sales pitches and claims that run counter to the laws of physics and science. As a result, even their very credibility is sometimes questioned.

Making matters worse, many engineers are either not interested in thoroughly documenting their work or are unable to express themselves with fluency and accuracy. These inabilities tend to impede their progress and can close the door to professional recognition. Then also, and quite unlike medical doctors whom one would consistently address as "doctor," engineers are perfectly content being called by

their first names. That fact alone might illustrate why engineers are not held in the same esteem as the medical profession. Moreover, many engineering graduates consider studying for a professional engineer's exam a waste of time—for whatever reasons. However, having the drive and motivation to study for and pass such an exam would be perceived as a positive step by others, and would often help improve one's own sense of self-worth and accomplishment.

In contacts with the legal profession, as expert witnesses or otherwise, engineers very often concede the entire field to the attorneys. Many engineers meekly endure attacks on them or their credibility. They allow lawyers to browbeat them into submission. This, too, does nothing positive for the esteem in which others hold the engineer's profession. Allowing such attacks or conceding the field to those who shout the loudest is not enhancing an engineer's image. But fortunately, it does not have to be that way. Observe, for instance, how the top companies train and grow their reliability engineers or subject matter experts (SMEs).

THERE ARE CHOICES TO BE MADE

While time and unforeseen occurrences befall anyone, it is equally true that our lives are largely influenced by the choices we make. A reliability engineer can choose to receive virtually all his or her post-college training in the form of on-the-job learning. Of course, there's nothing wrong with traditional on-the-job learning; chances are the process reliability professional started his career by splitting his time between field training and the many other training methods that were available to him. We can be certain that one such "other method" will be chosen by those that buttress and supplement their field learning with mature reading habits.

It is a well-recognized fact that mature reading habits will greatly accelerate the acquisition of thoroughly marketable skills. A disciplined reader's knowledge intake will progress in considerably more structured and measurable ways than the intake and absorption rate of a traditional on-the-job learner. Reading is one of the keys to professional growth

Accepting and absorbing as "fact" what somebody else tells us may not always be of true benefit, but neither will the act of discarding everything that others have done before us. For instance, some engineers offer guesses instead of solutions, or accept on blind faith what others tell them "on the job." Some, not having trained their thinking abilities, confine their contributions to voicing concerns over potential problems. Although having a degree in engineering, practitioners of a shallow version of engineering put themselves at risk of being viewed

by management as a dispensable job function, a "pair of hands," a person deserving little respect, one that can be readily terminated, and easily replaced by contract employees.

On the opposite extreme of the ones who habitually spout off opinions are the perfectionists. Perfectionist engineers see doom in every decision made by man. They will "study things to death," not realizing that there are many endeavors that do not merit investigation or micro-definition beyond a certain point. Obviously, either of the two extremes must be avoided, and science must always trump gullibility and sales pitches. On the other hand, testing and understanding "the mechanics of things" is always a sensible pursuit, as is thoroughly examining underlying design principles. This implies that a balanced view must be sought; it stands to reason that finding and consistently practicing this balance will require effort. It also requires an investment in time, and certainly implies reading and thinking not just on one's employer's time, but also on one's own time. Reading, learning, and progressing are shared responsibilities. Both parties must invest in this activity, and the employer should periodically sit down with the employee to examine progress. During such performance appraisals, the parties could go over such topics as "how we do procedure 'X' or repair 'Y' at this facility versus how the book tells us it's done at best-in-class ("BiC") facilities."

True professionals have balance. They learn to identify root causes of problems and map out remedial actions that avoid problem recurrence. While it is certainly never too late to choose cultivating the balanced view, it is obviously best to do so early in one's life. Regardless of how and when acquired, a balanced view can be transferred into a job situation. The acronym "CCC" is worth remembering: "Cooperation. Communication. Consideration." Practicing all three is needed if we want to consistently add value.

WHY SHARED LEARNING AND A MEASURE OF SPECIALIZATION ARE IMPORTANT

When a person learns and/or adds experience in a field that is logically related to his or her job function, both employee and employer stand to benefit far beyond their original expectations. The employee gains a sense of self-worth that will allow him or her to confidently look ahead to an otherwise hazy employment future. By nurturing an employee's desire to learn and become an above-average contributor, an employer may well gain a value-adding employee. The employee adds value by acquiring and cultivating the ability to make "go-no-go" or "do versus don't do" decisions. These decisions will be based on more fully understanding risks and consequences; the ability to carefully weigh these decisions can

be worth a fortune. A smart employer, therefore, makes training a shared responsibility. Such an employer will faithfully do his or her part; likewise, the employee will consistently and conscientiously do his or her part.

Bright people have an intuitive understanding of the merits of having not just a job; they wish to gain an increasing measure of marketable knowledge, or marketable skill. They put themselves in charge of their own future and assign great value to the systematic acquisition of a definable specialty. They also know, ultimately, how they compare against above-average competitors.

ACTING AT THE STUDENT LEVEL

Let's just assume the reader is a student and future mechanical engineer with the goal of specialization in rotating machinery for oil refineries and petrochemical plants, or reliability improvement of fluid machinery (pumps, turbines, compressors). Note that this arbitrarily chosen specialization goal is not as narrow as, say, "small metering pumps." An overly narrow area might not serve you in the long term if, for instance, small metering pumps were suddenly being replaced by "electronic stroking pistons" or whatever. Likewise, an overly broad area of specialization (such as "machinery and equipment") might be presumed to include bookbinding, consumer goods packaging, shoe manufacturing, and ten thousand other types of machines. Claiming coverage of such an area could be grounds for suspecting a measure of shallowness or naivete in the applicant.

A LOOK AHEAD: STEPS IN THE TRAINING AND LEARNING PROCESSES

In next month's conclusion, we'll re-emphasize the maxim that the most important learning process in an engineer's training begins after graduation. Specifically, we'll dig deep into distinct phases of learning, from reading trade journals and technical books to participating in off-site meetings and conferences. Each phase builds on the others, requires different demands, but also presents exponential rewards.

HEINZ P. BLOCH resides in Montgomery, Texas. His professional career commenced in 1962 and included long-term assignments as Exxon Chemical's regional machinery specialist for the United States. He has authored or co-written over 800 publications, among them twenty-four comprehensive books on practical machinery management, failure analysis, failure avoidance, compressors, steam turbines, pumps, oil mist lubrication, and optimized lubrication for industry. Bloch holds a B.S. and an M.S. degree (cum laude) in mechanical engineering from Newark College of Engineering (NCE). He is an ASME Life Fellow and was awarded life-time registration as a professional engineer in New Jersey. He is one of ten inaugural inductees into NCE's Hall of Fame, which honors its most distinguished alumni.

MAINTAINING YOUR PUMP CAN BE SIMPLE

How to install cartridge and component seals on a Griswold® 811 ANSI Series Pump

BY JAMES FARLEY, GRISWOLD

The Griswold® 811 ANSI Series is comprised of a versatile, reliable collection of centrifugal pumps. With over thirty models available in a wide range of sizes and capacities, Griswold 811 ANSI Series centrifugal pumps are heavy-duty, ASME B73.1 compliant, and purpose-built to fit any process-fluid application.

Maintaining these pumps is a simplified process thanks to their advanced engineering. Installing or replacing the seals is a particularly crucial part of basic maintenance to avoid fluid leaks, ruptures and other safety hazards.

Installing either a cartridge or component-type seal is a standard

GRISWOLD 811 ANSI SERIES PUMPS: UP CLOSE

The 811 ANSI Series is available in a wide range of sizes, capacities, and materials to fit virtually any process-fluid application. Griswold has your application covered—for abrasives, corrosive substances, and a wide range of capacities.

MAX FLOW RATE
7,000 gallons per minute

MAX HEAD
900 feet

MAX TEMPERATURE
500 degrees Fahrenheit
(260 degrees Celsius)

AVAILABLE MATERIALS
Ductile Iron
316 Stainless Steel
Alloy 20
CD4MCuN

process depending on the pump size and style. To help make the installation process easier, we've created this quick and handy guide to installing both types of seals.

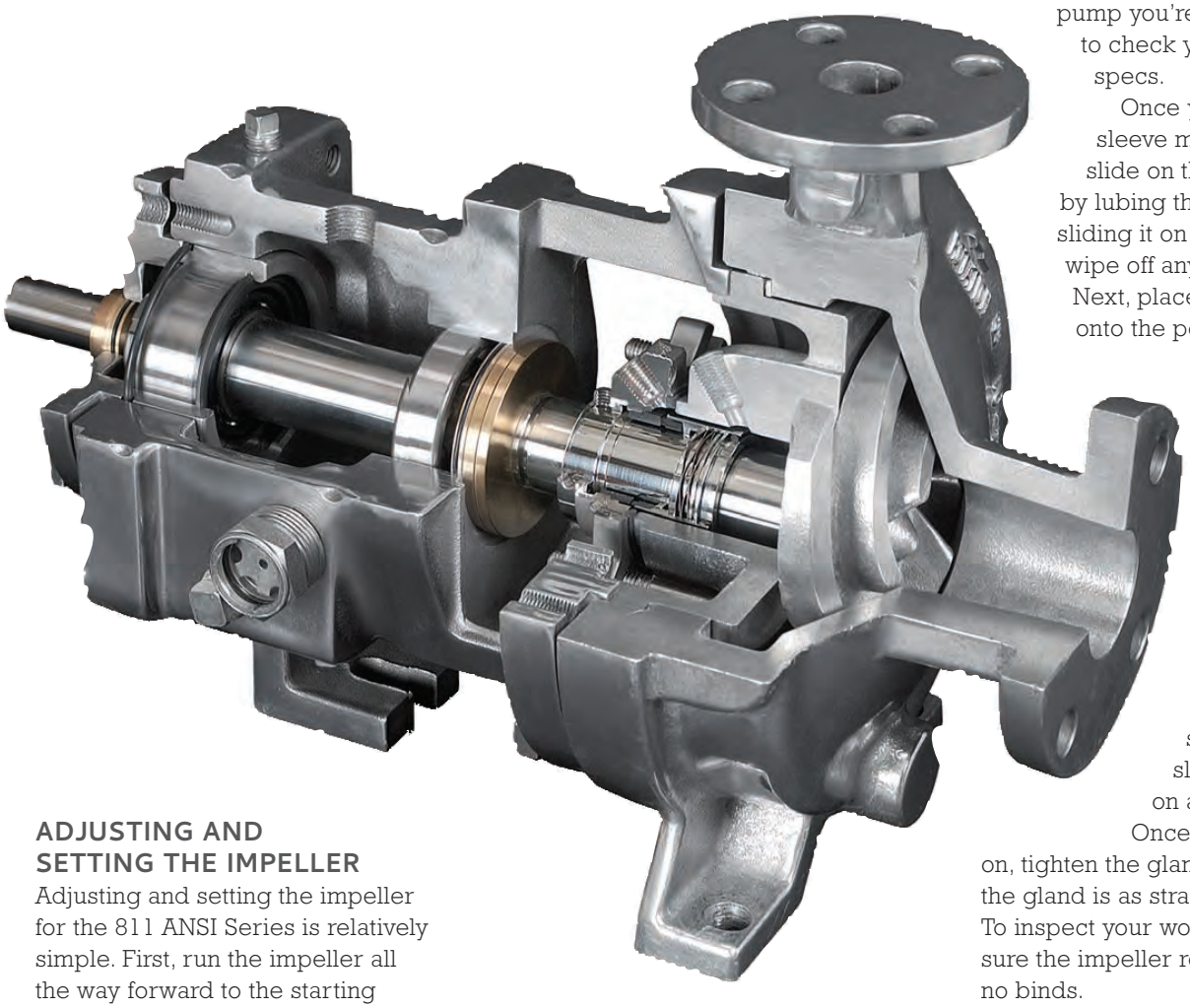
INSTALLING AES CARTRIDGE SEALS: STEP BY STEP

Using a workbench or similar flat workspace, screw in all the studs into the stuffing box. Next, install the seal onto the stuffing box, with the flush line inlet facing the power frame, then place two washers on each stud, and cap them off with a nut. Turn the stuffing box with the seal attached over and lube the back O-ring that seals on the sleeve.

Now slide the sleeve on the power frame shaft, and then mount the stuffing box and seal straight on the sleeve—make sure the flush line is facing towards the sight glass/power frame side. Then screw the nuts on the stuffing box studs. Lightly lube the threads on the shaft and the impeller, and place the O-ring on the impeller. Now that the O-ring is in place, spin the impeller on the threaded end of the shaft.

Once the impeller is tightened down, insert the case gasket into the case and slide the front case back on and tighten down the case bolts. Make sure the impeller adjustment bolts in the back are backed off so the case mates up to the impeller.

Congratulations—your AES cartridge seals are now installed.



ADJUSTING AND SETTING THE IMPELLER

Adjusting and setting the impeller for the 811 ANSI Series is relatively simple. First, run the impeller all the way forward to the starting point and set your dial indicator to zero. Now move the impeller to the desired setting.

Once you have the setting right, tighten up the seal. To accomplish this, torque down each bolt a little at a time to make sure the seal goes in straight and flat. Once the seal is in, run the set screws in to mate up to the shaft.

After the set screws are tightened, remove the safety clips. One additional tip: Be sure to save the clips for future use.

INSTALLING COMPONENT SEALS: STEP BY STEP

As with before, begin by using a workbench or similar flat workspace. Lube the capsulated the O-ring on the gland seal, and install the seal into the gland, relief side down (this is the seal point on the stuffing box). Once the seal is in the gland, wipe off any excess grease from the gland (and also your fingers!). Line up the gland with the studs on the stuffing box, slide it on, and tighten the bolts.

Next, make sure your calipers are nearby. Take the sleeve and seal and, using calipers, measure from the shaft side out to this seal for the style of pump you're using. You'll need to check your manual for specs.

Once you have your sleeve measurement, slide on the spring. Begin by lubing the seal itself and sliding it on the sleeve, then wipe off any excess grease. Next, place the stuffing box onto the power frame, then slide the seal into the stuffing box, moving the gland so it goes past the seal face.

Now, lube the impeller seal and press the O-ring onto it. Lube the shaft threads on the stuffing box, then slide the impeller on and spin it down.

Once the impeller is on, tighten the gland bolts down so the gland is as straight as possible. To inspect your work, carefully make sure the impeller rotates freely with no binds.

GETTING THE MOST FROM YOUR PUMP

Keep these guidelines close by. With these steps, you'll be able to install or replace seals quickly and seamlessly to get your pumps up and running with maximum efficiency.

JAMES FARLEY is Griswold product manager. Griswold is a product brand of PSG, a Dover company. PSG is comprised of several leading pump companies, including Abaque®, All-Flo™, Almatec®, Blackmer®, Ebsray®, em-tec®, Griswold®, Hydro™, Mouvex®, Neptune®, Quantex™, Quattroflow®, RedScrew™, and Wilden®. For more information, visit **www.psgdover.com/griswold**.

VIBRATION MONITORING THAT ANYONE CAN AFFORD

SEE •PART ONE• VISIT www.mptmag.com

A Q&A for proximity devices Part 2 of 2

BY RETT JESSE, METRIX INSTRUMENT CO.

In last month's installment of this series, we discussed how vibration monitoring is an affordable and reliable component for almost any manufacturing concern and introduced some common Metrix customer questions related to our DPS 1 system. Below, concluding this series, we'll address more common questions on getting the most out of your proximity devices. From verification reports to custom calibration to comparison against an analog driver or transmitter, there's still a great deal to learn—so let's get started.

HOW IS THE PROXIMITY SYSTEM "VERIFICATION" DONE WITH THE DPS 1.35?

Using the Metrix DPS configuration and utility software, connected to a DPS unit, while using the "Verification" tab the DPS proximity probe system can be verified to a known target material. This process can be completed by using a proximity probe static calibrator (dial micrometer) looking at shaft target material or the shaft directly.

When the proper gap is set between the probe and appropriate target material in 10 mil or 250 micron increments, use the "Get" button for the DPS to gather the voltage information. Please note that this process takes between 5 and 10 seconds, and cannot be filled in. It must be the voltage measured by the Metrix Digital Proximity System 1.35.

As the gaps are changed and voltages recorded the system draws the line between points, calculates the incremental scale factor (IFS—slope between points), the average scale factor (ASF), and the deviation from straight line (DSL—1 mil or 25 µm). Note: Acceptable IFS for a 200 mV/mil Proximity Probe is from 190 to 210 mV/mil or 7.48 to 8.26 mV/µm (200mV/mil + 5 percent or 7.87mV/µm + 5 percent, per API 670).

HOW IS A CUSTOM CALIBRATION OF THE DPS 1.35 CONDUCTED?

If the results of a "Verification" are unsatisfactory, then using the Metrix DPS configuration and utility software, and using the voltages recorded

after a "Verification" the user can select "Perform a Custom Calibration – Yes."

To ensure the custom calibration was effective, perform the verification step again. If the verification after the custom calibration is not satisfactory, you can try it again. If the results are still unsatisfactory, it is recommended to change parameters like system length, or material type as appropriate. It could also be a problem with the system set up or some component of the system such as probe, cable, or DPS unit.

Please note that last point (100 mils or 2500 μm) is not required, Metrix put this in because we normally can meet this distance. The API requirement is 80 mils (2250 μm) of linearity. This will use the results measured in the verification step to create a custom calibration for the DPS unit connected.

HOW DOES ONE GENERATE A REPORT USING THE DPS 1.35 SOFTWARE?

Using the Metrix DPS configuration and utility software, connected to a DPS unit, while using the "Verification" tab the DPS proximity probe system verification can be used to produce a verification report in Excel. With data in the verification table the user selects "Generate Report". The system will prompt the user to input appropriate information for the test.

None of the fields are required, but are usually necessary for proper documentation. The data from the DPS configuration is automatically uploaded into the report. After the report fields are filled in, or not, the user selects "OK" and then the user is prompted to input a file name and file location. The file generated is a Microsoft Excel file.

Upon opening the Excel file the header and footer can be changed, and the file can be supplemented with other verifications. Other verifications can be added, using the Excel copy and paste feature, to create a complete report.

HOW DOES MATERIAL TYPE IMPACT PROXIMITY READINGS?

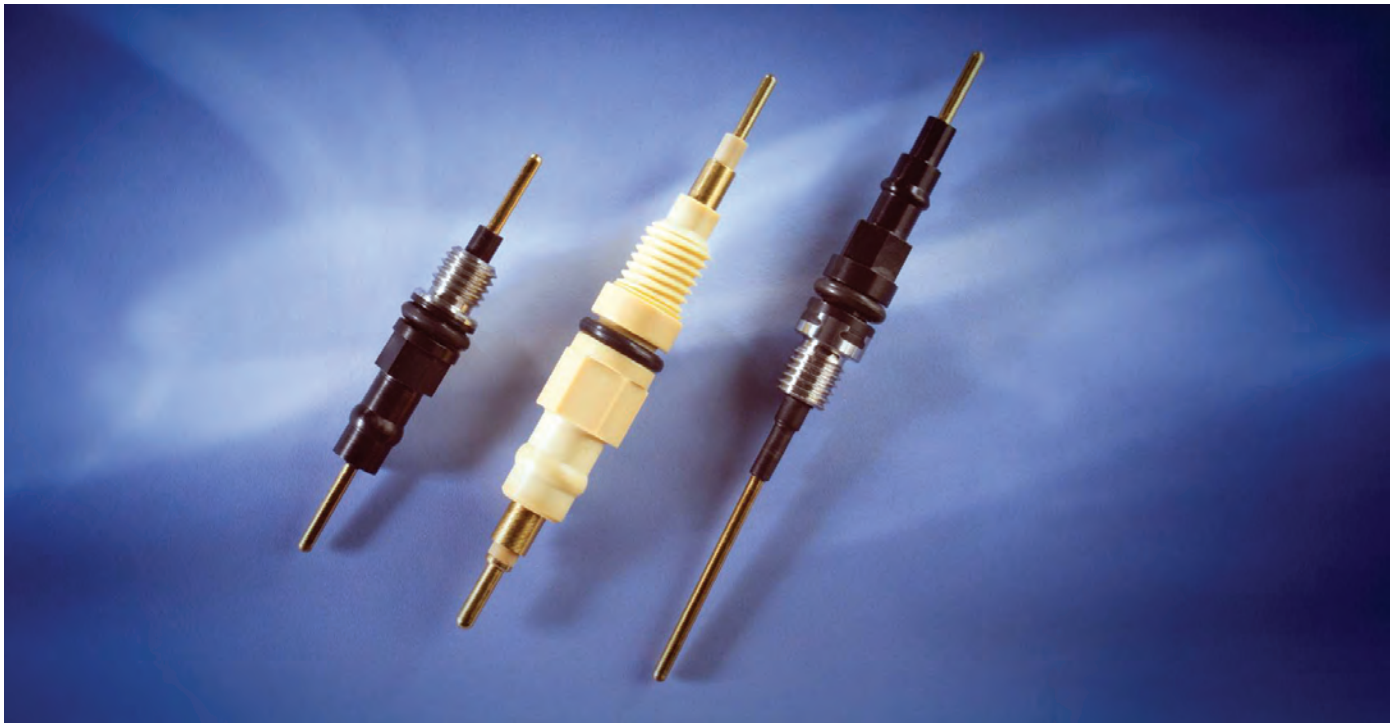
The proximity system generates eddy currents in the surface of the material. Depending on the range of the probe to the target material, the voltage output will be impacted by the eddy currents. The eddy currents generated in the target material are impacted by the material density, surface roughness and composition, and electromagnetic properties of the elements contained in the material.

The DPS can accommodate differences in material, system length, and probe type. All of these materials below could have been ordered directly from the factory or custom calibrated in the field to be within the API 670 specifications of 200 mV/mil +/- 5 percent (7.87 mV/μm).

BENEFITS TO THE CUSTOMER OF THE METRIX DIGITAL PROXIMITY SYSTEM (DPS)

Once customers take the leap into digital proximity sensors, they generally find improved frequency and amplitude resolution and reduced need for spare parts inventories. Furthermore, given the DPS's flexible nature, the system can be used with other manufacturers' proximity probes and cables. Also, regardless of manufacturer, if the probe curves are outside API 670 specifications for linearity and incremental scale factor the DPS can be reconfigured to meet specifications. It can work in tight applications where normal probe clearances are not available.

Metrix pioneered the concept of simple, affordable machinery protection with its mechanical vibration switch offerings, revolutionary 4-20mA vibration transmitters, robust high-temperature velocity sensors, and innovative impact transmitter technology for reciprocating machinery. Metrix has been ISO-9001 certified for more than two decades and is committed to quality and continuous improvement of its manufacturing processes. For more information, visit **www.metrixvibration.com**.



LIFTING EXPECTATIONS

Material that protects your ESP systems in the harshest environments

BY LAUREN RAINEY, GREENE TWEED

According to the United States Energy Information Administration, there are almost one million oil producing wells in the United States alone, and most require the use of an artificial lift system. There are various methods of artificial lift which are utilized to increase pressure within the reservoir to push oil to the surface. This allows operators to enhance production and extend well life.

THE ELECTRICAL SUBMERSIBLE ADVANTAGE

One of the most efficient and reliable methods of artificial lift for moderate to high volumes of fluids from well bores is through use of electrical submersible pumps (ESP). It is important for ESP systems that every component stands up to the rigors of high pressures, high temperatures, and direct contact with the well fluids and contaminates common in oilfield environments.

One type of critical component is the electrical thermal insulators that mate with electrical connectors and feedthroughs downhole. Electrical thermal insulators are designed to protect sensitive electrical connectors and feedthroughs transmitting critical data in extreme temperatures and pressure environments. Without an effective insulator, connectors are at risk of not being able to transmit a continuous signal and power to vital surface equipment. This could have serious consequences, such as unscheduled and costly oil well downtime.

Finding an insulation material that can deliver the required electrical performance and reliability while also withstanding the harsh HPHT downhole environmental conditions is critical, but finding the right material is not easy. To address these downhole needs, Greene Tweed has developed a patented cross-linked PEEK thermoplastic, Arlon® 3000XT. This innovative material platform can withstand temperatures ranging from 500 to 572 degrees Fahrenheit (260 to 300 degrees Celsius), environments with high pressure in excess of 35,000 psi, and harsh media such as hydrogen sulfide, methanol, drilling fluids, and well products.

ADOPTED ACROSS THE INDUSTRY

Arlon 3000XT is already being rapidly adopted by global oilfield companies. Let's see why: Our engineers put Arlon 3000XT through a rigorous test in extreme oil and gas applications. It demonstrated superior performance

at high temperatures ranging from 500 to 572 degrees Fahrenheit (260 to 300 degrees Celsius)—typical temperature range in oil wells.

Compared to competitive materials (polyimides, other polyketones), Arlon 3000XT performed consistently even when exposed to fluids at temperatures ranging from 500 to 572 degrees Fahrenheit (260 to 300 degrees Celsius) for 112 days. It delivered superior mechanical property retention and outperformed standard grades of PEEK in tensile strength and Young's Modulus, showing no statistically significant difference after aging at 572 degrees Fahrenheit (300 degrees Celsius) compared to baseline data (unaged samples). Both surface and volume resistivity were above standard insulative requirements at high temperatures, tested up to 572 degrees Fahrenheit (300 degrees Celsius).

In addition, any exposure even to minimal amounts of water or moisture may irreversibly attack polyimides; while Arlon 3000XT is able to withstand not only moisture but has even withstood the harsh chemical exposure conditions required to successfully attain Norsok certification.

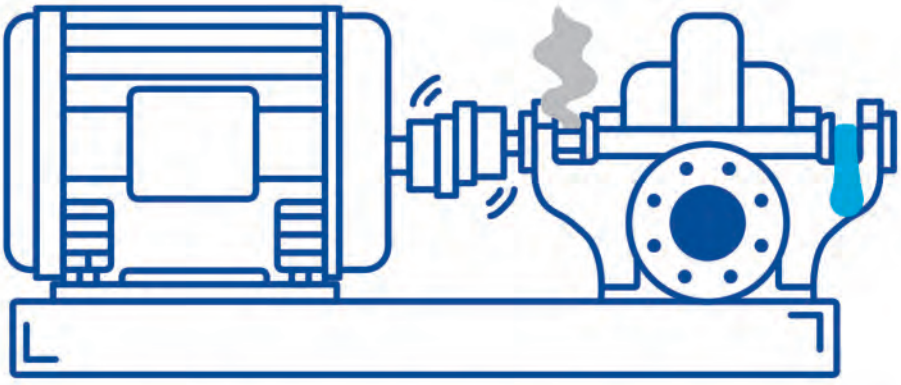
Regarding manufacturability, Arlon 3000XT can be net molded or near net molded with no additional machining steps required. Custom or standard injection molded parts with final machining are also available.

DECADES OF EXPERIENCE AT WORK

From extensive industry knowledge, Greene Tweed knows having a robust material platform you can use in your ESP systems is critical to meeting or exceeding the run life and operation of your artificial lift systems. Let us put our decades of experience and innovative material and product solutions to work for you. Our engineers can design a custom solution for your electrical thermal insulator needs to protect your sensitive electrical connectors and feedthroughs.

Greene Tweed is a leading global manufacturer of high-performance thermoplastics, composites, and engineered components, including custom-engineered sealing solutions for the aerospace/defense, energy, semiconductor, industrial, life sciences, and chemical processing industries. For more than 150 years, Greene Tweed has remained dedicated to new ideas and high-performance products, providing its customers with solutions that have pushed the boundaries of material science, while exploring and testing the use of new polymers. For more information, visit **www.gtweed.com**.

PENTAIR



WHAT'S YOUR PREVENTATIVE MAINTENANCE PLAN?

At Pentair, we want to help you get the most out of your pump. That's why we have built a robust Authorized Distributor network outfitted with high-quality OEM Parts designed to keep your pump running strong for as long as possible.

By conducting a routine pump check, you can spot issues before they lead to an expensive problem. Our experts have compiled a checklist to show you what to look for, so you'll know when to schedule a service call with a Pentair Authorized Distributor.

Let our team of experts help you get the most from your pump.

Learn how to spot your pump's warning signs at pentair.com/pumpcheck.

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As the world around us becomes more and more automated, an understanding of electrical control systems becomes more and more vital. Manufacturers, as well as the technicians, integrators, and/or engineers they employ, know firsthand the benefits automation provides. In fact, for many, automation has been the key to their success. That's why we feel the more people know about automation, the more prepared they are to succeed in a world that's increasingly automated.

Access free video libraries that explain the fundamentals of PLC control from entry level programming to advanced PLC functions. The online video series initially offered non-brand specific PLC basics with topics on logic gates, basic switches, sinking and sourcing, scan time, I/O fundamentals, memory addressing and more. Additionally, the course provides in-depth training on AutomationDirect's families of PLCs including the award-winning CLICK PLC. No time or viewing limitations, simply enter your email address to register your account or continue your training.

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For more information, visit

WWW.AUTOMATIONDIRECT.COM

NETZSCH

TORNADO T1 ROTARY LOBE PUMP

The Tornado T1 pump is extremely versatile for just about any orientation and installation. Its robust design offers longevity, operational flexibility, and dry-run capabilities. It allows the pump to operate and handle many upset process conditions without causing harm to the pump. The pumps are available up to over 4,000 gallons per minute and up to 130 psi. Netzsch Tornado T1 is a full service-in-place (FSIP) pump. The front pullout design allows for easy access for maintenance and inspection. For more information, visit **www.netzsch.com**.

KROHNE

OPTISONIC 6300 FLOWMETER

The newest iteration of the Krohne Optisonic 6300 flowmeter for permanent mount installation is particularly suitable for flow measurement of liquids at any location where inline measurement is not possible or desirable. The flowmeter features new robust stainless-steel clamp-on rails which can be very easily attached to virtually any pipe up to 160-inchdiameters with metal straps or with newly available magnetic mounts. All versions come with a wall-mounted or field mounted ultrasonic signal converter. For more information, visit **www.us.krohne.com**.

WATSON-MARLOW FLUID TECHNOLOGY SOLUTIONS

QDOS CHEMICAL METERING PUMPS

Watson-Marlow Fluid Technology Solutions (WMFTS) will be showcasing its Qdos range of peristaltic chemical metering pumps at WEFTEC 2022 (Booth 7047). Qdos pumps are offered with wall, floor or tote mounting options via standard and custom skid systems and enclosures. Qdos skid and POD systems feature a calibration column, pressure gauge isolator, pressure relief valve and piping. A pressure relief valve ensures pump and piping are protected against over-pressure. For more information, visit **www.wmfts.com**.

SIFCO ASC

TECHNOFLOW

The newly redesigned TechnoFlow gives operators and technicians data logging capabilities as well as improved safety features. The TechnoFlow units are designed to work with SIFCO Process solutions that are best plated at an elevated temperature. One major improvement is the pump adapter plate that provides better access to the frame mounting screws, making removing the large 14 gallons-per-minute pump easier. Improvements have also been made to the pump connector plugs. For more information, visit **www.sifcoasc.com**.

DIVERSITY IN LEADERSHIP BENEFITS THE OIL AND GAS SERVICES INDUSTRY

Groebner's Carissa Skorczewski says there are no limits for female business leaders

Carissa Skorczewski is the first woman and third generation of her family to successfully run and modernize Groebner, a manufacturer's representative and distribution company serving the natural gas industry. Despite being in a traditionally male-dominated industry, her family's forty-six-year-old company has just been certified as a Women's Business Enterprise (WBE) by the Women's Business Enterprise National Council (WBENC), the nation's largest third-party certifier of businesses owned and operated by women. Below, Skorczewski discusses some of the benefits diverse leadership can bring.

MPT: ***How would you assess the diversity found at top business positions today? Who's benefitting from a more representative leadership team?***

CARISSA SKORCZEWSKI: Things are looking up for female business leaders across corporate America, and the entire U.S. workforce is the chief beneficiary. As industries become more competitive amid a shakily rebounding macroeconomy, diversity of thought and perspective at the top of the corporate ladder is growing in importance. New challenges from inflation and globalization to automation and supply chain woes need to be met with new solutions—often the kind of ideas and innovation that stem from a leadership team comprised of different life experiences, whether it's a difference of gender, race, identity, or socioeconomic background.

MPT: ***Where can the value of these different life experiences best be seen today?***

CARISSA SKORCZEWSKI: The oil and gas services sector, particularly, has needed a fresh perspective for many years, but it recently has made great strides. Today, the female perspective is not only necessary but also encouraged in a field that was once male-dominated.

A new and inclusive approach is required to not only stay relevant but advance in a competitive market. The number of women in leadership roles is growing every day, and in many industries, it's become commonplace. Even those who were initially slow to accept change have since warmed up to the idea of having the make-up of the C-suite reflect that of the workforce. This includes critical areas of the economy like the supply chain, where female leaders are being accepted at a rate that would have been surprising only ten years ago.

MPT: ***Is the proverbial glass ceiling finally broken or just cracked?***

CARISSA SKORCZEWSKI: There is still room for improvement, though, according to workplace diversity research, which recently found that less than 4 percent of people leading America's Fortune 500 companies are women.

Also, according to a study by McKinsey and Co, gender equity is crucial for organizations and businesses to perform at the highest levels. The study found, "companies in the top quartile for gender diversity on executive teams were 21 percent more likely to outperform on profitability." Additionally, having women in decision-making roles has been found to help the company better serve their female clients and consumers.

MPT: ***What insights can you share for those companies looking to diversify their leadership teams?***

CARISSA SKORCZEWSKI: Better opportunities for creativity and problem-solving are just a few benefits of diversity in the workplace. Female leadership, specifically, brings a point of view that is sorely lacking in many industries. Despite the false stigmas that have spread, women are likely to improve corporate culture and boost efficiencies while maintaining quality.