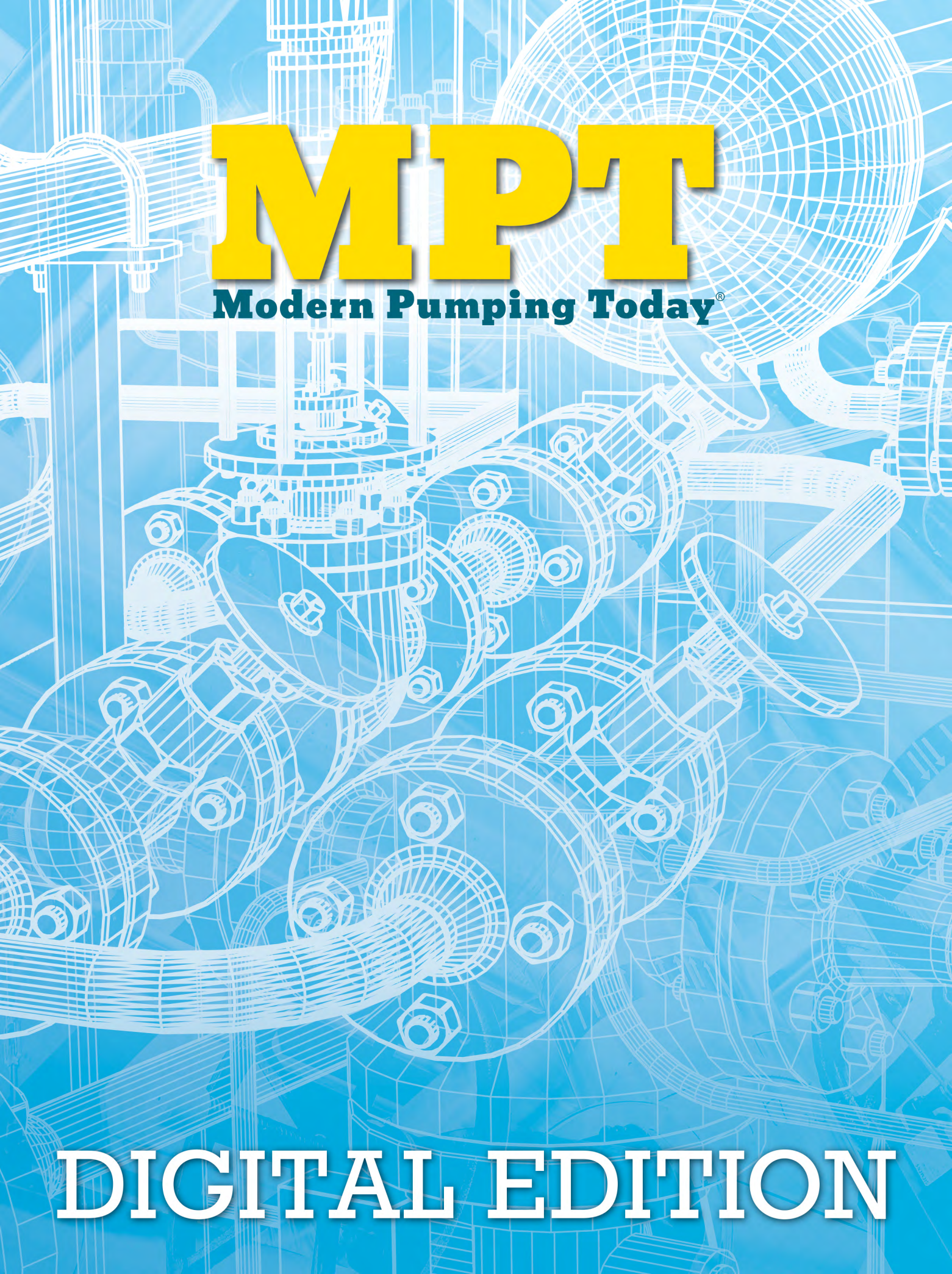
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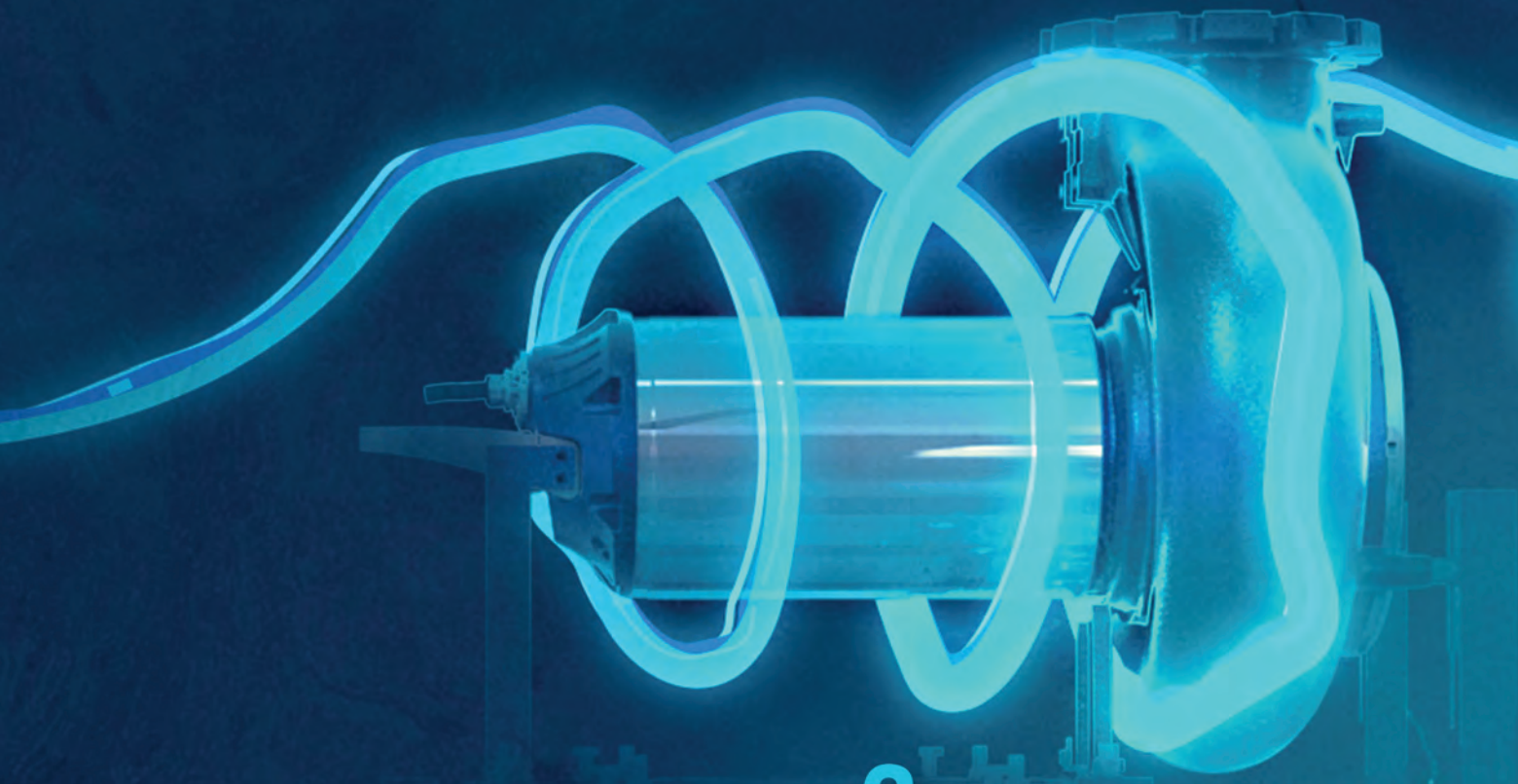

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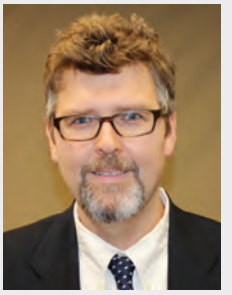

J. Campbell, Editor
Modern Pumping Today

It's spooky season but there's nothing to fear in the October issue of MPT. When you think of processing plants, you may think of oil and derivatives and other chemical products, but in our Water & Wastewater Focus section (pg. 16) this month, Walt Prentice of Applied Flow Technology shows how utilities are finding an invaluable tool in flow analysis software.

At first glance, the scope for energy conservation available through proper mechanical sealing techniques may appear limited. After all, sealing devices account for only a small fraction of the energy consumed by pumps. However, in their article, "The Mechanical Seal Industry's Contribution to Energy Efficiency in Pumping Systems" (pg. 34), AESSeal's Richard Smith and Chris Booth argue there are areas where significant energy conservation can and has been achieved by elegant sealing practices.

Finally, Gilad Cohen, CEO for IDE Americas, stopped by MPT's podcast, The Efficiency Point, to discuss his company's Eco-Reuse system, which offers a safe alternative to chemical treatment for producing potable water while also minimizing environmental impact. Enjoy!

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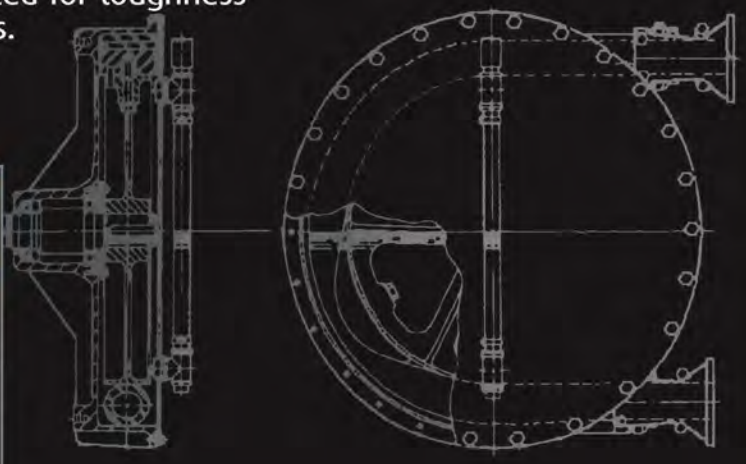

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BOSCH AND ITK ENGINEERING LAUNCH NEW FREELANCING PLATFORM

Two partners in the Bosch Group—the Connectory and ITK Engineering—have developed ''freelancernetwork,'' a digital service to facilitate freelance workers. The Connectory brand is both a co-innovation community and an ecosystem. Its initial mission was to build physical co-creation spaces around the world to establish an interdisciplinary IoT ecosystem. Recently, it also started offering various digital solutions.

ITK Engineering is a wholly owned Bosch subsidiary specializing in software engineering, embedded systems, and model-based development. An international technology company, it provides customer-specific consulting and development support services as well as system solutions. These two partners joined forces to set up the freelancer platform. Bosch is thus among the first companies worldwide to afford external experts direct access to internal projects.

"A fundamental change is underway in our working world," says Martin Kröger, founder and head of the Connectory Digital Solutions. "We are seeing much greater demand for short-term, flexible, and sometimes highly specialized services. This is where we enter the picture. With 'freelancernetwork,' we can quickly and efficiently connect highly qualified professionals with our project managers who are seeking precisely these skills." This freely accessible platform puts freelancers in touch with international projects pursued by Bosch and its customers.

BUMAX EXPANDS IN THE U.S. MARKET WITH NEW HIRE

As part of a strategy to increase its presence on the North American market, Swedish leading manufacturer of high-strength stainless steel fasteners Bumax has appointed Bo Andersson to a new position as business development manager for the United States.

''We see the U.S.A. as a strategic focus market for Bumax with huge potential for our premium stainless steel fasteners in a variety of industries,'' says Lars Holm, managing director at Bumax. ''We will increase our efforts to capture new clients and new projects in North America—in sectors like marine, oil and gas, energy, defense, pulp and paper, and construction where durable and high-strength fasteners are increasingly required.''

In his new position, Andersson will be responsible for growing the American market and making sure that Bumax continues to provide excellent customer service as a ''solutionist.''

''I am happy to be part of the Bumax team and look forward to contributing to the expansion of the company's footprint in North America,'' says Andersson. ''I am

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VYSUS GROUP APPOINTS NEW CHIEF FINANCIAL OFFICER TO DRIVE BUSINESS GROWTH

Geoff Morrison has been appointed as CFO of Vysus Group to help drive and support the next stage of the business's development. Morrison has more than twenty years of experience working in the energy industry, with previous roles leading global finance and operational teams across transnational businesses. Based in the company's Aberdeen office, Morrison joins the senior leadership team as Vysus Group approaches its first year as a standalone business, following the carve-out of Lloyd's Register's energy division.

Commenting on his own appointment, Morrison says, "I am delighted to take on the role of CFO here at Vysus Group, and I am excited in the direction we are taking the company."

David Clark, CEO of Vysus Group, adds, "The skills Geoff has gained in his numerous years in leading finance roles based both in the UK and internationally, will stand him in good stead for the next chapter in our business' journey. We see tremendous opportunity to leverage the extensive technical and regulatory experience across the global Vysus Group team as we help customers realize and deliver on the transformational changes needed across all sectors as we transition to a low carbon world."

CASTOLIN EUTECTIC JOINS THE UNITED NATIONS GLOBAL COMPACT

Since the beginning of September, Castolin Eutectic is a ratified member of the United Nations Global Compact, a voluntary leadership platform for the development, implementation, and disclosure of responsible business practices. Based on the ten universal principles and the Sustainable Development Goals, the U.N. Global Compact pursues the vision of an inclusive and sustainable economy for the benefit of all people, communities, and markets, today and in the future.

"I am proud that Castolin Eutectic is now part of a leading group of companies that was accepted into the United Nations Global Compact—the world's largest corporate sustainability initiative—committing to push the boundaries of ESG and sustainability," explains Patrick Fetzer, president and CEO of Castolin Eutectic.

Castolin Eutectic has already started several environmentally-friendly and people-centric action plans. Many of the products launched in recent years put the health and safety of operators' first, for instance the EnDOtec Safe-hard 600 welding wire, exempt of chrome and nickel, or a new range of CMR-free brazing fluxes

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CONSTRUCTION STARTS ON STANTEC-DESIGNED PROJECT TO BOOST WATER QUALITY

As part of a comprehensive effort to improve the water quality in the Los Angeles River and Arroyo Seco, the City of Los Angeles Department of Public Works will soon break ground on the $13 million Low Flow Diversion (LFD) Project. The project, led by global design firm Stantec's Pasadena office, in collaboration with Los Angeles Department of Public Works Bureau of Engineering (BOE) and Los Angeles Sanitation and Environment (LASAN), will provide new infrastructure to remove dry-weather flows from five sub-watersheds to the L.A. River and Arroyo Seco.

Both the L.A. River and the Arroyo Seco are negatively impacted by multiple pollutants contained in dry-weather flows. At times, high levels of bacteria in the two waterways rivals that of wastewater. Heavy metals and petroleum products are also washed into storm drains and waterways. Dry-weather flows are usually a combination of runoff from car washing, lawn sprinkling, and watering of plants/gardens.

Diverting the dry-weather flows from the storm drains into existing sanitary sewers and to the city's Hyperion Water Reclamation Plant for treatment provides two benefits. The first is improvement to the water quality. The second provides additional water that, once treated, can bolster water security in the region.

TELECOM FIRMS CONVERGE ON $143 BILLION DIGITAL WATER MARKET OPPORTUNITY

Amid increased demand for digital solutions from water utilities and industrial firms, a host of telecommunications companies are responding with dedicated strategies to capitalize on the burgeoning market opportunity, according to a new report from Bluefield Research, "Connecting Water Infrastructure: Telecom Company Strategies in the Global Digital Water Market."

Digital water, which is the application of digital solutions and tools (e.g., hardware, software) for utility and industrial water management, has seen a 53 percent increase in project activity since 2016. Digital water spend in the top ten key markets is forecasted to grow from $8.7 billion to $20.2 billion by the end of the decade. Globally, this activity puts the growing sector on a 10% per year pace, led by the United States, Australia, the United Kingdom, and select Northern European countries.

In conjunction with the water sector's growing appetite for more advanced communications, the industry's unique and highly variable connectivity requirements are becoming more apparent. Communications network operators and vendors are targeting a range of data-related challenges that include power consumption, bandwidth, and cost.


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BIG FOG DISPOSAL CHALLENGE IN THE BIG EASY

Safeway Used Oil & Grease finds their solution with Greasezilla

BY BRIAN LEVINE, GREASEZILLA

New Orleans boasts more than 1,400 eateries offering a delectable and diverse selection of Creole, Cajun, and international cuisines to an estimated nineteen million tourists each year. For local grease trap waste professionals, the amount of FOG (fats, oils, and grease) being produced is enough to keep them busy. However, the massive amount of collected FOG is beginning to outpace the capacity of area disposal sites.

Local receiving stations have been experiencing frequent shutdowns and other complications, leaving pumpers to compete for grease disposal at a reduced number of commercial waste sites. Unfortunately, that much demand ultimately results in long wait times and steep tipping fees for the pumpers.

Last year, when the site of the largest grease disposal company shut down for several weeks, the situation became dire. Grease trap pumping came to a standstill. Traps and interceptors needed to be serviced, pumping trucks were full, and there were no nearby sites able to handle it. As a result, pumpers had to drive hundreds of miles to find disposal locations, adding significant costs.

For local pumper Carlo Cacioppo, these disposal challenges led him to search for other options. He found a solution that has not only transformed his business, but also fills a critical need in the region.

WEIGHING THE COSTS OF FOG DISPOSAL

Cacioppo owns Safeway Used Oil & Grease, a premier grease trap cleaning company located in St. Bernard Parish, Louisiana. A family-owned business with over twenty years in operation, the company provides expertise in used oil collection, grease trap cleaning, and motor oil recycling for commercial, industrial and institutional clients across the greater New Orleans region. Accredited by the U.S. Environmental Protection Agency (EPA), Safeway strives to deliver forward-thinking, eco-friendly services that benefit both clients and the environment.

Cacioppo learned about the Greasezilla® FOG separation system during a monthly meeting of the Sewerage and Water Board of New Orleans. The prospect of installing a system that could alleviate his disposal problems and recycle the FOG into a high-quality biofuel was intriguing enough for him to inquire about Greasezilla.

"I initially figured that a system like Greasezilla would be too expensive for my family business," says Cacioppo, "However, as business grew, we began running into disposal problems. I realized we had to become independent and start doing things on our own. We were having a lot of difficulties disposing of the waste. And then on top of that, it was too costly. If we could afford to pay somebody else for disposal, we figured we could afford to pay for a Greasezilla system that would help us process FOG, get rid of it and even use it."

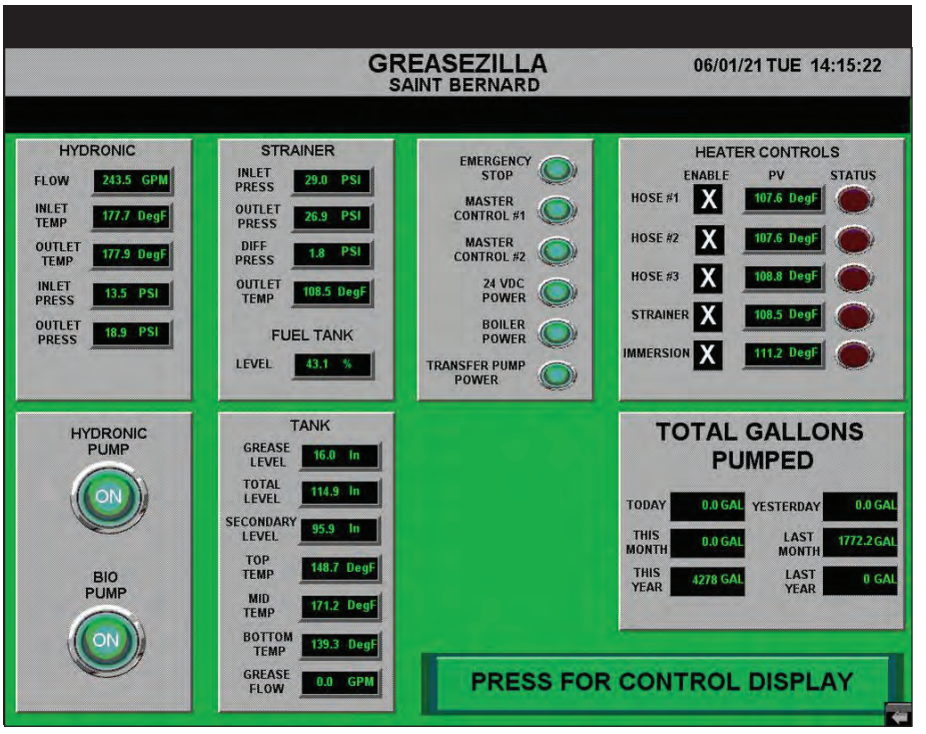
AN END-TO-END SOLUTION

Developed by Ron and Mary Crosier to improve FOG disposal for West Virginia-based Crosier's Sanitary Service, Greasezilla is a turnkey standalone system that separates and processes FOG waste. The end-to-end solution enables the operator to remove FOG from the grease trap waste stream, reduce disposal expenses, create new revenue and run a cleaner, greener, more eco-friendly operation. Greasezilla operates without dewatering; does not require polymers, flocculants, or chemical treatment; and leaves nothing to be landfilled.

Greasezilla's ecological FOG separation process recovers resources for further consumption:

- A high-quality, low-moisture Brown Grease advanced biofuel (ABF), approximately 15 percent of the finished process, is in demand on the commodities exchange.
- A BOD-rich batter, making up five percent of volume, serves as a rich feedstock for anaerobic digesters or is suitable for composting.
- The remaining pasteurized water is ready for standard wastewater treatment.

By taking FOG disposal in-house, Safeway Used Oil & Grease could control costs and independently manage



FOG from pumping through to processing. Safeway's trucks would be able to tip their loads on site and let Greasezilla do the rest.

After reviewing the mechanical, economic and environmental benefits of Greasezilla, Cacioppo and his family decided that they needed Greasezilla to better service their customers and expand their business.

GREENER PROCESS, GREENER PROFITS

In early 2021, Safeway Used Oil & Grease installed its own Greasezilla system. Since the installation, much has changed for Cacioppo and his business. Not only is Safeway saving on tipping fees and transportation costs, but they have also gained new revenue streams.

It wasn't long before other pumpers took notice and began asking Cacioppo if they could tip at Safeway. Greasezilla's processing capacity easily allowed Cacioppo to accept outside loads, providing a much-needed alternative disposal site in the region. The tipping revenue combined with sale of Greasezilla's Brown Grease ABF and the BOD-rich batter have significantly increased the company's cash flow and profitability.

"Things are working flawlessly," says Cacioppo, "Greasezilla makes waste disposal a whole lot simpler, for me and for other haulers. My goal is to work together with other people in our industry to provide faster, more dependable and ecologically responsible FOG disposal throughout New Orleans."

The current system is working with such success that Cacioppo is considering the addition of another reactor tank and the possibility of opening a new Greasezilla site beyond the New Orleans metropolitan area.

BRIAN LEVINE is executive vice-president of Greasezilla. Greasezilla provides services and technology that significantly reduce or eliminate costs associated with dewatering, drying, lagooning, land applying, composting, incinerating, hauling, tipping, or any further treatment. Plus, Greasezilla creates a biofuel sold on commodity exchanges for competitive rates. For more information, visit **www.greasezilla.com**.

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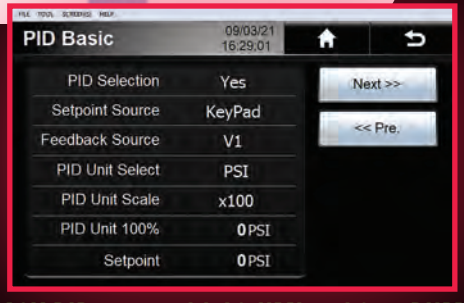

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MODELING SOLUTIONS FOR THE UNSUNG HERO

Process utilities and offsites find an invaluable tool in flow analysis software

BY WALT PRENTICE, APPLIED FLOW TECHNOLOGY

When you think of processing plants, you may think of oil, its derivatives, and other chemical products. After all, the end-product is what ultimately matters to consumers; it is what has monetary value. The goal is (and should be) that product. However, there are whole disciplines dedicated to the backend functionality that rarely get public attention: utilities and offsites. Without functioning utilities, the money-maker might as well remain undiscovered, raw materials.

A colleague who previously worked in a utilities division of oil and gas, opened my eyes more to the subject. These engineers hold an honorable position, bearing much of the responsibility without common recognition. Even more impressive is they are given much less insight into their systems than the process side. It is not uncommon for utilities to lack any controls, meters, or updated layouts. The systems are usually more than half a century old, which also

reigns true for the main processes, but without the same insights available. Rather than constant flow metering, utility engineers get annual flow surveys. Once a year, they receive the great privilege to record a flow rate.

With the lack of basic information most of the time, how can they know what is going on, let alone plan for expansions and other changes?

The saving grace lies in computer modeling. Flow analysis software exists for nearly any system, from liquids to gases to two or three-phase, and from steady-state to transient. Let's narrow our focus to a single steady-state utility, cooling water, and how modeling brings invaluable solutions to the table.

COOLING WATER

Cooling water, arguably the most common utility, is something every process needs. Narrowing this further to the most common need leads us to expansion projects. (Of course, the same principles apply to any greenfield projects.) During standard operation, where a system has successfully met demand for years, it is less concerning if engineers do not know everything about the system. Though, any time questions are raised, or projects are brought up, those engineers are left hanging.

For instance, a project manager comes to utilities and says they are considering an expansion and need to know how tapping into the cooling network and redirecting flow to new heat exchangers will affect everything. Will required flows still be delivered to the existing exchangers? If not, will they need new pumps? What easy changes can be made to even the flow distribution more, to ensure no one user takes an unnecessary amount?

Most systems are complex enough, and have little enough insight provided, to scare engineers (or at least they should) out of hand calculations to answer those questions—not exactly a single-pipe, textbook problem to solve. Software removes that barrier. Through computer modeling they can build a replica of the same system to experiment with. Engineers can test the hypothetical expansion and find several solutions. The best solution, of course, is the most economical, ideally both in the short and long-run. Without software, having confidence in any solution, let alone the best one arising from scenario evaluations, is a pipe dream. Walking through an example can help solidify this concept.

EXAMPLE EXPANSION

Figure 1 shows a simplified cooling network and its supposed expansion in red. With this we can follow the process a utilities engineer would take to submit an actionable feasibility study. While hypothetical, the principles described can be applied to any system, and analysis expanded to whatever parameters are in question for a specific case.

In the beginning the engineer makes sure the model of the existing system is accurate, comparing to any data

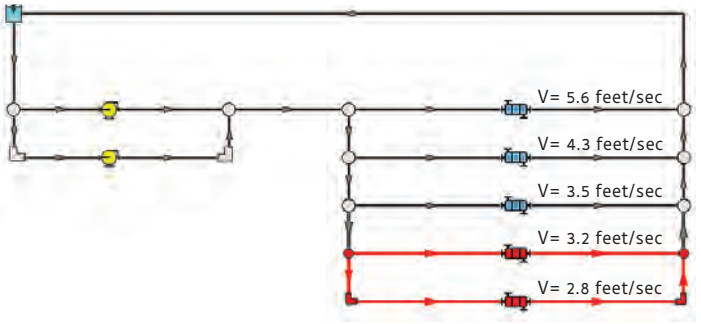

Figure 1: *Hypothetical cooling water loop with its expansion in red. Velocities through the heat exchangers are displayed above the corresponding pipes.*

they can get, even if it is just the annual flow survey. Then they add the expansion, also ensuring they can justify any assumptions and its subsequent accuracy. They check results to see how parameters, such as pump performance, flows, and velocities, have changed.

Initially, they look at the pumps' shifted operating points. It turns out there is less total system resistance from opening more parallel paths. This shallows the system curve, making the pump supply more flow. However, the engineer finds operation really did not shift much, avoiding the concern of running the pump out on its curve. Figure 2 compares the two system curves. With the pumps confirmed OK, they can look at each unit to see if flow and velocity requirements are met.

The engineer knows they need velocities above 3 feet per second through the exchangers but wants them no higher than 8 feet per second. Enough speed is needed to avoid any sedimentation or fouling, but too high of velocities indicates system inefficiencies and can cause

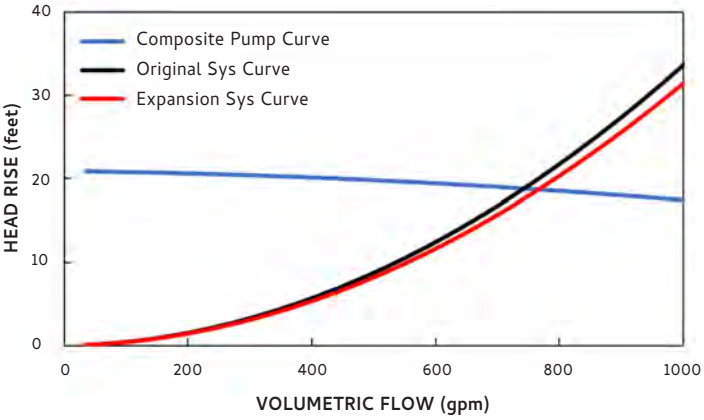

Figure 2: *Comparing system curves before (black system curve) and after (red system curve) the expansion. Pump curve is a composite pump curve, representing two parallel pumps as one.*

other damage. If both goals can be met, that is ideal. The expansion without any modifications indicates the most remote exchanger (bottom line) has a velocity under 3 feet per second. He also notices the least remote (top line) exchanger has a healthy margin with velocity at 6 feet per second and has flow above what's necessary.

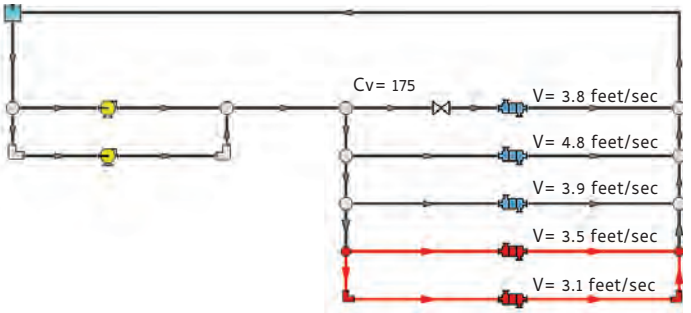

Figure 3: *Proposed suggestion for the hypothetical cooling loop. The throttling valve in the top heat exchanger line redirects flow to the other exchangers to meet design requirements.*

THREE SOLUTIONS

They then test three hypothetical solutions: (1) larger pumps to supply more total flow, (2) smaller pipes in the top line to increase local resistance, and (3) throttling valve in the top line to similarly increase resistance. All three solutions are found to work, which alone is valuable insight, but only one will dubbed the optimal.

While larger pumps can do the job, it supplies the top exchanger with excessive velocity and flow and is capital intensive. The second option to replace the top exchanger's piping is effective at redirecting flow without changing pump operation much. Dropping the diameter a couple inches does the trick, but that solution is still expensive and undesired if the pipes still have a lot of life left. The final, throttling valve solution similarly redirects flow to the other exchangers. This looks like the best solution—cheap, simple, and effective—assuming they can plan appropriately for installation. The model also reveals the proper valve size (flow coefficient, Cv) to get the job done. See figure 3 for the results.

Now the engineer can give recommendations to management on approaching the expansion. Of course, there are many other scenarios to test, and more parameters to consider than this simplified example, but the main point stands. Modeling software invaluably helps process engineers make faster and smarter decisions.

Utilities and offsites is a special division of processing plants, wherein engineers of old did not have the insight to make confident recommendations. Software changes the landscape by allowing them to understand their systems and to experiment for the best solution when needs arise. As my colleague put it, "I don't know how we would have done those expansions without software."

WALT PRENTICE is a business applications engineer at Applied Flow Technology (AFT). Prentice holds a bachelor of science in chemical engineering with a minor in economics from the Colorado School of Mines. At AFT, he supports engineers around the world to troubleshoot their piping and ducting models. For more information, visit **www.aft.com**.

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CAUTION

SCALING SINGLE-USE LIQUID DISPENSING FROM R&D TO AUTOMATED PRODUCTION

Production scale-up and changeovers are possible with accurate, reliable liquid measurement and filling systems BY DEL WILLIAMS

At pharmaceutical companies, including those that deal with reagents, buffers, biologics, cells, immunotherapy, and similar products, liquid measurement and filling is often done by hand during R&D and lower initial production volumes. However, as advances are made through the development process, increasing demand for production volume and product changeover increase, result in significant drawbacks to this approach. With hand filling some amount of overfilling, underfilling, or product spillage can be expected, which can be costly when handling high-value product. Manual dispensing and measuring can also lead to repetitive stress injuries for employees.

In addition, in automated filling systems, production is traditionally accomplished with equipment that must be thoroughly disassembled, washed, and sterilized between batches. The process is time-consuming, expensive, energy intensive, and opens the door to possible cross contamination as well as occasional control breakdowns.

As a solution, a growing number of companies are turning to sterile, single-use, closed liquid dispensing systems and kits. These utilize disposable parts that can be quickly replaced to start the next fill cycle and expedite production changeovers. Such systems reduce the risk of cross contamination since only the single-use components are in contact with the liquids being dispensed.

BENEFITS OF SINGLE-USE DISPENSING

This approach delivers superior, repeatable dispense accuracy after hundreds or thousands of cycles, while minimizing repetitive motion injuries. It can also be scaled up to accommodate requirements from R&D to fully automated, GMP manufacturing.

"Single-use liquid dispensing has become a trend because of its production flexibility, streamlined production [versus cleaning the entire system], and relatively nominal cost," says Derek Dunn, P. Eng., senior director, services and customer experience, LuminUltra, a biological diagnostic testing company that develops tests and reagents for environmental, industrial, and diagnostic monitoring, and is a key supplier of COVID-19 clinical testing reagents for the government of Canada.

In the case of LuminUltra, the company develops a range of testing solutions. One of these is its second generation adenosine triphosphate (ATP) test, which measures ATP in water across diverse industries. This requires multiple liquid reagents in different volumes, dispensed into containers of various sizes.

According to Stephen Galpin, packaging supervisor, LuminUltra, when an existing product line was produced in lower volumes up to six operators were needed to dispense the liquid reagents using pipettes and affix caps and labels. While this was sufficient during R&D and at the initial production levels, continued growth eventually forced the company to decide between increasing staffing or automating the process.

"We were growing every year and we reached a fork in the road, so we had to decide if we wanted to hire more people just for filling," says Galpin. "We ultimately decided to automate and re-assign the personnel to other more productive areas."

PRECISION PLUS EFFICIENCY

LuminUltra also sought an efficient process that minimized any potential contamination or reagent degradation.

"One of the major challenges was avoiding contamination of the reagents, given that the introduction of even small amounts of ATP [from unintended sources] would quickly degrade the quality of the test," says Galpin.

After searching for a market solution and reviewing multiple bids, LuminUltra selected a single-use liquid measuring and dispensing system that included an i-FILL® pump, from Florida-based

Intellitech, a manufacturer of precision liquid filling and closure equipment.

Single-use technology minimizes the risk of contamination by utilizing sterile, disposable fluid path components from product source to dispensing nozzle. Each kit is a complete unit containing intake and discharge tubing, check valves, complete pump parts, and a dispensing tip/nozzle. The disposable fluid path kits are assembled and packaged in an ISO Class 7 cleanroom and post-assembly gamma irradiated to eliminate or minimize any biological risk and maintain microbial control.

Production downtime is minimized and changeovers accelerated by eliminating the need to disassemble, clean, sterilize, and reassemble fluid path components between batches. Changes from one reagent to another takes only a few minutes and requires no special tools.

The total start-up time usually takes about thirty-minutes, but starting up the automation line "is down to about ten minutes," says LuminUltra's Dunn.

CUSTOMIZATION IS KEY

Dunn says the equipment from Intellitech was customized to fit the available space as well as to accept different container sizes and configurations.

"Because the volume of each reagent is different, the ability to handle containers of various sizes was important," says Dunn. "Our process involves multiple reagents. We might need 5 milliliters of reagent for one aspect of the test, 9 milliliters for another, and 125-milliliter- and 250-milliliter bottles for others."

Despite being customized, the system was easy to use out of the box, allowing LuminUltra to quickly begin dispensing liquids with the needed volume and accuracy. Dunn says he also appreciated Intellitech' s willingness to consult and provide expertise throughout the process, which he views as vital for a successful implementation.

"It wasn't just, 'Here's the machine. This is how you run it. Good luck, see you later.' They helped us to optimize the process by providing input on operator selection, training, and production flow. That was very helpful," says Dunn.

The system can also be easily reconfigured to accommodate a range of fill volumes, dispense profiles, containers, and closure types. Custom designed component parts are also available utilizing in-house design and 3D printing, as needed.

"That kind of flexibility facilitates line expansion in the future. It is nice to have the option to scale up when we are ready for it," says Dunn.

GENTLER DISPENSING OF BIOLOGICS

In addition to dispensing a variety of liquids, filling equipment is also increasingly being used to dispense sensitive "biologics" manufactured by or extracted from living sources—typically proteins, cells, nucleic acids, viruses, or vaccines

In recent decades, protein-based therapeutics have become increasingly important to the pharmaceutical industry. These biopharmaceuticals are costly, difficult to produce, and susceptible to physical degradation when subjected to high shear forces during dispensing.

In fact, biologic products can degrade when dispensed using peristaltic pumps. These pumps contain fluids in a flexible tube, housed by a pump casing. A rotor outfitted with a system of rollers compresses the tube as it turns to create continuous fluid flow. However, the pump's shearing force is not conducive for live cells and its rollers can gradually damage the tubing, causing it to wear and stretch over time. The shearing force can even potentially release or shed small quantities of tubing material into the liquid as it flows.

The alternative to peristaltic pump technology is a hybrid pump design that is gentler and more reliable when dispensing biologics. Because liquids in the pump are not squeezed by rollers, there is no opportunity for cultures or delicate specimens to be harmed as it flows through the tubing. In terms of accuracy, this hybrid pump-based filling equipment, like the i-FILL, delivers repeatable liquid filling accuracy less than or equal to 0.5 percent of the intended volume. In comparison, conventional pump accuracy is usually within 1 to 2 percent.

Whether pharmaceutical companies are in basic R&D, product development or rapidly scaling up through clinical studies to full scale GMP manufacturing, utilizing a modular, single-use liquid dispensing systems that can be scaled up to meet increasing production demands can be a tool to achieve greater production efficiency, flexibility, reliability, and profitability.

Intellitech manufactures bench-top precision liquid filling systems that deliver unmatched repeatable, highly accurate liquid filling volumes. Intellitech products outperform peristaltic pumps for transferring delicate product such as live cells. Intellitech pump models offer single-use fluid path ideally suited to the life science industry to minimize the risk of cross contamination and reduce the need for time-consuming cleaning protocols. For more information, call 866.434.5548, email sales@intellitech-inc.com, or visit **www.intellitech-inc.com**.

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IMMERSIVE MIXED REALITY IN MANUFACTURING

Incorporating 3D artificial intelligence with AR and VR technology

BY DIJAM PANIGRAHI, GRIDRASTER

The race continues between the world's largest tech leaders and companies to see which one will prevail and power the next generation of tools, technologies, and resources for manufacturing, healthcare, construction, and many other vertical market applications. These companies have been working tirelessly to create changes that will make a significant impact on our world. This all starts with the technological advances that have been made in recent years with artificial intelligence (AI), and immersive mixed reality technologies such as augmented reality (AR) and virtual reality (VR).

All these technologies have specific differences, but they're also today now working together in advanced three-dimensional (3D) applications and environments, all for the benefit of these companies and their customers.

IMMERSIVE MIXED REALITY USES

With virtual reality, a user wears a headset that fully delves into a new world or environment, some that even mimic the real world. The user is given both a visual and audible experience that is meant to replicate a real-world setting in a manufacturing environment.

Augmented reality is similar in concept, but it also displays digital content in the real world. Imagine a manufacturer of construction equipment, tools, or structural materials used in the development of buildings who uses an iPad in front of construction equipment being designed where they can see virtual specs of the design and also see how it could function in a real building/development environment.

WHERE IMMERSIVE MIXED REALITY FALLS SHORT FOR ENTERPRISES

The challenge is that these technologies require heavy doses of data, the ability to process vast amounts of data at impeccable speeds, and the ability to scale projects in a computer environment that doesn't often allow in traditional office environments.

Immersive mixed reality requires a precise and persistent fusion of the real and virtual worlds. This means rendering complex models and scenes in photorealistic detail, rendered at the correct physical location (with respect to both the real and virtual worlds) with the correct scale, and accurate pose. Think of the accuracy and precise nature required in leveraging AR/VR to design, build, or repair components of an airline engine, or an advanced surgical device used in medical applications.

This is achieved today by using discrete GPUs from one or more servers and delivering the rendered frames wirelessly or remotely to the head mounted displays (HMDs) such as the Microsoft HoloLens and the Oculus Quest.

THE NEED FOR 3D AND AI IN IMMERSIVE MIXED REALITY

One of the key requirements for mixed reality applications is to precisely overlay on an object its model or the digital twin. This helps in providing work instructions for assembly and training, and to catch any errors or defects in manufacturing. The user can also track the object(s) and adjust the rendering as the work progresses.

Most on-device object tracking systems use 2D image and/or marker-based tracking. This severely limits overlay accuracy in 3D because 2D tracking cannot estimate depth with high accuracy, and consequently the scale, and the pose. This means even though users can get what looks like a good match when looking from one angle and/or position, the overlay loses alignment as the user moves around in 6DOF. Also, the object detection, identification and its scale and orientation estimation—called object registration—is achieved, in most cases, computationally or using simple computer vision methods with standard training libraries (examples: Google MediaPipe, VisionLib). This works well for regular and/or smaller

and simpler objects such as hands, faces, cups, tables, chairs, wheels, regular geometry structures, etc.

However, for large, complex objects in enterprise use cases, labeled training data (more so in 3D) is not readily available. This makes it difficult, if not impossible, to use the 2D image-based tracking to align, overlay, and persistently track the object and fuse the rendered model with it in 3D. Enterprise-level users are overcoming these challenges by leveraging 3D environments and AI technology into their immersive mixed reality design/build projects.

Deep learning-based 3D AI allows users to identify 3D objects of arbitrary shape and size in various orientations with high accuracy in the 3D space. This approach is scalable with any arbitrary shape and is amenable to use in enterprise use cases requiring rendering overlay of complex 3D models and digital twins with their real-world counterparts.

This can also be scaled to register with partially completed structures with the complete 3D models, allowing for on-going construction and assembly. Users achieve an accuracy of 1 to 10 millimeters in the object registration and rendering with this platform approach. The rendering accuracy is primarily limited by the device capability. This approach to 3D object tracking will allow users to truly fuse the real and virtual worlds in enterprise applications, opening many uses including but not limited to: training with work instructions, defect, and error detection in construction and assembly, and 3D design and engineering with life size 3D rendering and overlay.

WORKING IN CLOUD ENVIRONMENTS IS CRITICAL

Manufacturers should be cautious in how they design and deploy these technologies, because there is great difference in the platform they are built on and maximized for use. Even though technologies like AR/VR have been in use for several years, many manufacturers have deployed virtual solutions that are built upon an on-premise environment, where all the technology data is stored locally.

On-premise AR/VR infrastructures limit the speed and scalability needed for today's virtual designs, and it limits the ability to conduct knowledge sharing between organizations that can be critical when designing new products and understanding the best way for virtual buildouts.

Manufacturers today are overcoming these limitations by leveraging cloud-based (or remote server based) AR/VR platforms powered by distributed cloud architecture and 3D vision-based AI. These cloud platforms provide the desired performance and scalability to drive innovation in the industry at speed and scale.

DIJAM PANIGRAHI is co-founder and COO of GridRaster Inc., a leading provider of cloud-based AR/VR platforms that power compelling high-quality AR/VR experiences on mobile devices for enterprises. For more information, visit **www.gridraster.com**.

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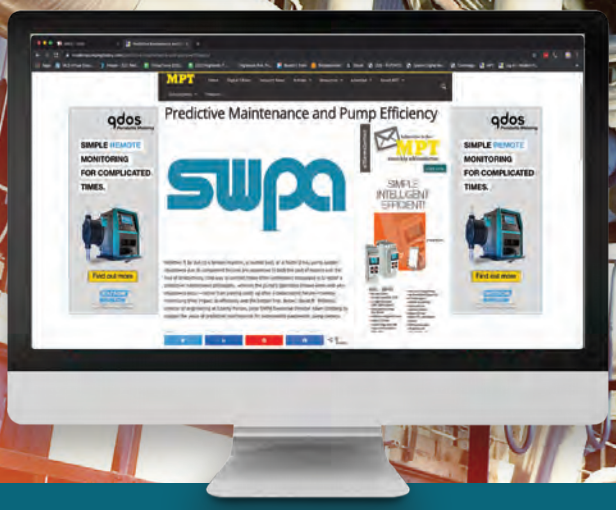

FOR MORE INFORMATION:

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BOOSTER PUMPS BRING DREDGING SUCCESS

Magnolia Dredge & Dock partnership highlights DSC Dredge's commitment to innovation

BY MERCEDES GABRIEL, DSC DREDGE

Magnolia Dredge & Dock LLC., headquartered in Mandeville, Louisiana, was founded in 2009 through the merging of two companies. According to Michael Johnson, managing member, while the company initially focused on providing hydraulic dredging services, they have since expanded to include dewatering and water treatment, plus heavy civil and marine construction to their portfolio of services.

Over the years, and with their primary focus on dredging, this company continues to service both the private and public sector throughout the United States. Johnson shares, "We do a lot of industrial and environmental dredging maintenance, coastal restoration, cleaning of lakes and ponds, coal ash removal,

levee construction, deepening and maintaining of waterway access channels to name a few areas of focus.''

A PARTNERSHIP BUILT ON PERFORMANCE

The spark of a long-term partnership between DSC Dredge, LLC and Magnolia Dredge & Dock, LLC started well before Magnolia's inception. ''When I was employed by another company, we rented dredges from Dredging Supply Company, which is now known as DSC Dredge. That's how I got introduced to them and the quality of their product and impeccable service standards.'' He goes on to state it was ''a match made in heaven'' for Magnolia, since both companies are located in the greater New Orleans area, and one of DSC's specialties is customizable dredges which is key to Magnolia's service offerings.

Johnson recalls Magnolia's first three dredges, which were all the DSC Barracuda class dredge, came from DSC's Mississippi based subsidiary, Best Equipment Technologies, and they immediately went to work on a project in Mississippi which turned out to be a big success. ''Over the years Magnolia has purchased dredges from many other manufacturers, however it's difficult to find another supplier that has such a high focus on customer service which was, and continues to be, extremely important to us'' says Johnson.

Johnson adds, ''Over the years we have experienced first-hand a performance driven culture with DSC. Their equipment has always performed well, and their customer service is unfaltering both in the field and during the entire purchase/build process. DSC's expertise, has always been, and will continue to be, invaluable to Magnolia.''

CUSTOMIZABLE SOLUTIONS ON THE MOVE

One of the main challenges faced by most service driven dredging companies is that every project has specific requirements, and unlike most manufacturing companies, DSC's ability to design customizable dredges has allowed Magnolia to stand out against their competitors. Magnolia thinks of their dredge fleet like a ''toolbox'', prepared with a wide variety of dredges to meet the needs of their customer. DSC's ability to customize their equipment has significantly contributed to the diverse business offerings Magnolia can provide. As of today, Magnolia's fleet includes three Barracuda class dredges, one 8-inch Moray class dredge, 10- and 18-inch Shark class dredges, one 16-inch Marlin class dredge, a number of booster pumps, and a workboat which are all transportable allowing them to service customers throughout the United States. In addition, DSC is currently constructing a traveling spud carriage barge with an integrated booster pump. This barge will be coupled to Magnolia's 18-inch Shark class dredge. The only dredge not currently on their manifesto is the Sharkuda® class dredge; however, Johnson notes ''that may change in the near future''.

''Our customers' success is also our success. DSC focuses on providing both the dredging equipment and the support services to help ensure that happens,'' states Bob Wetta, DSC co-owner and president and chief executive officer. ''The equipment we manufacture lasts over twenty-five-plus years, so we need to take advantage of the opportunities when they arise. If we miss a dredge sale, we may not have the opportunity to sell to that client again for a long time. DSC has been fortunate to have a high level of repeat sales to our client base, which is particularly of interest in growing companies like Magnolia. We believe it is the overall experience and relationships we build with our clients. We listen to their challenges and we try to create solutions. Open minded clients such as Magnolia keep us on our toes to look for the next best thing we can dream up and build together.''

"Magnolia Dredge & Dock, LLC has a solid history of winning high-quality projects across the United States and we are honored that DSC's dredges can be part of their story as they continue to build upon their historical successes, and expand DSC's geographical footprint."

—BILL WETTA | DSC CO-OWNER AND CHIEF TECHNOLOGY OFFICER

THE RIGHT EQUIPMENT FOR EXTREME CONDITIONS

Johnson went on to share some of their success stories and the importance of having the right equipment. He talked about a project they worked on in Florida where the conditions were extreme, causing the flooding of homes and many other issues. He noted that with the use of a

DSC dredge, they were able to go in and quickly improve the community drainage, their water quality and clarity, and ultimately it increased recreational use for the area.

Another project shared was one located in Houma, Louisiana, in Bayou Terrabonne, where the numerous bridges and excessive traffic in the area presented multiple challenges. The only dredge that could complete this critical work had to have enough power to move the sediment along but was also easy to move. The Barracuda class dredge was perfect for this style of dredging, he states.

As DSC continues to lead the industry with innovative technology, such as DSC Vision (a user-friendly bottom visualization system that provides dredge operators and

managers with ability to stop "dredging in the dark") and Dredge Rx (which allows dredge owners and operators to monitor and maintain their dredge fleet in real time, while on the dredge or while working remotely), Magnolia knew they had to add this to their already existing "toolbox". According to Johnson, by the addition of these features, it helps Magnolia stay at the forefront of dredging trends enabling them to continue delivering exceptional project performance and thus ensuring the success of their clients and projects. Magnolia has already pre-purchased these upgrades for some of their dredge fleet and is now eagerly waiting for their installation.

Johnson notes, "Being able to see below the water while dredging is a great feature that will allow our operators to be more efficient and productive. Cave-ins after dredging a particular area is common in the industry and being able to see this and correct it immediately will be a game changer."

CONCLUSION

In closing, Johnson reiterates, "Magnolia is very excited about our long-time collaboration with DSC. We view them as a strategic partner for both the growth and operation of our business. We have always been very pleased with their products, customer service and equipment performance and the personal relationships built over the years is incomparable to any other. One of the many things that stands out about DSC is DSC's receptiveness and openness to create innovative solutions for any project Magnolia may need support on."

To ensure the high level of service that has defined this family-owned business for the past thirty years, DSC Dredge, LLC has five key values: commitment, quality, innovation, service, and customization. This is what the foundation of DSC is built upon, and clients who become long-standing business partners and friends only confirms what this company strives to do each and every day.

"We consider ourselves a leader in new technology for the dredging industry and we are always open to challenges," adds Bill Wetta. "We have enjoyed the projects and challenges that Magnolia has brought to DSC. Both Magnolia and DSC share a common vision in technology and thinking outside of the box. I couldn't be happier with the relationship DSC has earned with Magnolia Dredge & Dock."

DSC is also a global leader in the dredge manufacturing industry, engineering superior customized dredging solutions to meet specific application needs. DSC Dredge designs and manufactures high quality, durable cutter suction, and underwater pump mining dredges. DSC Dredge operates from three manufacturing facilities located in Reserve, Louisiana; Poplarville, Mississippi; and Greenbush, Michigan. For more information, visit **www.dscdredge.com**.

BRUSHLESS DC MOTOR COMMITS TO 100 PERCENT RUNNING TIME

REact EQ-L offers high performance together with low maintenance BY ROGER INGEMEY, CIRCOR

When process operations depend on 100 percent running time, control valve actuators must offer unrivaled performance together with low maintenance requirements. Ideal for processes that depend on these conditions in multiple industries—including industrial, chemical, and power applications—Circor International's RTK® REact EQ-L electric intelligent linear actuators are built for high-range force output. Corrosion-resistant variants have been specially designed for offshore applications. The REact EQ-L electric actuator offers an all-in-one intelligent package for applications with opening/closing forces from 3,380 pound-force up to 6,750 pound-force.

REPLACING THE OLD SCHOOL WITH INNOVATION

RTK REact EQ-L offers system-protecting functions for medium-to-heavy applications with higher pressure drops or large or unbalanced valve trims. The new actuator makes it easy to replace old-school synchronous drive technology for industrial, chemical, power, and process actuation requirements. Using the newest brushless DC (BLDC) motor system, REact EQ-L offers high force and delivers up to 60 percent energy savings compared to synchronous drives.

Other cost-saving features include over-force protection to prevent damage to the valve and actuator; reduction in maintenance due to 100 percent running time; and external LEDs indicating actuating direction for easy monitoring. Also included is a smart controller with several adjustable and easily selectable preset speeds.

AT-A-GLANCE SYSTEM STATUS

REact EQ-L's external LED clearly displays operating directions and power status for easy monitoring. Outfitted with RTK's optimized REpos digital positioner, this actuator offers data logging functions and the possibility for remote control through Profibus or CANopen. Using field device notification of diagnostic status, users can expect to conduct timely, status-based intervention to promote higher system availability and reduced maintenance costs.

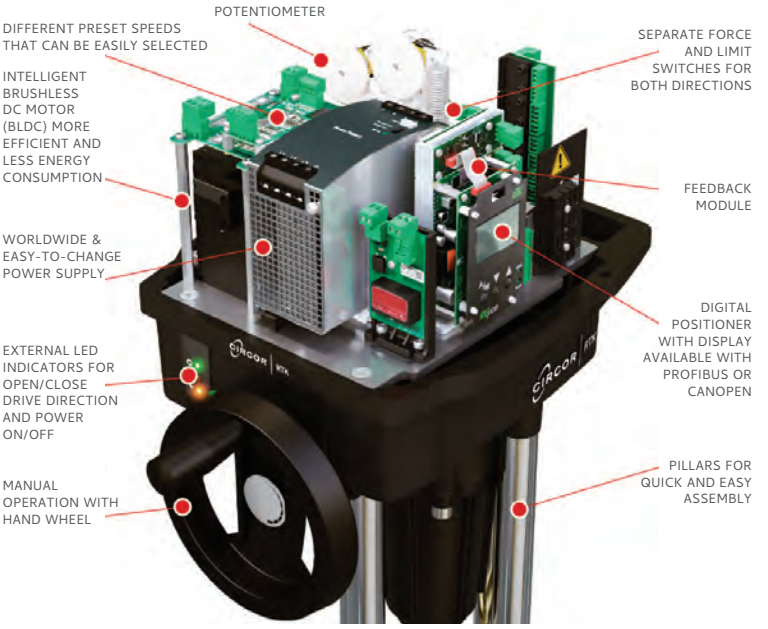
The new REact EQ-L opens the door for Industry 4.0 functionality and flexibility for multiple signal exchange systems in open digital protocols for process automation. REact EQ-L is also programmed

with over force limiting technology to protect the valve and actuator, allowing the motor to self-regulate and serve as a built-in safety feature. Unlike other electric actuators, it works to help ensure 100 percent running time, 24/7.

SAY GOODBYE TO COSTLY SURPRISES

Approved for protection rating IP 66 and NEMA 4x, CE design and NRTL certification, REact EQ-L's single gear unit-motor combination offers three different open/close force outputs; easy setup for worldwide voltage inputs and actuator protocols; and different speeds for different applications with only one gearbox.

When force outputs are high, keep damages to valve parts and actuators low with RTK's REact EQ-L. It's an innovative system-protecting solution that combines RTK's signature modular design with more efficient, adaptable, and connected actuator technology.



ROGER INGEMEY is vice-president for power and process at Circor International, Inc. Circor RTK is an international leader in the design, manufacture, distribution, and service of control valves and related equipment. In its fourth decade, the company continues to engineer innovative and reliable control technology for optimization of customer control circuits. RTK produces high-quality control and shut off valves ideal for industrial, process, petrochemical, and power applications. It also offers effective electric and pneumatic linear actuators, sensors, and controllers. For more information, visit **www.circor.com/rtk**.

THE MECHANICAL SEAL INDUSTRY'S CONTRIBUTION TO ENERGY EFFICIENCY IN PUMPING SYSTEMS

Part 1 of 2

BY RICHARD SMITH AND CHRIS BOOTH, AESSEAL

Sealing devices account for only a small fraction of the energy consumed by pumps. The scope for energy conservation at first appears limited; however, this following article details areas where significant energy conservation has been achieved by elegant sealing practices. Process industries have enjoyed savings in energy associated with seal cooling water circulation. A correlation between effluent reduction and carbon emission is postulated. Technology can provide the process industries with significant efficiency improvement in seal cooling. Case studies are reviewed from several industry sectors. API standards endorse many of these techniques as best practice. The mechanical seal industry contribution is key in assisting pump users to play their part in reducing adverse climate change.

HOW TO MAKE A DIFFERENCE

Pumping of liquids in the service and process industries is a significant user of energy and, consequently, a major contributor to CO_2 emissions. The link between rising atmospheric CO_2 (see figure 1) and climate change has been fiercely debated, but now appears to be generally accepted by mainstream science. Industry leaders have committed their corporations to developing technologies that will help reduce carbon emissions. Such actions may be visionary or recognition of a significant market opportunity, or both. The reader is left to decide.

Can the pumping community (users, manufacturers, and component suppliers) make a difference to carbon emission levels? In the United Kingdom, electric motors account for 40 percent of total electricity consumption. Pumping equipment is estimated at 32 percent of this, or 13 percent of total electricity demand. If the United Kingdom is typical of modern developed economies, then improvements in pumping efficiency can have a significant impact on carbon emissions. Can the pumping community rise to this global challenge?

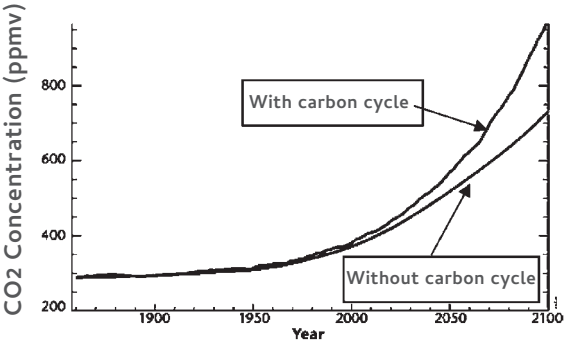


Figure 1: Concentration comparisons with and without carbon cycle.

ENERGY SAVING AND MECHANICAL SEALS

Most pumps require a sealing device to prevent liquid escaping from where the drive shaft enters the pump casing (see figure 2). In the developed world, mechanical seals have replaced traditional gland packing on the majority of newly installed industrial pumps. With many mature pump assets still in use the potential remains for reductions in energy consumption by replacement of gland packing.

Where mechanical seals are fitted, seal frictional losses account for as little as 1 percent of total pump power consumption, hence the potential energy savings from improved seal technology are low. However, experience shows that much larger energy efficiency improvements can often be made by improvements to the seal support system.

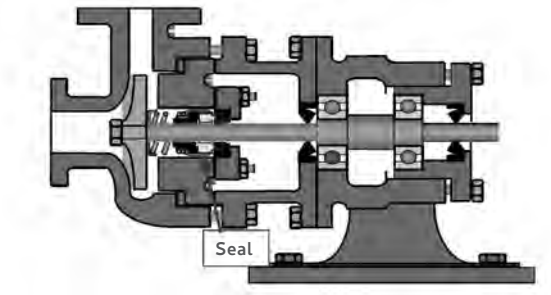


Figure 2: Seal location in typical centrifugal pump.

ENERGY SAVINGS FROM SEAL SUPPORT SYSTEMS

Mechanical seals in process industries are often reliant upon supporting auxiliary fluid systems. Referred to as "piping plans" or "seal support systems," these improve the operating environment of the seal to provide reliable operation and longer seal life. The energy consumed indirectly by the seal support system is often overlooked, but can be considerable.

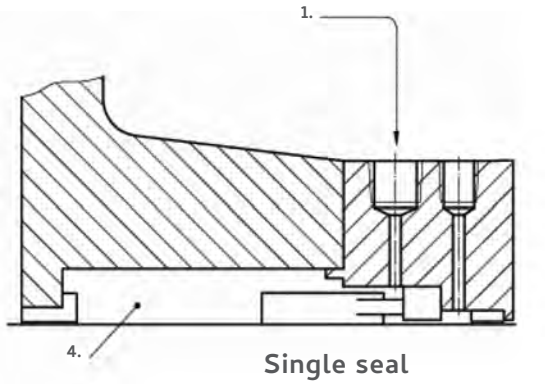


Figure 3a: Typical single seal piping plan.

The American Petroleum Institute (API) in its international seal standard API 682 (ISO 21049) recognizes twenty-six piping plans; many other variations are also used. These generally fall into two main groups:

1. **Flush:** Clean, cool liquid is injected into the seal chamber to improve the operating environment (see figure 3a).
2. **Barrier or buffer:** A secondary fluid is fed to the space between two co-axial mechanical seals to prevent atmospheric contact with the pumped fluid, improve seal cooling, or enhance safety (see figure 3b).

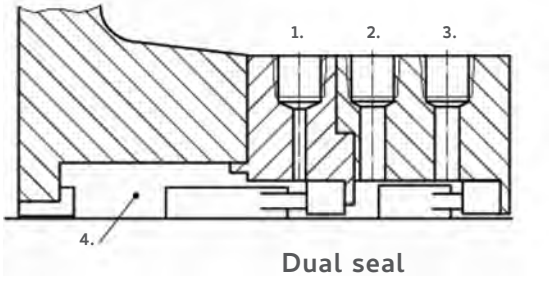


Figure 3b: Typical dual seal piping plan.

With hot processes, a flush system injects cool liquid into the process stream, which must in turn be heated to compensate. Barrier systems remove heat from the process, then cool the secondary fluid before returning it to the seal. If the flush or barrier were not present, the process would require less energy. Heat exchangers are often used to cool the flush or barrier fluid, requiring a supply of pumped cooling water or a fan to drive air past the vanes of the exchanger.

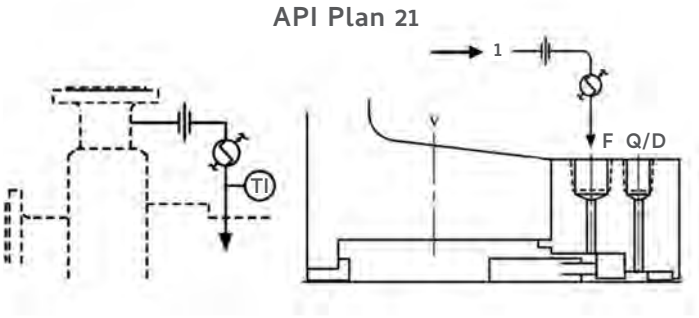


Figure 4: Recirculation from pump discharge through a flow control orifice and cooler, then into to the seal chamber.

A smart approach to seal support systems can improve energy efficiency and provide significant reduction in energy costs and carbon footprint.

BOILER CIRCULATION PUMPS: CONVERSION FROM API PLAN 21 TO PLAN 23

This first example illustrates the efficiency difference between two (process side) flush piping plans. Single seals operating in higher temperature media often require additional cooling. This may be needed to improve the margin to vapor formation, to meet secondary sealing element (e.g., O rings) temperature limits, or to reduce coking or polymerization.

There are two piping plans commonly used in industry, referred to here as API Plan 21 and API Plan 23.

In API Plan 21 (see figure 4), process fluid is circulated from the discharge of the pump, through a restriction orifice and a cooler, then into the seal chamber. The cooler is removing heat from the process stream, reducing overall process energy efficiency.

In API Plan 23 (see figure 5) is a more efficient way to provide cooling for the mechanical seal. Liquid is recirculated from the seal chamber, through a cooler, then back to the seal chamber. Circulation is driven by a rotating pumping ring in the seal chamber, which may be integrated with the mechanical seal. Instead of constantly cooling a part of the process stream, only the contents of the seal chamber are cooled. This minimizes the load on the cooler, since the heat to be removed is only the heat generated by the seal faces plus the heat soak through the seal chamber casing.

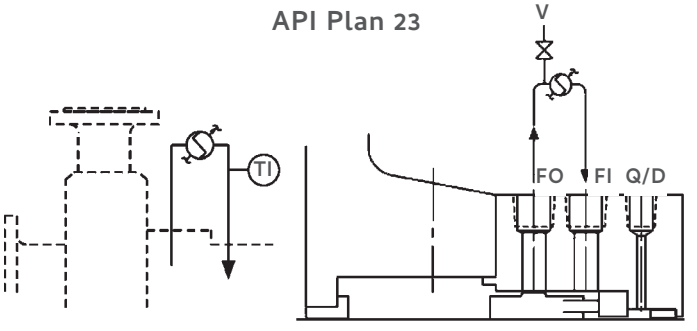


Figure 5: Recirculation from a pumping ring in the seal chamber through a cooler and back into the seal chamber.

BEST PRACTICE

API 682 offers an excellent tutorial on the reliability improvements that can be obtained with Plan 23 and states that Plan 23:

- is the plan of choice for all hot water services, particularly boiler feed water,
- is also desirable in many hydrocarbon services where it is necessary to cool the fluid to establish the required margin between fluid vapor pressure and seal chamber pressure.

This duty is usually much less than that in a Plan 21. Lessening the duty is very desirable because it extends the life of the cooler. The industry has considerable negative experience with Plan 21 because of cooler plugging.

— API 682 3rd Edition ISO 21049

PLAN 23 BOILER FEED PUMP APPLICATION

Energy Saving

One such application was the boiler water feed pumps on a modern CHP plant supply at a paper recycling mill. Operating at 320 degrees Fahrenheit (160 degrees Celsius), and seal chamber pressure 8 bar(g), this application serves to illustrate the difference between the two plans. The pumps were fitted with a traditional seal of 85mm diameter cooled by API Plan 21 configuration. Service life of the seals was less than twelve months, with associated problems of cooler fouling. A software package developed between the cooler manufacturer and AESSeal was used to calculate cooler heat loads for both Plan 21 and Plan 23 operation. Plan 21 results demonstrated that the seal would be operating at seal chamber temperatures of 226 degrees Fahrenheit (108 degrees Celsius) and with cooler heat load in excess of 14 kW. Using the same basic operating parameters, an SMSS 23 (see figures 6 and 7) mechanical seal on Plan 23 operation gave significant efficiency improvement. Seal chamber temperature drops to 116 degrees Fahrenheit (47 degrees Celsius), with the cooler heat load falling to 1.9 kW almost 1/8th of the heat load of the Plan 21 system. The reduction in cooler load does not reduce the power absorbed by the pump but provides for two potential savings. First, almost 12kW less heat is required to operate the boiler. Second, reduced load on the cooling water waste-heat removal system results in lower maintenance costs.

Figure 6: A modern cartridge design.

Reliability Improvement

A similar exercise was undertaken on a ship application, which demonstrated similar reduction in cooler load. Mean time between failure of the original Plan 21 arrangement was less than twelve months with cooler fouling being the

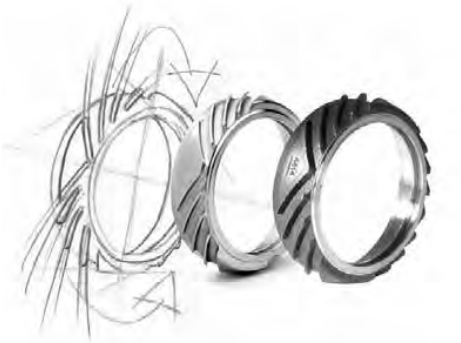


Figure 7: Bi-directional seal circulating device.

root cause of failure. The SMSS Plan 23 conversion has now been operating since 2002 with no failures to date.

Industry Adoption

Industry adoption of the preferred and more efficient Plan 23 is currently low. Plan 21 is far more popular. This is because traditionally Plan 23 seals were expensive due to the cost of including the pumping ring and complex tangential porting in the seal chamber. Modern machine tool techniques combined with innovative modular cartridge designs (see figure 6) have made the implementation of such seals easier on both new and retrofit pumps. Cost has been reduced by fully integrating the pumping ring and ports into the seal cartridge. Development of efficient bi-directional pumping rings (see figure 7) serve further to simplify installation on between bearing multi-stage machines.

In a recent proposed design of a petrochemical facility to be built in the Middle East, 10 percent of the applications were originally specified as Plan 21. After demonstrating the energy savings to be made, these were changed to Plan 23. It is still common to find a high incidence of Plan 21 on major projects where capital cost has been the over-riding factor, such as combined heat and power (CHP) plants.

A LOOK AHEAD

In next month's conclusion, we'll more closely examine the impact sewage treatment has on energy consumption as well as the ways its energy content can be made lower in a modern context with mechanical seals. Whether it be the complex treatment of industrial effluent or the more direct treatment of wastewater and small processing plants, energy savings and environmental benefits are both possible and applicable.

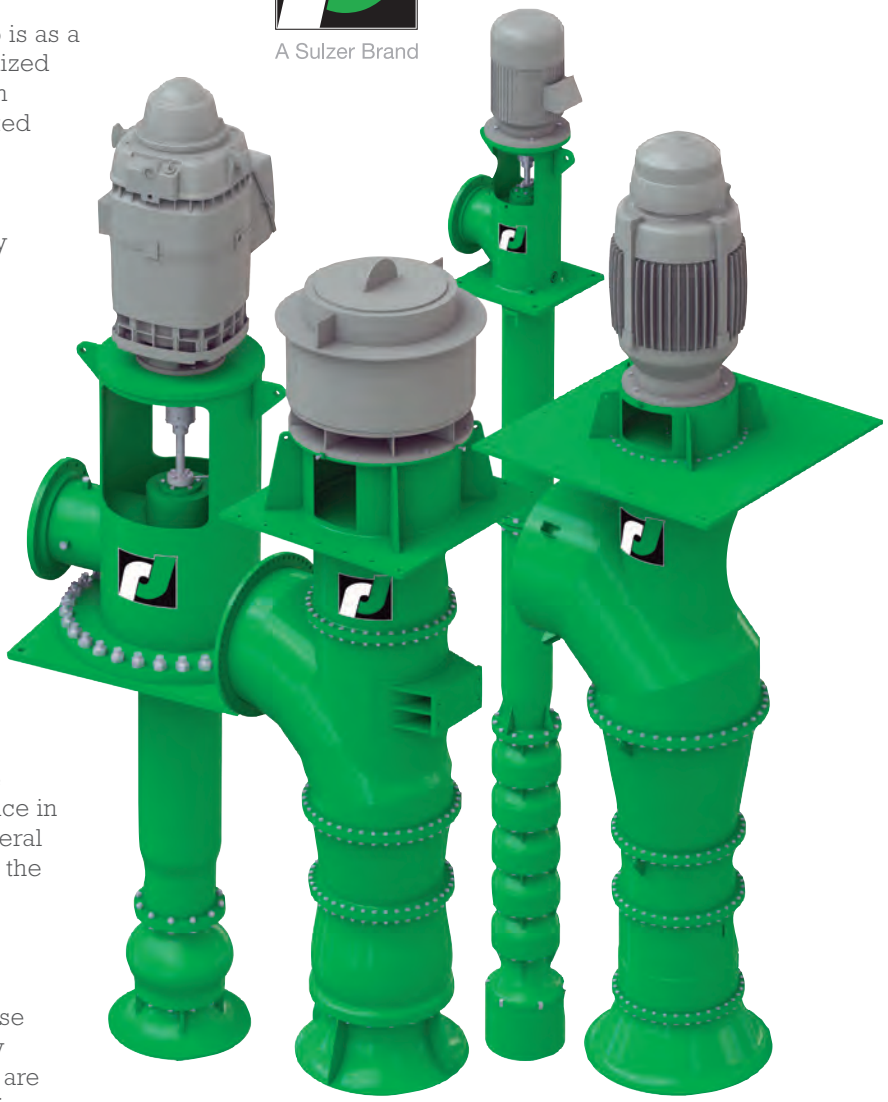
AESSeal is a specialist in the design and manufacture of mechanical seals and support systems. AESSeal's mechanical seals are used in a wide range of pumps and rotating equipment worldwide to prevent liquids and gases escaping into the environment. AESSeal manufactures mechanical seal types to suit all industries and its investment in modular design means that the company provide the best on-time delivery performance in the industry. The AESSeal range of seals, seal support systems, and bearing protectors are all designed to improve pump reliability and reduce maintenance costs. For more information, visit **www.aesseal.com**.

FEATURED PRODUCT

SULZER

JOHNSTON PUMP

A Sulzer Brand



Acquired by Sulzer in 2004, Johnston Pump is as a specialist range of vertical pumps recognized for their reliability and used extensively in the power and water industry throughout the United States. As a recognized leader in the municipal water industry, as well as irrigation and flood control, the Johnston Pump name is familiar to several generations of operators. Sulzer is equally well-known for its quality and extensive product range in the oil and gas and power generation sectors; so, with both benefitting from extensive service and manufacturing facilities in North America the brands sit well together.

The Sulzer management and operational teams are confident to provide reassurance that the attributes of high-quality engineering and reliability associated with Johnston pumps have been retained and refined over the past sixteen years. Manufacturing standards within the current production facilities remain extremely high with extensive testing capabilities within Sulzer to ensure that every product is delivered to the exact specification required.

Randy Milton, sales and tendering manager at Sulzer, comments: "We are really excited to be bringing such a strong brand back into prominence in the market. Even after sixteen years, we have several staff members who are looking forward to seeing the product lines back in the traditional green color."

The Johnston product range, which has been adopted by Sulzer globally, is renowned for its reliability and versatility. For the water and wastewater industries, the ability to engineer a base pump design to suit individual applications is very important. It ensures the essential design features are retained while the specifications match the operation, delivering an efficient and cost-effective solution.

Milton adds, "Our customers will really get the best of both worlds now. A familiar brand with the dependability and quality of the Johnston products, together with the engineering and maintenance support available through Sulzer's extensive service center network."

SULZER

For more information, visit

WWW.JOHNSTONPUMP.COM

ANOMET PRODUCTS

PLATINUM CLAD WOVEN MESH ANODES

Anomet Platinum Clad Woven Mesh Anodes feature a complete metallurgical bond between the platinum and niobium substrates that provides a dense, pin-hole free uniform structure for lower operating current densities and longer life. Laser cut into complex shapes, they are offered as single pieces up to 24 inches wide with a ten wires-per-inch pattern in both directions; available with or without frames and tabs. Anomet Platinum Clad Woven Mesh Anodes are priced according to configuration and quantity. For more information, visit **www.anometproducts.com.**

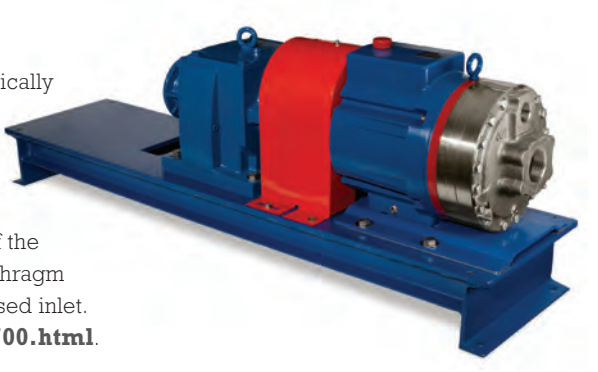
ASAHI/AMERICA, INC.

SERIES 19 ELECTRIC ACTUATORS

Asahi/America, Inc. introduces the Series 19 electric actuator, offered in both smart and basic options. Compact and lightweight, the Series 19 is available in four operating configurations: on/off, modulating, failsafe, and modulating failsafe; and three sizes to meet valve torque requirements. The multi-voltage general purpose unit operates at a 75 percent duty cycle for more frequent cycling of the valve. Compatible with most PLCs, the Series 19 is an ideal choice for OEMs and skid manufacturers where space is at a premium but power cannot be sacrificed. For more information, visit **www.asahi-america.com**.

WANNER ENGINEERING

HYDRA-CELL P700 "PULSE-FREE" METERING PUMP



Hydra-Cell Metering Solutions P700 Series metering pumps feature a hydraulically balanced, multiple-diaphragm design to provide smooth, linear, virtually pulse-free flow without the need for expensive pulsation dampeners. Employing VFD electronic flow control adjustment, P700 metering pumps deliver precise, accurate flow throughout the turndown range at up to 1,394 gallons per hour with discharge pressure ratings to 1,200 psi. As part of the extensive line of Hydra-Cell seal-less pumps, the P700 features patented diaphragm position control that protects the pump and enables operation in case of a closed inlet. For more information, visit **www.hydra-cell.com/metering/product/P700.html**.

DANFOSS

VLT® SOFT STARTER MCD 600 ENCLOSED

The new VLT® Soft Starter MCD 600 Enclosed provides a flexible solution to potentially long lead times that are currently seen in the industry. This product is in stock and ready to ship quickly—including the NEMA 3R enclosure. The new MCD 600 Enclosed offers the latest in soft start motor control and protection for superior performance in fixed-speed applications wherever drives are used. The product provides all the features and functions as a standard MCD 600 Soft Starter in a compact NEMA12 or NEMA3R enclosure, with circuit breaker, keypad, and operators on the door. For more information, visit **www.danfoss.com**.

CREATING CLEAN WATER WITHOUT HARSH CHEMICALS

IDE's Gilad Cohen on water reuse and the path to greater sustainability

Gilad Cohen is chief executive officer for IDE Americas, a leader in the development, engineering, construction, and operation of advanced water treatment solutions, managing the company's sales, marketing, and business development activities. He stopped by MPT's podcast, The Efficiency Point, to discuss his company's Eco-Reuse system. Addressing the world's growing water demand by reusing municipal wastewater, IDE Eco-Reuse offers a safe process for producing high-quality potable water while also minimizing environmental impact.

MPT: ***Most people are familiar with adding chlorine to treat water. But what are the hazards of that process and what led you to seeking an alternative?***

GILAD COHEN: Adding clients into water is obviously for the purpose of disinfection. This is the most common use but with that there are certain side effects that I think the public is less aware of, information of different organic matters that with time and with investigation have been identified to be potentially harmful.

Our team at IDE always have the model of thinking how can we continuously increase water safety, increase resilience, and increase sustainability. For us, sustainability and water safety start with reducing chemical footprints to the extent possible. Looking on those processes that are used today for wastewater, we came to the conclusion that if we can reduce the disinfection element dosing up front, we can potentially increase the safety of the water.

MPT: ***How would you summarize the Eco-Reuse process?***

GILAD COHEN: Eco-Reuse is the process that was developed by IDE, which essentially takes the standard process coming for wastewater reuse, essentially turning wastewater into potable water. The process essentially incorporates a different logic on how to run the main or the core of the process, which is using reverse osmosis by modifying the logic of the process in a way that already embeds disinfection.

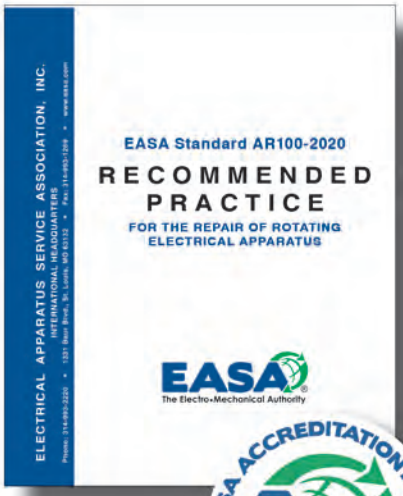
In short, we're modifying the way reversal is most commonly used. Instead of running a continuous process, we're running a full cycle process, which essentially means we create modifications in pressure on the bright side of the reverse osmosis systems in a way that modifies the pressure periodically and that causes the bacteria to dehydrate, or the iteration of the bacteria and inactivate them in a way that essentially gives you the effect that the disinfection would be without using chemicals.

MPT: ***Does that change in pressure without using chemicals mean that Eco-Reuse can help improve system efficiency?***

GILAD COHEN: Absolutely, it essentially simplifies the operation. It reduces the chemical footprint, or the fact that you even need to handle some of the chemicals or have chemicals on your site. That makes the system more available and you get more uptime of the system, and in certain cases, in the right configuration, we can even increase recovery. Every increase in recovery means you get more product water out of the system than you would get with a regular system.

To listen to an extended version of this interview, be sure to subscribe to MPT's podcast, The Efficiency Point.

Repair or Replace? That is the question.



Sometimes it makes sense to replace your electric motors. Other times, repair is the best option. EASA members can help you make that decision. They understand motors can be repaired or rewound without reducing efficiency or reliability if the work is performed to the industry standard.

ANSI/EASA AR100-2020: Recommended Practice for the Repair of Rotating Electrical Apparatus is *the* standard for maintaining (or sometimes even improving) AC electric motor efficiency and reliability.

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