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WATER UTILITY - PAGE 31

# MANUFACTURER-DISTRIBUTOR PARTNERSHIP HELPS SOLVE SUPPLY CHAIN CHALLENGES

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# SERVING LEADERSHIP

*Author: Charli K. Matthews*

Servant leadership is a style based on the desire to serve and give to your community.

“By putting the needs of others first, you empower people to perform at their best. When members of the community see your passion and your commitment through your actions, they want to be connected to you.” NSLS

With a goal of serving others, I set out to Uganda. The plan was to visit several churches, primary schools, and friends in Kampala & Kasese. I am not a pastor, teacher, or even a youth director. I am just a girl who loves the Lord with a love for the Uganda people. Ever since Brian Winters, my highschool Math/ Science teacher, shared with me their stories, I have wanted to travel to Africa. I knew they had great needs for things like water and education, but I didn't have any expectation about how I could help. I just knew I was called to show up and serve.

The Lord directed my steps and after nearly 10 years of lunches with Brian and the never ending sharing of the Uganda people with me through photos and storytelling, I was able to say “YES” to the calling on my heart to serve with Brian in Uganda. I have always loved how he could call each child by their name as he was telling me of his trips. I wanted to meet these amazing children and the leaders in the community that took care of them. I had once given financial support to the children, and Brian created a photo that said, “Charli's Angels.” For course, I needed to meet these angels who hung in my office.

The most significant thing I learned from the trip was that as you serve others, your love for them grows. You could truly feel your heart overflow with love and joy to be in their presence. I especially felt this with the team of pastors that served with us. The ones that do this work so beautifully everyday.

I also learned that all you have to do is show up. God will instruct those around you on how we can use our gifts. I had no plans when I arrived. By the end of the trip, I had help share the Living Water of Jesus with over 2500 students, twirled a baton made from a eucalyptus tree, led a bible study for women who



didn't speak English via a translator, played with children in a poor fisherman's village, and I led an empowering women conference with 25 women who were inspired and to build their own businesses and create financial security for their families. This is just a touch of the things I have to share with you.

Please follow my blog for the rest of the story...

I hope you can all see value in serving. Serving Leadership is about getting out of our comfort zones and showing up for the team that needs us. Who will you serve today?





# Contacts

Charli K. Matthews  
Founder & CEO of  
Empowering Brands and  
Publisher of Empowering  
Pumps & Equipment  
cell: 205-391-8422  
[charli@empowering-brands.com](mailto:charli@empowering-brands.com)

Bethany Womack  
Brand Development Manager  
cell: 281-610-2212  
[bethany@empowering-brands.com](mailto:bethany@empowering-brands.com)

Vince Marino  
Director of Business Development  
cell: 205-310-2491  
[vince@empowering-brands.com](mailto:vince@empowering-brands.com)

Rebekah Mechtensimer  
Director  
cell: 814-289-9964  
[rebekah@empowering-brands.com](mailto:rebekah@empowering-brands.com)

Amber Brewster-Graning  
Multi-media Communications  
cell: 309-750-0250  
[social@empowering-brands.com](mailto:social@empowering-brands.com)

Carter A. Matthews  
Co-Founder and Digital Media Specialist  
cell: 205-792-2778  
[carter@empowering-brands.com](mailto:carter@empowering-brands.com)

## Key Contributors

**Ari Copeland**  
Water & Wastewater Operations

**Bryan Christiansen**  
Developing Maintenance Software

**Gilbert Welsford, Jr.**  
Business Development

**Ken Latino**  
Prelical Solutions, LLC

**Kristin Graybill**  
Manufacturing

**Larry Bachus**  
The Pump Guy

**María Elena Rodríguez Hernández**  
Water Engineering Director

**Heinz P. Bloch, P.E.**  
Engineering, Reliability

**Sandeep Mukunda**  
Senior Market Research Analyst

**Randal Ferman**  
Engineering

**Thomas Cutler**  
TR Cutler, Inc

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## A Letter from Bekah

### How Inclusion Impacts Our Mind & Body

You may have heard me discuss this before about how I think supporting the LGBTQ+ community directly influences our initiatives to create a more diverse, equitable, and inclusive workplace. And the benefits of having diversity of thought and encouraging that in all facets of our lives – in our daily lives, in the people that we surround ourselves with, and in the workplace. You can read more about this, here.

For this article though, I want to talk about the health impacts of not feeling safe, included, and free to be who we are in life. I'm a bit of a nerd when it comes to learning about how our minds work. What I've learned over the last few years of actively learning and also digging into my own mental health struggles, is that our emotions, traumas, stresses – they're all connected to our nervous system.

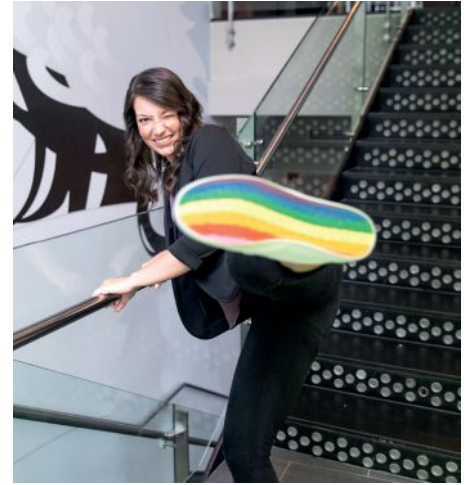
Where I'm going with this is that if we don't feel like we belong, our brains are going to go into a trauma response (or survival mode) and our mind and body are going to react accordingly. Our nervous system is what guides our behavior so if we're dysregulated, it's going to negatively impact our health and well-being. I recently learned that our brain processes physical pain basically the same way it does when we feel emotional pain. I don't know about you, but I'm forever changed by that realization.

How we make others feel – whether it's good or bad – directly impacts what goes on inside their bodies. This is a huge deal, especially when it comes to DEI initiatives and striving to be better. The LGBTQ+ community experience mental health issues at higher rates than those in "heteronormative" groups. This is even more impacted if you're in the BIPOC (Black, Indigenous, and people of color) community.

First and foremost, I believe that we should be kind and show compassion to all people. But I don't think that's enough. Yes, in our daily lives we can be accepting and good to others but from a corporate/company standpoint if you aren't showing that you are truly diverse, equitable, and inclusive in your workforce – people still aren't going to feel that psychological safety they need to show their true selves.

My call for all of you during this month – Pride Month – is to actively support and amplify those in your network that are different than yourself. To lift those up in the LGBTQ+, BIPOC, and other marginalized communities, and give them the safety that they (and we all) need and deserve to be our most authentic selves.

Lastly, if you're interested in learning more about our autonomic nervous system, here's a great video breaking it all down: <https://www.youtube.com/watch?v=ZdIQRxwT110>



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## From a Recruiters Perspective with Alex Chausovsky

Alex Chausovsky is a highly experienced market researcher and analyst with more than twenty years of expertise across subjects including economics, industrial manufacturing, automation, and advanced technology trends. For the last two decades, he has consulted and advised companies throughout the US and Canada, Europe, South America, and Asia.

Alex has delivered hundreds of keynote presentations and webinars to small businesses, trade associations, and Fortune 500 companies across a spectrum of industries. Alex is currently overseeing a suite of analytics products focused on talent for the Miller Resource Group. He is also consulting with companies to help them become better at attracting, hiring, and retaining the impact players in their industry.

Alex Chausovsky will be joining us for our Knowledge Shared Video Series. The series with Alex will feature 3 videos.

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# The Manufacturer-Distributor Partnership Helps Solve Supply Chain Challenges

*By Michelle Segrest*

During the long global shutdown caused by the 2020 Covid pandemic, staying ahead of the game became the name of the game with regard to manufacturing and distributing pumps and key components. At least that was the case for pump manufacturer, Curflo, and one of its key distributors, Stealth Pump & Supply.

Solving the critical supply chain challenges that resulted from the shutdown required a strategic plan. They needed to study detailed market analyses and have accurate trend forecasting. It also required anticipating that the world would get back to normal, eventually. By throwing into the mix a little bit of risk, trust, bravery, and constant communication between manufacturer and distributor,

Curflo and Stealth found a recipe for success that catapulted them into a competitive position for the industry bounce back of 2022.

“Our plan was mostly risk driven,” explained Curflo’s VP of Operations, Bradley Ritchey. “We weren’t developing new products or doing anything differently. It was a matter of strategic timing. We needed to time the market demand accurately and successfully guess when sales would rebound. We took the risk of believing in our distribution channels and listening to what they were telling us. We tried to get as much market analysis as possible—prospecting about what kinds of materials would sell, and what size pumps to focus on. Then we just took a risk and loaded up. Even



though we knew Covid 2020 would put strains on the revenue side, we decided to continue to invest in ourselves and prepare inventory appropriately.”

It was a gamble that paid off.

“A lot of our manufacturing competitors sat back and waited,” Ritchey said. “They were cutting inventory while we were stocking the shelves. We did the opposite of everyone else with the hopes of a big bounce back in 2021.”

Inventory can be a tricky thing, especially during times of international chaos, Ritchey explained.

“Industry is experiencing an incredible increase of lead time,” he said. “Our main discussions from Day One revolved around the issue of inventory. It’s important not to have too much or too little. During Covid there were a lot of supply chain lockdowns that accelerated the issues that already existed.”

Manufacturing slowed because demand decreased. That led to a decrease in sales industry wide. In response, many companies cut back on inventory and production. As 2021 became the bounce back year, many companies are still struggling to catch up.

Curflo, a Houston, Texas-based manufacturer of ANSI pumps and parts, took a risk during the shutdown and was able to maintain inventory throughout 2020 and 2021. Having a distributor like Stealth Pump & Supply, who could get the product to the end users quickly, was a game changer for Curflo.

“Surviving market fluctuations and supply chain issues during something like a pandemic requires a lot of faith and trust in your company and in your partnerships,” said Blake Lisenbe, Chief Operating Officer & Owner of Stealth Pump & Supply, a west-Texas oil and gas industry distributor of industrial equipment. “The partnership between Curflo and Stealth made the world of difference for our customers. Brad had confidence that they had a great product and that the market would eventually come back. I had that same mindset. That helped us to work together strategically and just keep moving forward. A positive mindset can change everything.”

The partnership was not a one-way street. Both the manufacturer and the distributor took risks. Most important, they trusted each other and worked together as a team.

“Curflo stocked up on inventory, but so did we,” Lisenbe said. “The biggest key for Curflo is that they take the time to listen to what we are telling them, and then they take the steps required to make it work. The mistakes that some manufacturers make is focusing only on the manufacturing side and not taking critical input from the distributors. Curflo is great about listening to us, considering what we are telling them and then together we can





come up with a plan moving forward to improve the process and understand the market trends. That's what separates them from the manufacturers who are struggling."

Throughout the past couple years since the 2020 Covid shutdowns, the ebb and flow of industry has caused challenges for almost every manufacturing company in all industries. The supply chain challenges have caused havoc for all companies. The response to those challenges is what has allowed companies like Curflo to survive the slow times and prepare for the influx of business on the other side.

"The biggest contributing factor holding people up since Covid was the shutting down of manufacturing and how slow everything became," Lisenbe said. "Companies stopped filling their inventory. Then when things picked up again in 2021, it happened so fast that many manufacturers couldn't keep up with the demand. It was like flipping a light switch, and then all of a sudden you have all this product that needs to be shipped out. It takes time to restock and fill those shelves again and catch back up. I think that Curflo did a great job of staying ahead of it. Brad and I had multiple meetings during the Covid shutdowns to find solutions to keep up and stay ahead because we knew that it would eventually come back strong, and we would need to be prepared for that. They made the bold decision to pull the trigger and have a lot of equipment on order and in the process of being manufactured while many other companies were tightening their belt loops and didn't invest in the future or plan for what would be needed as soon as things opened back up again."

## Lessons Learned

Even with the gamble of building inventory without orders during times of inflation, rising raw material costs and supply chain challenges, both Curflo and Stealth learned some lessons about surviving a global shutdown and keeping business on track.

"One of the biggest key factors for Curflo and Stealth was the great communication that we had," Lisenbe said. "We talk so much that we are able to trust each other. It took a lot of faith on Curflo's part to believe in what we were telling them. And then we had the

confidence that we could move the product. Even during the really slow times, Curflo continued to place orders and had faith that their distribution channels would move the product. They are one of the only companies I deal with who actually had product sitting on the shelf when the orders started coming in again."

Strategic market forecasting became an essential tool for both the manufacturer and the distributor.

"Yes, there were some cuts, but we never fully stopped production," Ritchey said. "We continued to manufacture the components. We kept a steady stream of components that were being casted and machined and imported. The whole process continued to run smoothly, and we just never went into a complete shutdown. We also continued to do heavy analysis, especially in 2020. In the third quarter of 2020 we really pulled the trigger and ramped it up. Blake and I spent a lot of time together talking about the market, forecasting, and trying to have a good understanding of when things would fully come back. We slowed down a little, but we never really took our foot off the gas entirely. We knew we needed to keep a steady stream flowing."

It takes about six months for Curflo to manufacture its products, from the order to the delivery.

"When the process is completely shutdown, it's hard to reboot," Ritchey explained. "The companies that did not keep going through 2020 and 2021, are going to have a big disadvantage in 2022 because it takes half a year or more to get things going again. Because we didn't stop, we are now a good six months ahead of our competition. They are doing the same thing we are, but we just did it a year ago. That gives us an edge."

The demand for product has skyrocketed quickly—even more so than originally forecasted. That means that the companies with inventory ready to ship have a huge competitive advantage. Lisenbe and Ritchey said they can recommend 10 key takeaways to overcoming supply chain issues in industry.

1. Manufacturers should spend time listening to its distributors.
2. Perform in-depth market research.
3. Develop an understanding of what the future holds.
4. Take the time to listen to different points of view about what the market will bear.
5. Trust distributors when they tell you how much product they can move.
6. Get a game plan and strategy to stay ahead of the market demands.
7. Develop key partnerships between manufacturers and distributors.
8. Talk through the challenges that arise to find a reasonable solution.
9. Work together. It takes both sides of the business to service the industry.
10. Take a gamble during slow times to stay ahead of the market.

## Overcoming Challenges

Centrifugal pumps are heavily manufactured internationally. The supply chain challenges of getting the equipment delivered to the



U.S. has been a major challenge that still exists. Covid forced a spike in container prices and shipping and also presented chaotic logistic challenges.

“Maintaining our process throughout the shutdowns was a key to our success,” Ritchey said. “It was our job to maintain the manufacturing and support our distributors with product so they would be ready to go. Our distributors give us the information of what they think will move. They are talking to the end users, so they also can see the future. We use that data to help make investment decisions. Then we can plan for the long term. We try to stay at least six months ahead of the game. Communications with our distributors helps us better forecast and make more strategic decisions about what the market will bear now and in the future.”

Fluctuating prices continue to present daily challenges, but quality should not falter in the process of getting the products out the door.

“We have lots of conversations about pricing, with regard to inflation, material costs, and shipping costs,” Lisenbe said. “Everything is going up. We were able to come together and structure a plan for pricing for 2022. Also, it’s important to maintain quality. You must keep consistent quality coming through production during a slowdown. When you ramp up again you must take the time to maintain the quality of product.”

Ritchey agreed that companies who are not prepared for an influx of orders could experience a downgrade in quality.

“This often happens when companies ramp up too fast,” he said. “They miss a lot of the little details when trying to move as much product as they can in a short period of time. The pump game is always evolving and moving and changing. One of the issues we experienced was the importance of noticing the trends and responding to them. You may have one class of pump that is not selling much, and then all of a sudden that size pump is selling faster than it can be produced. The key is understanding those market trends and trying to make a plan to prepare for them. This can help to avoid time constraint issues and long lead times.”

Strategic forecasting also becomes a critical component in overcoming these challenges.

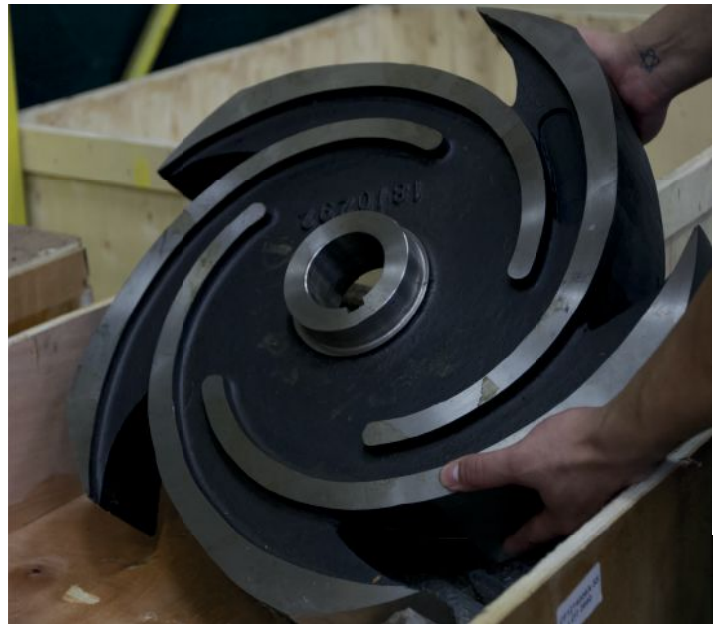
“Our owner is always pushing to keep the constant pressure on,” Ritchey said. “He is always thinking forward. You can’t sit back and wait. At the end of the day, to stay in business you must have revenue. And you can’t have revenue without product. Curflo did a great job of supporting its employees and supporting our distribution. We knew business would come back, so we were in constant communication about actions we could take and how we could prepare ourselves and stay ahead. We had to take the risk together. Many companies did not invest in their inventory and distribution, and for us, that was a game changer.”

Both Lisenbe and Ritchey agree that the outlook for 2022 is positive.

“The numbers speak for themselves,” Ritchey said. “The demand is back. People are flying and going back to work, so the natural demand for energy is back.”

During the pandemic, staying ahead of the game was the key. Now, it’s about keeping up with demand in a rapidly evolving climate.

“Curflo has done a much better job than many companies,” Lisen-



be said. “As a whole, manufacturing has not been able to keep up with demand. Lead times for components like motors and fittings are moving further and further out. But I’m not seeing that problem with Curflo. Across the board, we are seeing a lot of products moving but the delivery dates change daily. The cost of materials changes daily, the cost of containers coming across the seas is fluctuating. So, most quotes are only good for a couple days. It’s like the Wild West out there. It’s crazy.”

And in an environment like that, stability is everything.

“Our success is a direct result of the communication we have with our distribution,” Ritchey said. “A lot of decisions in manufacturing take some time and go through many channels. Because of the market downturn created by Covid, there is just as speedy a pace of bounce back. It comes back to the simple fact that the companies that are nimble and able to make quick decisions and can act quickly will have a huge advantage. Covid is not going away. It will be another year or two of supply chain issues for all industries.”

And in the end, the partnership between manufacturing and distribution is the ultimate game changer.

“Your distribution needs to understand their industry and be able to see into the future,” Lisenbe said. “Industry always bounces back. Then the manufacturer needs to decide where they want to be when it does bounce back. One of the biggest things we have working for us is that we both took the risk. We both stocked up on inventory. It’s a partnership—a marriage—and both sides need to have skin in the game. We have our feet on the ground and can predict what the market will bear. But the manufacturer needs to trust us. We both took a big gamble and now it’s paying off.”

### About the Author:



Michelle Segrest is an industry reporter with more than three decades of experience as a journalist. She is the president of Navigate Content, Inc., and the host of the Factory of the Future podcast.

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We can't wait for the Empowering Women in Industry Conference and Awards Gala in New Orleans on October 13, 2022. The Empowering Women Conference is a one-day event that will be spent learning and networking with some of the best in the industry. Many of the topics discussed this year will be centered around our #BeIntentional theme for the event.

The evening will be spent celebrating Empowering Women Award Winners and feature an Industry Fashion Show. Earlybird registration is open now. We hope to see you there!



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# The World Needs More Pump Engineers

By: Michael Michaud, Hydraulic Institute



**In a world without pumps, the bucket is the most valuable household tool.**

**READ WHY...**

It's difficult to imagine a life without something. We're all too familiar with the frustrations of everyday life. For example, when the WIFI is down, or cell reception is bad we lose immediate access to information and to our ability to call or text. This leads to a loss of efficiency and time. This got me thinking about a world without pumps.

Pumps play critical functions in modern society, yet they remain mostly hidden and we therefore take them for granted.

Water is probably the easiest to identify. Most Americans—not all unfortunately—know the luxury of turning a on a faucet and enjoying access to freeflowing, clean water. Pumps bring water to our homes from wells and to our communities through elaborate water systems. Thanks to pumps, we don't all need to live by a river or a fresh water source. Pumps bring pressure to systems so we can live in multistory buildings, and put out fires. Pumps also irrigate our crops and remove water from where it shouldn't be—basements, flood zones, or the hull of a ship.

Although water is a large part of what is pumped, many other fluids and materials are pumped as well. Pumps are essential to many industrial processes. Pumps transfer ingredients in doses, making them critical to producing medicine and other products. Without pumps, we wouldn't be able to produce power in power plants or make gasoline, let alone put it in our vehicles.

Pumping is also the most efficient way to process peanut butter and put it in jars. It is also how we mine things, from diamonds to the critical minerals needed for batteries, electronics, etc..

Without pumps, the data centers would not be cool enough to handle the heat produced by today's data-driven, electronic lifestyles. The list goes on.

Hydraulic Institute's upcoming A World Without Pumps campaign aims to underline the ubiquitous and essential nature of pumps. It will highlight the important role pumps and pumping systems play in society, and frame opportunities that exist for individuals seeking meaningful careers in this exciting industry.

From front line sales to application and test engineers, R&D, design and manufacturing roles, the career opportunities are numerous. But just like pumps themselves, careers in the pump industry are often overlooked.

The Hydraulic Institute will be launching its A World Without Pumps campaign to raise awareness of the industry. A career center with training resources will help those with no knowledge of the industry gain a basic understanding of necessary requirements, and provide the tools for those who are already in the industry to thrive in it.

Perhaps you know someone who looking for a meaningful position in a critical industry. The pump industry makes a significant impact on our everyday lives. Visit [pumps.org](http://pumps.org) to share the campaign and share with us what your World Without Pumps would look like.



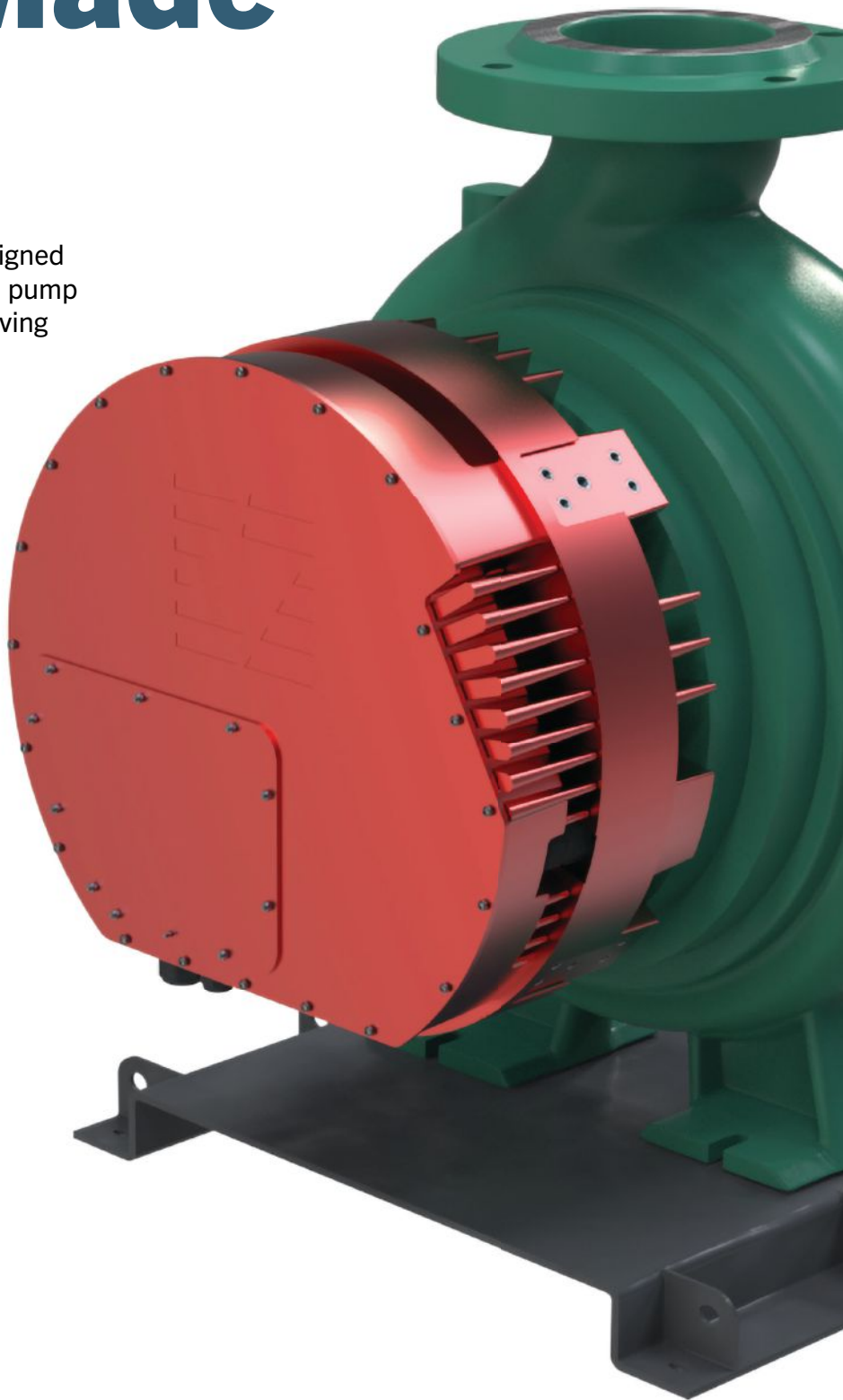
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# Industry #Influencers

In this issue, Empowering Pumps & Equipment honors #Influencers in Industry! A Special 'Thank You' to these individuals below who are actively working to Be the Change we need to see in the world! Whether it's empowering women, inspiring students into STEM fields, being role models and keeping our water clean and our systems operational, these individuals are our heroes!



**Emily Newton** · 3rd  
Editor In Chief at Revolutionized  
Talks about #iot, #science, #automation, #supplychain, and #manufacturing  
Greater Philadelphia · [Contact info](#)



**Ansell Sims** · 2nd  
President, Grundfos USA  
Greater Houston · [Contact info](#)



**Shadrach Stephens** · 1st  
Award Winning Engineering Leader | Global Improvement Director  
| Founder of Re-engineer, a collaboration network  
Talks about #stem, #diversity, #inclusion, #valuecreation, and #professionaldevelopment



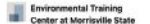
**Peter N. Barry** · 1st  
President at WEG Electric Corp.  
Atlanta Metropolitan Area · [Contact info](#)



**Lucas Marino, D.Eng., PMP, CMRP** · 1st  
Serial entrepreneur and engineer | Help entrepreneurs and authors launch and sustain online training products | I also help Asset Managers significantly reduce asset life cycle cost  
Talks about #assetmanagement, #projectmanagement, #lifecyclemanagement, #engineeringmanagement, and #maintenancemanagement



**Stephen Sanders** · 1st  
Director / Head Trainer at The Environmental Training Center at Morrisville State



**H.J. Dewes** · 1st  
Making life more comfortable, healthy and sustainable with energy efficient solutions.



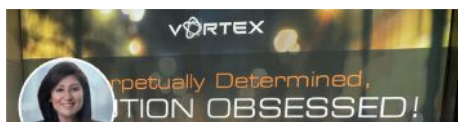
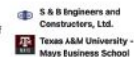
**Ron Frisard (He/Him)** · 1st  
Global Training Manager at A.W. Chesterton Company  
Worcester, Massachusetts, United States · [Contact info](#)



**Margaret Misera, P.E.** · 1st  
Rotating Equipment Engineer at S & B Engineers and Constructors, Ltd.  
Houston, Texas, United States · [Contact info](#)



**Nadine Tribur, P.E.** · 1st  
Director of Instrumentation and Electrical Engineering / Director of Engineering Solutions at S & B Engineers and Constructors, Ltd.  
Spring, Texas, United States · [Contact info](#)



**Jackie (Wilkerson) Herrera** · 1st  
Chief Marketing Officer at Vortex Companies - Trenchless Infrastructure Rehabilitation Solutions  
Talks about #cmo, #marketing, #womenempowerwomen, and #trenchlesstechnology

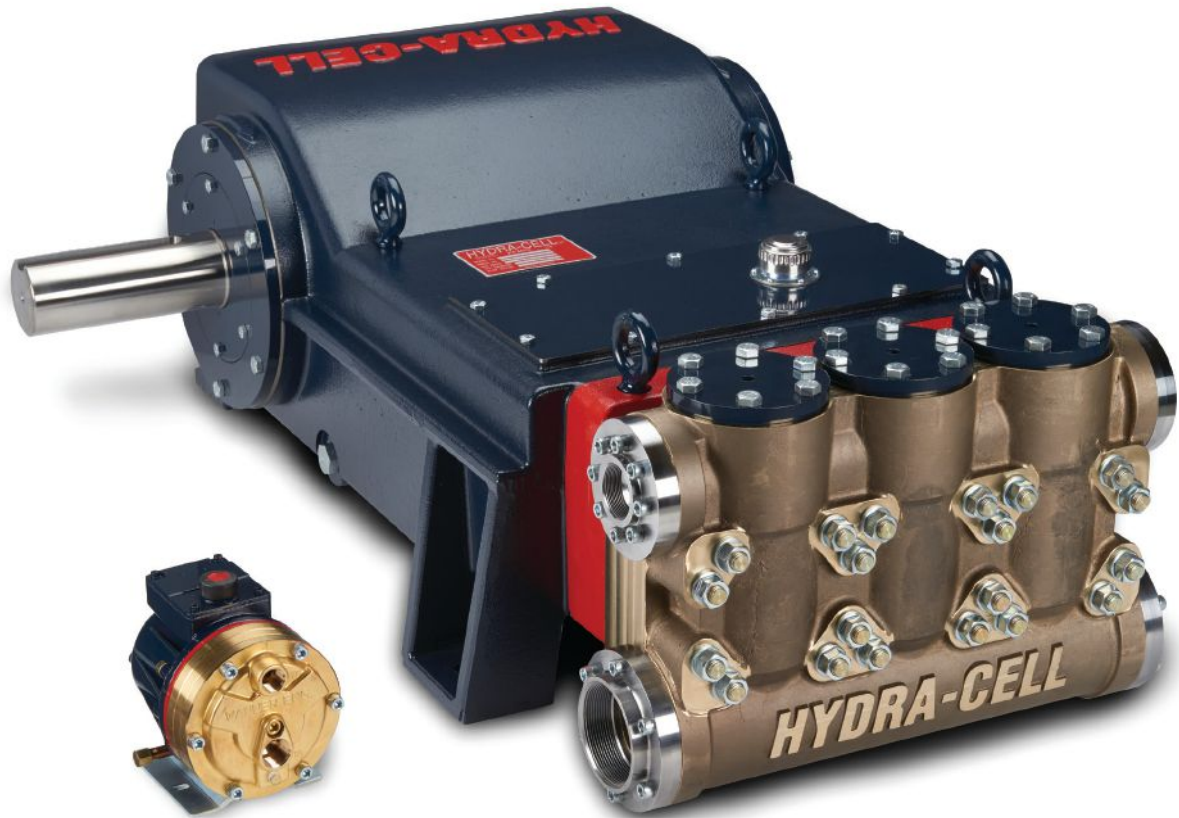


**Barbie The Welder** · 2nd  
Metal Sculptor | Author | Skilled Trades Advocate | Boudoir Model  
Talks about #art, #welding, #sculpture, #skilledtrades, and #successmindset





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# KNOWLEDGE: SHARED

Empowering Pumps & Equipment is the information and connection hub for the pump and related equipment industries with a mission to Connect, Inform, and Educate. Our community shares their knowledge so we can continue to address the issues of an aging workforce, encourage and educate professionals that are new to the industry, and be your 'go-to' resource for information and access to industry professionals who can support you!





# Ethics and the Engineer in Practice – Part 1

By: Randal Ferman

If you are a registered Professional Engineer (PE) in at least one of the 50 U.S. states, you have consented to abide by rules of ethical conduct in engineering practice. The same holds true for professional engineering organizations internationally.

If you are employed by a medium-to-large size company or corporation, there is a good chance that you have signed an agreement (or clicked acceptance) to abide by their code of business conduct.

These codes look good on paper. But what happens when you face a real situation? In Part 1 of this 2-part series, we will look at a series of six situations involving real workplace ethical choices.

## Behind Schedule

You are the Senior Project Engineer responsible for the development of new canned motor pump product line. This project is on your annual performance goals which, at the upcoming performance review, will factor into an expected salary merit increase and an anticipated bonus.

The testing program is running behind schedule. The latest test results fall just shy of the target product performance specifications. A few manipulative test instrument calibration tweaks would 'solve' this, and you could then declare the project testing to be complete. What is the best approach here?

In this situation, a business code of conduct would normally advise that records are to be factual and accurate – or wording to that effect. Misleading 'tweaking' of the instrument calibrations, or any such manipulation of data, is clearly against company policy and may be illegal.

Once a person or a group starts down the path of dishonesty, it is difficult to turn back. Dishonesty was the solution to a problem. Then, the underlying problem does not get fixed. In future similar circumstances, dishonesty will be used again.

Your best course of action is to always be straight. In this case, communicate the issue with your boss. He/she will respect your honesty and more than likely be willing to help



you find a solution. The same holds true in dealings with a customer. Importantly, your lines of communication remain open, free, and your personal integrity stays intact.

## Gift – Accept It?

You are asked to obtain quotes and evaluate competing bids for a large stormwater pump. You are tasked to make an objective recommendation based on compliance with specifications and to identify any intangible factors that might affect the final bid selection. The Purchasing Department will evaluate pricing and delivery.

A salesperson from one of the pump vendors has diligently helped you out with technical advice. He calls you and offers to take you and your spouse out for an evening dinner and concert. There are certain intangibles in his company's offering that might sway the selection in their favor even if they are not the low bidder. How do you answer him?

The dinner and concert offer by phone gives you the option to delay acceptance or refusal. You can say "Let me check with my spouse." Delay is not always an option, but in this case it is, and it gives you a chance to consider consequences, talk it over with your spouse, your supervisor, etc. What you do not want, of course, is to feel pressured

by his offer to reciprocate in the bid process. Companies usually have specific policies on accepting gifts. A dinner and concert would constitute a "gift" and you want to make sure it does not violate policy or law.

## Working Remote

Your company allows you the privilege of working remotely from home and to show up in the office for just 1 out of the 5 working days in a week. While working from home, you are expected to participate in online meetings and meet project deadlines. Otherwise, there is no tracking of your work hours.

You have figured out that you can get enough work done with the 1 day at the office, plus a minimal number of additional hours of remote work time at home. You put in roughly half of the customary 40 hours per week. You believe it looks like you are working full time because you still manage to meet project deadlines. Is it acceptable to continue with this pattern?

First, make sure you have thoroughly read up on the organization's work engagement, time off, holiday, and vacation policies. It may be time to arrange a talk with your supervisor and clarify expectations. If your



per-hour production level is exceptionally high, you might still be asked to work full time hours and thus accomplish more than expected. You might be offered a raise or a promotion. But do not just go on assuming your work engagement is not somehow being checked and do not continue assuming that your 'half-time' engagement, while being paid full-time, is OK. You want to remain straight, above-board, and maintain the uncompromised trust of your employer.

## Asking Out

You are attracted to someone in your department and wish to ask that person out to lunch. You are aware that certain employee relationship situations are prohibited. What do you do?

You would be well-advised to read up on the applicable company policies, ensure you understand them, and do not even think about skirting around these rules. Management does not wish to prohibit relationships, except where they might be considered as sexual harassment or coercion, or create conflicts of interest, embarrassment, or distraction in the workplace. The organization's policies on this may be 'zero tolerance' and the employer may have little or no recourse but to terminate employment for violation. If you are uncertain as to what you may or may not do, it would be best to have a discussion with your supervisor and/or an HR manager.

## Area of Competence

You are a registered PE in mechanical engineering. Your company has sent you out to a customer's facility to troubleshoot a pump that is not delivering its rated flow and pressure. You were chosen since you have shop pump test experience, and you are competent with pump performance issues.

While onsite, one of the facility operations people asks you to look over a new pump installation and comment on the motor starter wiring. Industrial electric motors are not unfamiliar pieces of equipment to you. You have seen what the wiring connections should look like. How do you respond to this inquiry?

As a registered PE, you have agreed to perform services only in your area of competence. Having seen wiring connections

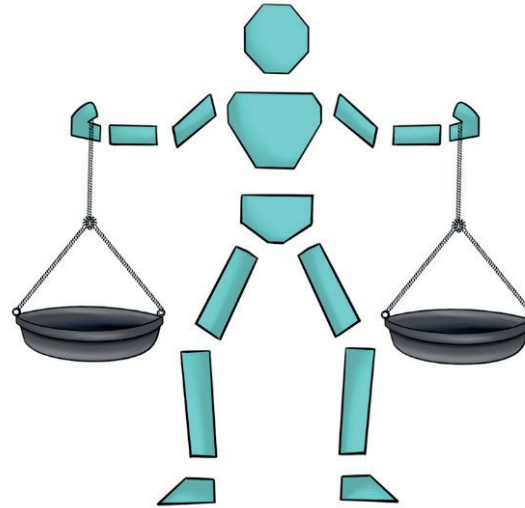


Figure 2. Ethical situations involve the weighing of options and making decisions.

versus having been technically and directly involved with them in professional practice are two distinct levels of knowledge. If you choose to offer any advice on the matter, you must additionally declare that this is not your area of expertise and to have them seek the advice of a party with expertise in industrial motor electrical wiring.

## Quality Assurance Issue

Representing your firm, you to travel to a manufacturing facility and witness dye penetrant testing (PT) of a large stainless steel pre-machined impeller. You have visited this plant before. You have a good working relationship with their engineers and shop personnel.

On this latest visit, you observe some slightly out-of-specification indications that both the shop supervisor and the senior project engineer present do not call to your attention. You know that if you speak up, those PT indication locations will likely require excavation, weld repair, heat treatment, and new PT. This could be a non-trivial repair exercise and result in a 1-week delivery delay. How would you handle this one?

In this situation, the visited manufacturing facility put you in an uncomfortable position. They, in effect, handed over their Quality Assurance (QA) function to you. The approach might be to hand back to them their QA function by asking "What about...?" as you point to an obvious dye indication. And then proceed to point out the other indications as well. Invite their input as to how they will resolve the out-of-spec impeller conditions.

A follow-up in writing would be appropri-

ate, with copies to your own supervisor, your own company's Quality Assurance Department, and your company's Purchasing Department. As both an ethical and practical matter, this vendor must be corrected before their lack of QA creates problems for everyone down the line.

## Summary Remarks

These preceding six real-world situations pose ethical decisions and there are many others that you, as an engineer, will likely be faced with. In matters of ethics, it is balancing or prioritizing interests: personal, those of your family, of your company or organization, of worker or public safety, or even of a larger sphere such as society or the environment. You will be involved in situations where you may have to voice an uncomfortable position. Often, you will not have the luxury of time – you will have to speak up and hold a position spontaneously, on the spot.

Pick up a newspaper or read the online news feed. Easily half of this news content are peoples' failures to know and apply ethical principles of conduct. You are not prepared unless you possess certainty. Certainty of what? Certainty that your decision-making is ethically correct.

In the second of this two-part series, we will take a look at essential differences among morals, ethics, and codes of conduct. We will pose questions to consider when making choices and decisions. To finish off, I provide some tips, based on a career of experience, to help guide you personally and professionally.

# Ethics and the Engineer in Practice – Part 2

By: Randal Ferman

In Part 1, I presented a series of real-world ethical situations that an engineer might be faced with. In this Part 2, I discuss the general categories of morals, ethics, professional rules, and business codes of conduct. As guidance, I pose a list of questions to help guide the engineer in making ethical decisions. And finally, I have offered up a few tips, based on my personal engineering career journey.

## Ethics versus Morals

Let us begin with a review of the differences between ethics, morals, rules, and codes of conduct. Morals are prescribed do's and don'ts, either written or understood. An example of a moral is "Thou shalt not steal." Another example of a moral is: "Always speak the truth." Adherence to morals tends to be clear-cut. The behavior is either "right" or it is "wrong." There is no room for debate.

Ethics is the individual's determination of conduct and behavior considering the relevant morals, law, policy, guidelines, and codes of conduct, given multiple factors and interests at play. Ethical behavior is often not explicitly prescribed. It may involve the weighing and balancing of several options and potential courses of action. The optimal ethical decision may fall within narrow boundaries or there may be wide range of possible "good" solutions.

Professional rules and business codes of conduct are often a compilation or mix of morals, policies, guidelines, law, and ethical principles. For purposes of this article, the term "ethics" is meant to encompass the entire mix.

## Questions Posed

Ethical conduct in the field of engineering practice is generally similar to that of any other field of professional practice. Most often, the right decision or the better option is obvious. But if the optimal decision is not obvious, ask yourself one or more of the following questions:

- Will you be hiding something?
- Is it legal?
- Does it violate the policies of the group or the profession to which you belong?



- Do you expect your decision will bring about harmony or might it produce discord?
- Is it being trustworthy and the way you yourself would want to be treated?
- Are you uncomfortable, pressured, or coerced by this situation?
- Do you feel you need more time to decide?
- Are you already thinking about how to explain or justify your decision?
- Despite personal reservations is someone else trying to convince you that it is OK?
- Is this motivated primarily by personal interest?
- Are you doing this just for the money?
- Is it fair conduct or does it unfairly disadvantage another?
- What about the near-term or long-term consequences?
- Is there something about it that just doesn't feel right?

If one or more of these questions gives you pause or hesitation, then there is probably something about the decision that you need to come to terms with. An optimal decision takes account of all parties and interests involved.

## Ethics – Yourself and Others

Keep in mind that other people take note of what you say and observe what you do. For example, you have previously worked for company A. You now work for company B.

In a product development discussion with your supervisor, you say that you still have copies of design details for a similar product that you were working on at company A. You offer to share those files.

At first you may feel good that you can be helpful with valuable information. However, you have conveyed to your supervisor that you are not trustworthy with proprietary business information. Answers to some of the above bullet points would be warning signs that you are walking down the wrong path on this matter.

The reverse approach, namely keeping company A's intellectual property confidential, is an opportunity to do what is right, to feel good that you are doing the right thing, and to demonstrate trustworthiness to others.

An ethics situation may not be with you yourself directly but rather, something you observe going on with another or others. For example, you observe deliberate falsification of records to meet a product shipment date. From a legal standpoint, and depending upon circumstances, this might be fraud. What do you do?

Is it safe to simply ignore or pretend nothing happened? When you do that, you become party to the offense. These types of situations – those that involve others – can be the most difficult because they involve friends and co-workers. Should you be the "police?" No, but having observed the act, you have a responsibility to call it to the attention of either the people doing it, your supervisor, the HR Department, or management.



Figure 2. This engineer, on his break, is enjoying being himself.

Why is it not OK to just stand back and remain silent? Left unchecked or unhandled, unethical situations can ultimately cause great loss or harm to individuals and to the entire organization. Examples of this are found with the accounting scandals and company implosions following the dot-com bubble of year 2000. The resulting bankruptcies were accompanied by many employees losing their jobs, losing their retirement savings, and executives landing in jail.

The flip side of this is when you are not trying to cover for lies, or turning your back on unethical situations, your lines of communication remain free, and you feel good about yourself and about the colleagues you work with.

## Ethics Tips

Following are some ethics tips I'd to share:

- Don't mix personal affairs with business. As far as possible, keep those separate.
- When it comes to travel and other reimbursable expenses, strive to do what is best for the company or the organization and stay within travel expense policy and guidelines.
- If you are a consulting engineer, maintain accurate billing records and always give your client the benefit of doubt on any gray or questionable areas of billable hours and expenses.
- When in conversations and discussions with others outside of your organization, keep in mind that you are a reservoir of proprietary intellectual property and sensitive business information that is not in the public domain.
- Your influence on the ethical behavior of others and your perception of what is going on around you are monitored by keeping your own house in order.
- Trustworthiness. In business and personal relationships, it is just about everything. Trust holds people together. In business, by the

way, the individual who is both trustworthy and competent, is gold.

- I have previously mentioned "personal integrity." What is it? It is what you know, from personal observation, to be true. Not because someone else tells you so, but because you observe it for yourself, and you have the courage and confidence to express a belief in what you know, by observation, to be true. Personal integrity is an intangible that cannot be bought. It is earned by leading a life of ethical behavior and living with the truth. Personal integrity is one's most valuable possession.

And here are some "personal ethics" tips for the broader picture of life and livingness:

Strive to lead an active life and one of accomplishment. Do not fear adventure. 20 years from now, you want to look back and say to yourself, "I'm glad I did that."

Nurture good relations and friendships with people. As the years go by you will appreciate the value in this.

Above all, be your own self. Don't try to live the life of others. What you see is the social façade. Regardless of their apparent success or celebrity, they are all dealing with unspoken and sometimes difficult personal and family issues. You have enough of your own to deal with – you don't need other peoples' problems.

## Conclusion

Engineering schools may skip the subject matter of ethics entirely. When it is covered, it is likely treated as a sort of footnote. This is a huge omission. The success of an engineer in his/her profession and his/her wellbeing in life rest upon a foundation of ethical behavior.

Know your professional rules and business codes of conduct so that in all situations you can decide and act ethically with confidence and certainty.



# Liberty Lake, WA Jumps into Action to Flush out E. Coli

By: Mike Uthe - Mueller Water Management Solutions

Liberty Lake Sewer and Water District (LLSWD) is nestled in the mountains, east of the Spokane Valley and 3 miles west of the Idaho border. It is known for an abundance of pristine water from one of America's largest aquifers, the Spokane Valley-Rathdrum Prairie Aquifer. With a population of 10,500 residents, the LLSWD has been enjoying this natural water, chlorine-free, without a trace of bacteria for 45 years – until they received a call from a new resident just before Thanksgiving.

LLSWD added 1,500 feet of water main to service two existing homes east of town. One of these new homeowners had a rare medical condition that made her extremely susceptible to mold and bacteria, so she ran a series of her own water tests that detected E. coli in her water. LLSWD has a laboratory that monitors water quality through the system by taking 20 to 30 samples a month to ensure bacteria does not enter the system. "Finding E. coli is a serious concern, and something we had to jump on right away," said Mike "Andre" West, Chief Operator at Liberty Lake Sewer & Water District. "With further testing, we implemented a series of daily flushing and chlorinating efforts and had a boil water advisory in effect for 7 days that had people on edge for the upcoming Thanksgiving festivities."

LLSWD was able to identify three dead end lines that were not adequately being flushed through daily use; giving rise to E. coli following fall sprinkler blow out activities – one being on route to the new residential service. Liberty Lake is one of the few public water systems in the region, and for that matter the country, that does not chlorinate. The water comes directly from the underground aquifer and is delivered directly to consumers with no extra additive treatments like fluoride or chlorine. "Discovering the E. coli was a huge hit for us; it affected our morale. We pride ourselves on the purity of our water so we needed to resolve the situation as quickly as possible so our residents could go back to enjoying the water they were accustomed to," said West. The alternative solution was enforced chlorination by the Washington Department of Health that administers the Safe Water Drinking Act.

LLSWD installed three custom-engineered Hydro-Guard® 100 Series automatic flushing systems with water quality sampling stations from Mueller Water Products. The installation of the units took one day using three LLSWD field personnel. Once installed, LLSWD was able to immediately program automatic flushing of the connected water mains to ensure fresh water was flushing the dead-end lines weekly. The Hydro-Guard system can flush over 110 PSI, and the water is discharged to the atmosphere through a vented shield preventing erosion.

Each unit has an integrated programmer module that can be accessed by smartphone via Bluetooth. "I love the fact that I can just drive up with my phone and pull up the app to set the programmer," said West.

All sorts of debris can slip into the water system, "One time we got a rock that jammed up in the globe control valve that can handle sand and other debris up to 5/8". We had to disassemble the Hydro-Guard, retrieve the rock and put it all back together. It's really easy to access the inner workings of the Hydro-Guard and does not take long to get in and out," said West. If the debris problem persisted, a permanent solution would be the addition of a Singer® strainer upstream from the Hydro-Guard units.



The sampling stations are tapped into the service piping no more than 18" from the utility's 100 Series flushing systems. This positioning is essential to allow for a sample to be an accurate representation of the utility's water quality at the point of entry into the flushing device.

"During the E. coli event, we ran over 240 samples throughout our entire District to ensure that we did not have any more issues. The requirement is five clean samples over two consecutive days, so we went well above and beyond to assure ourselves and residents that the system was now clean," said West. LLSWD got the "all-clear" from the Department of Health the day before Thanksgiving, meaning that all the residents could celebrate and give thanks to LLSWD staff for working so hard to restore the purity of their drinking water.

With so many outdoor recreation opportunities, Liberty Lake Sewer and Water District's population is growing, and new developments are going up continuously as people seek a better lifestyle and move away from the big cities. Housing developments can be a bacteria "hot spot" for underutilized water systems as the infrastructure is designed for maximum flow capacity, but it takes time for houses to be sold and occupants to move in. With this experience, LLSWD water operators now have a quick and reliable water quality solution to proactively add flushing units as new outlying dead ends get added to the water system. The addition of automatic flushers and designated sampling points has allowed West and his team to focus their time elsewhere, without concern for the quality of the water that they are distributing to the residents of Liberty Lake.

Author: Mike Uthe

Northwest Area Manager for Mueller Water Management Solutions

# Motor Power Sensors and the Modern Water Utility

By: Mike McClurg - President, Load Controls Inc.

As energy costs continue to rise and water utilities strive toward carbon neutrality it's only natural that well run organizations look to optimize their pumping processes. The cost to run a water utility's pumps can run into the millions of dollars a year, and typically represent 70-80% of a utility's total electricity bill. Add in blowers, mixers and sludge collectors and it's clear that improving the energy efficiency of electric motors can be a big win both for the bottom line and the environment.

By adding power sensors to pumps and other electric motor applications, water utilities can not only protect and extend the useful life of their motors and pumps, but they can also unlock important energy usage insights.

## How does Motor Power Monitoring Work?

Motor power, measured in HP or Watts, is calculated from the electrical connections powering the motor. This motor may be powering a pump, mixer, clarifier, blower or other industrial process. By multiplying Voltage x Current x Power Factor (loosely described as the energy required to charge the coils in the motor) we can get an accurate view of the work the motor is doing. This gives us a signal to monitor and control motors. For pumping applications:

- When flow rate is low, power is low
- When flow rate is high, power is high
- At light load conditions, caused by pump cavitation or dry running, power can give clear data on error conditions and need to react.

## What are the applications for the Water industry?

Implementing power sensors across the range of motors in a Water delivery and treatment facility can have significant benefits. The following are areas that power sensors can connect to and deliver valuable feedback on motor conditions:

## Power sensors and Motor Protection

When motor power is sensed and tracked



in real time it can provide immediate feedback on abnormal running conditions. High power levels in a pump can indicate jams or clogs. Low power levels can be symptoms of loss of prime, cavitation or dry running. Shutting down the pump motor in these conditions can save the cost of the motor and potentially the pump as well.

A power sensor connected to a sludge collector or mixer can act as an 'electronic shear pin', shutting off a motor in high power events such as jams or viscosity changes that threaten to damage the motor or downstream equipment connected to the motor.

## Power Sensors and Energy Management

When motor power (measured in HP or kW) is aggregated over time it can easily



Figure 1: Power Sensors in Action.



be converted into kWh. This can be useful for insights into power consumption for the most important assets in the water treatment and delivery process. Power sensors also incorporate 'power factor' into their calculations, providing additional data on the true operational costs of motors and the link to monthly energy bills. By understanding energy trends at the device level over time, operators are able to initiate energy saving measures such as:

- Knowing whether pumping operations are becoming more or less energy efficient.
- Being able to tell which pumps or other motors are contributing to the utility's overall energy spend, and when peaks of demand are occurring.
- Determining when to replace motors with more efficient designs.
- Comparing measured HP to rated HP of the motors can indicate large savings by highlighting oversized pump motors. Replacing oversized motors with appropriately sized motors or Variable Frequency Drives can

	Protect Motors	Monitor Power Usage	Sense Motor Overload	Sense Viscosity Changes	Sense Dry Run, Cavitation
Pumps	✓	✓	✓	✓	✓
Blowers	✓	✓	✓		
Mixers	✓	✓	✓	✓	
Sludge Collectors	✓	✓	✓	✓	

Figure 1: Power Sensors in Action.

provide payback in a few months.

- Implementing staggered or off-peak operations. Spacing out the timing of peak demands can lower overall power usage and save significantly on the monthly energy bill.

## Conclusion

Power sensors and load controls can deliver important benefits to the Water industry, including:

- an excellent investment to protect all motors that power pumps, mixers and sludge collectors, and blowers

- offering key insights into changing process conditions, particularly viscosity changes in waste treatment operations

- providing long-term and detailed energy usage data that is critical to reducing on-going costs.

We believe every Water treatment facility should take advantage of power sensors to protect and optimize their installation. Many utilities can leverage rebate programs from their local electric provider, potentially offsetting any investment in power monitoring sensors.

# Waterhammer Pressure Considerations

By: *Applied Flow Technology*

Most large-scale fluid processes are designed to run at steady state and usually include continuous segments. Operation is efficient, cheap, and safe when flows are constant and predictable. But sometimes flow changes, either intentionally or not, and controlling the wide range of consequences is neither easy to comprehend nor predict. The effects from changing flow are collectively classified as "waterhammer." You may have heard this term in the context of your home plumbing system when you hear your otherwise-silent pipes make noise. However, this is only a small-scale example of the very serious topic.

Waterhammer is the phenomenon of pressure wave propagation that follows a change in flow – usually in the context of a sudden change. It is most common to associate this with a valve closure of some sort. Liquid systems running at steady state have large amounts of momentum. If all that momentum is stopped, the forward kinetic energy converts suddenly to potential energy in the form of pressure.

As flow comes to a stop throughout the rest of the pipes, that pressure wave propagates,

just like a sound wave in air. This causes damage to pumps, pipe components, and the pipe itself. There is a logical line of consequence to follow: moving flow stops, rising pressure results, propagating waves march forth. As a result, standards and codes have existed for some time to guide engineers toward a safer design. Controlling this pressure rise is a salient concern.

## High-Pressure Considerations

ASME B31.4 states that protective equipment must be in place to ensure any pressure surge does not exceed 10% above the internal design (steady state) pressure. That provides a baseline for system design. The engineer's job is to analyze those places that can potentially change flow, such as pumps and valves, and make sure mitigation equipment is sized properly, according to the possible changing-flow scenarios.

Most engineers will run calculations on the worst-case scenario, often assuming a valve closure is instantaneous. These calculations will yield an expectedly conserv-

ative pressure rise, and engineers can then design the protective equipment, such as bladders or relief valves, to control the surge and meet code. The standard formula for maximum pressure surge is the Joukowsky equation below:

$$\Delta P = -\rho a \Delta v$$

The Joukowsky equation describes the pressure rise from an instantaneous change in velocity. That will be the worst-case scenario for components near that valve for the initial pressure wave. But this surge will do what waves do best, which is to propagate, reflect, and interfere with one another. In long pipelines there is also line pack to consider. Often, worse conditions arise from these latter effects. Predicting these by hand is a tall order, and that's why waterhammer analysis software is crucial.

## Low-Pressure Considerations

One of the major, and often unanticipated, effects of waterhammer is low pressure. It is not the obvious concern, and it is not easily predicted. As we saw above, there



are codes for allowable overpressure, but there is not a single code for allowable underpressure. Engineers are left without guidance in that regard. That is to boldly claim, many engineers unknowingly consider only half of a pressure wave's effects.

There are many different events that cause low pressure waves. A more intuitive example is something such as a pump shutdown. As a pump shuts down, pressure is no longer supplied to the fluid, but the fluid still moves forward. This leaves a low-pressure zone that eventually catches up to the rest of the line as it finds mechanical equilibrium.

However, low-pressure effects also arise as part of the wave cycle from the traditional valve closure discussed above. The high-pressure wave travels through the pipe until it meets a point of reflection. When that wave travels back to the originating valve, it reflects again with a low-pressure wave. This is the second half of the "wave cycle".

Although hard to visualize, the wave cycle follows a momentum balance of velocity and pressure. Without getting into too much detail, velocity also changes as the pressure wave cycles. When the wave reflects off the originating valve, the fluid changes from negative velocity to zero velocity. This "increase" in velocity is met with a decrease in pressure, below the steady state value. A low-pressure wave will always follow a high-pressure wave. The severity of the low-pressure wave depends on dampening from friction and mitigation efforts.

Another case of low-pressure concern is the area immediately downstream of the closed valve. Similar to the pump trip, there is no momentum transfer to the downstream fluid once that valve has closed, but the fluid still has inertia driving it forward until the system corrects towards equilibrium. This creates a low-pressure area and disturbs in the line's pressure balance.

Whatever the cause of low-pressure waves, they are frequently not considered in a transient analysis. After all, the low pressure cannot be nearly as bad as the high pressure, right? It is common to associate high pressure with more pipe stress and lower pressure with less stress. While that is somewhat true, there are other factors for which to account.

## Vapor Formation

If the negative-pressure wave drops the line pressure below vapor pressure, the fluid will flash and form a vapor pocket. When the pocket is large enough to form a clear bound-

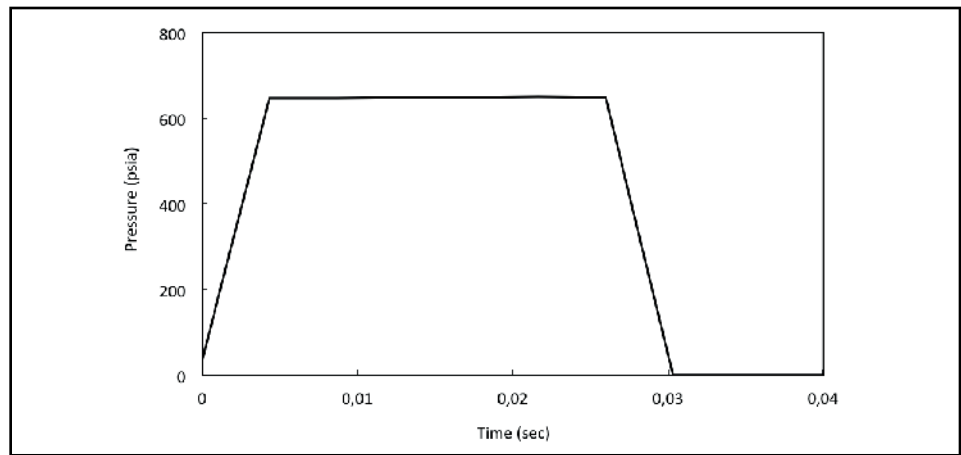


Figure 1: High-pressure area upstream of a fast valve closure, simulated in AFT Impulse™. The fluid's kinetic energy suddenly changes into potential energy and starts a pressure wave cycle.

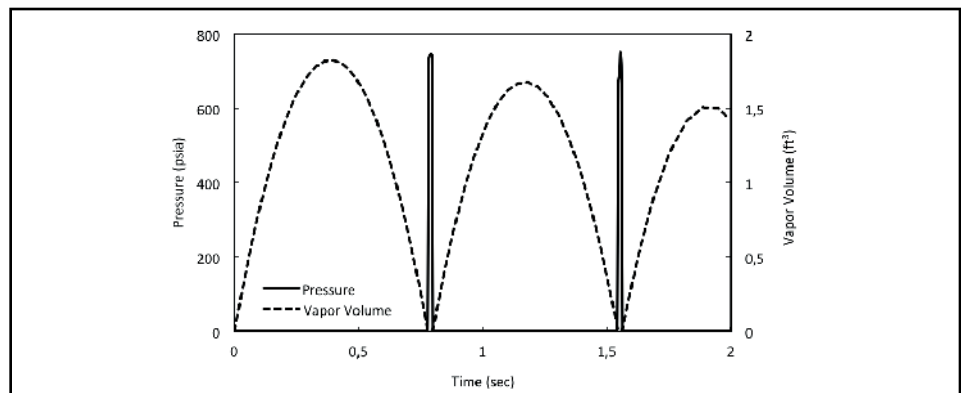


Figure 2: Low-pressure area downstream of a fast valve closure, simulated in AFT Impulse™. As flashing occurs, vapor volume grows and eventually collapses, causing sudden pressure surges.

ary between the upstream and downstream liquid, it is referred to as "liquid column separation". This term is also used more generally to describe any liquid flashing. Needless to say, that vapor pocket does not want to be there, and it does not last long.

It is common for this to be a worse situation than the initial high pressure. Pipes tend to resist internal high pressure much easier than internal low pressure. Often these pockets create vacuum conditions where the ambient pressure is much higher than the internal pressure. This differential can be more strenuous on a pipe than if the pressures were reversed. It may cause collapse and harm the pipe-wall integrity.

Even if the pipe does not collapse, that vapor pocket will. This causes yet another high-pressure wave to burst forth. These resulting pressures can be even larger than the original pressure wave from the valve closure. The vapor collapses with so much power that it often bursts pipe joints nearby. It is a very similar concept to cavitation in a pump. The collapse of the tiny vapor bubbles happens with enough

force to cause "pitting" and damage the impellers. The same thing happens with liquid column separation, just on a larger scale. Figure 2 shows the vapor collapse behavior downstream of the same fast valve closure explained in Figure 1. Compare the resulting pressures here with the initial pressure seen in Figure 1. The large pressure from vapor pocket collapse is not predicted by conventional calculations.

Stress on a pipe and its components due to vacuum conditions and vapor collapse may not be the most critical concern. In many situations, such as wastewater treatment or food processing, the process itself is the concern. There is very little vacuum needed for outside contaminants to make their way inside the pipes. Joints are the parts of main concern, as the seals and gaskets will let those contaminants through. Sterile-process engineers need to really watch out for these conditions.

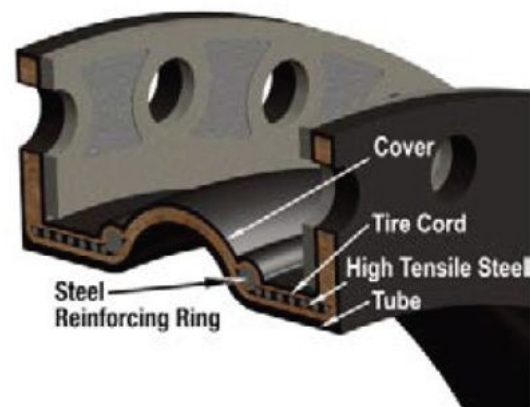
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# Rubber Expansion Joints for Pump & Piping Systems

By: Fluid Sealing Association

**TABLE II:** List of Elastomers Used in Expansion Joints and Rubber Pipes

MATERIAL DESIGNATION		RATING SCALE CODE	ELASTOMER PHYSICAL AND CHEMICAL PROPERTIES COMPARISON											
ANSI/ASTM D1418-77	ASTM-D-2000 D1418-77	7-Outstanding 6-Excellent 5-Very Good 4-Good 3-Fair to good 2-Fair 1-Poor to Fair 0-Poor X-Contact Mfg.	ALKALI CONC. ANIMAL VEG. OIL CHEMICAL WAXER	COAGULATED H2O2 OIL & OXIDIZING ALKALI DILUTE	ACID CONC. AROMATIC H2O2	ACID DILUTE	WATER ABSORPTION RADIATION SWELLING IN OIL	TEAR RESISTANCE	REBOUND/COLD COMP. SET	REBOUND/HOT	ABRASION	HEAT FLUID TEAR	WEATHER SWELLING	OZONE DEGRADATION
		COMMON NAME CHEMICAL GROUP NAME												
CR	BC BE	NEOPRENE CHLOROPRENE	4340	4401	2346	4543	5424	5245	4444	5565				
NR	AA	GUM RUBBER POLYISOPRENE, SYNTHETIC	53XX	X004	0033	0655	6646	6627	5052	4020				
IR	AA	NATURAL RUBBER POLYISOPRENE, SYNTHETIC	53XX	X004	0033	0655	6646	6226	5052	4020				
IIR	AA	BUTYL ISOBUTENE-ISOPRENE	5654	4034	0046	0455	5430	5264	4045	6556				
CIIR	AA BA	CHLOROBUTYL CHLOROISOBUTENE-ISOPRENE	5654	4034	0046	0455	5430	5264	4045	6556				
NBR	BE BK CH	BUNA-N/NITRILE NITRILE-BUTADIENE	4350	4520	4644	5541	0554	4544	3034	4022				
SBR	AA	SBR/GRS/BUNA-S STYRENE-BUTADIENE	53X2	4004	0033	0655	4544	4425	3053	2020				
CSM	CE	CSM CHLORO-SULFONYL-POLYETHYLENE	5644	4431	2346	4543	5222	4244	3444	6767				
FKM	HK	FLUOROCARBON ELASTOMER	5660	4610	6665	6553	5562	4555	2627	7777				
EPR	BA CA DA	EPDM ETHYLENE-PROPYLENE-DIENE-TERPOLYMER	5656	6036	0046	0766	7546	6545	4056	6767				
AFMU		PTFE/TFE/FEP FLUOROETHYLENE-POLYMERS	7777	7777	7777	737X	XXX4	XXX7	7777					
SI	GE	SILICONE	5550	2X02	0026	2566	4036	6020	2267	6666				



Typical expansion joint terms

Table II from the Expansion Joints Piping Handbook, 8.0

An expansion joint must perform several functions. The rubber joint is the most flexible part of a piping system, but this flexibility has a tradeoff. An expansion joint is usually the weakest component of a piping system and must be carefully selected for the application. Connected to a pump, it reduces vibration. If located in the connected piping, the expansion joint moves with the thermal pipe movement. It does all this while providing a seal under system pressure and at temperature – and maybe resisting a corrosive media. The keys to success are selection of the proper elastomer for the application, knowing the required movement, pressure and temperature, and proper installation.

## What Are Rubber Joints Made of?

Simply, rubber. Or more technically, elastomers. Elastomers are made of high-molecular weight polymer chains, when vulcanized (or cured) can be repeatedly stretched and return to the original length. The different types of polymer chains, when combined with the curing method, give the rubber unique properties that make it suitable for various applications.

But there's more than elastomers to an expansion joint. A typical expansion joint consists of three components: the tube, carcass, and cover. Let's look at a typical joint starting from the inside working our way to the outside.

## Typical expansion joint terms

**Tube:** The tube is a protective, leak-proof lining made of synthetic or natural rubber as the service dictates. This is a seamless tube that through the bore to the outside edges of the flanges. Its purpose is to eliminate the materials being handled penetrating the carcass and weakening the fabric. These tubes can be designed to cover service conditions for chemical, petroleum, sewage gaseous and abrasive materials.

**Carcass:** The carcass or body of the expansion joint consists of fabric and, when necessary, metal reinforcement.

**Fabric reinforcement:** The carcass fabric reinforcement is the flexible and supporting member between the tube and cover. Standard constructions normally utilize high-quality synthetic fabric. Natural fabrics can also be used at some pressures and temperatures. All fabric plies are impregnated with rubber or synthetic compounds to permit flexibility between the fabric plies.

**Metal reinforcement:** Wire or solid steel rings embedded in the carcass are frequently used as strengthening members of the joint. The use of metal sometimes raises the rated working pressure and can supply rigidity to the joint for vacuum service.

To read the full article, [click here!](#)





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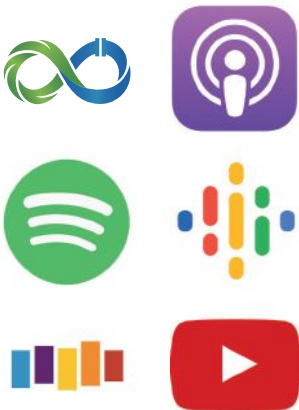
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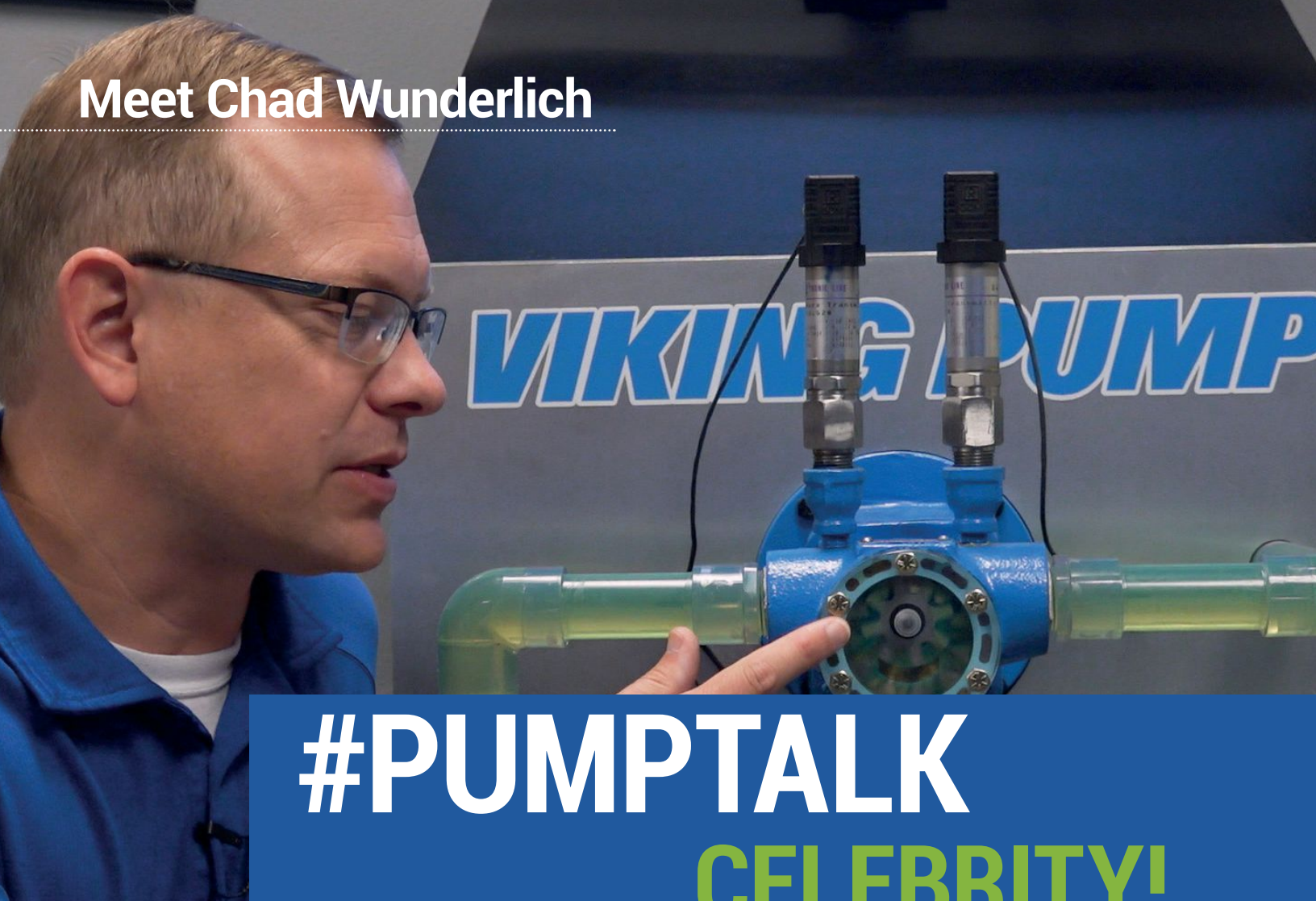


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## Meet Chad Wunderlich



# #PUMPTALK CELEBRITY!

Empowering Pumps & Equipment invites our community to nominate industry professionals, so we can shine a light on the professionals behind the critical infrastructure that we rely on each and every day. We are proud to have Chad Wunderlich as our #PumpTalk Celeb! He is the Global Distributor Development Manager for Viking Pump, Inc.

### **Q: How did you get started working in your field?**

Chad: I started my career as a part-time Student Drafter in the Engineering Department at Viking Pump. At the time I had no plans to stay; I just wanted to gain some industry experience before I graduated from college and started my career officially. But prior to graduation I was offered the opportunity to start full-time as an Application Engineer, assisting our customers with pump sizing, selection, service and troubleshooting questions. It was another great opportunity to learn, but a situation I still considered “temporary”. But I enjoyed where I was and what I was doing. I moved on to Field Sales in Chicago and later back to Cedar Falls as an Engineering Manager. It didn’t happen overnight, but gradually I realized that these jobs I’d taken for the experience had developed into a career in the pump industry. For the past 8 years I’ve held the role of Global Distributor Development Manager, providing instruction for our distribution sales channel, customers, and at talking at various industry events.

### **Q: What do you love the most about your job? What are you most proud of?**

Chad: I’ve always loved the opportunity to visit our customers and get the behind-the-scenes view of how they use our pumps to produce their various products. It feels good to know I’ve played a small part in helping our customers to make the shingles on my house, the tires on my car, and the peanut butter on my sons’ sandwiches. Viking Pump has given me the opportunity to participate in new product development, help with marketing and sales initiatives, travel all over the world, and host our customer visitors...there’s a lot I love about my job.

I’m most proud of the people I’ve been able to instruct and mentor over the years. I’ve provided instruction to tens of thousands of colleagues, distributor employees, and customers all over the world. For many that training was the start of their own careers. It’s rewarding to see someone develop their industry knowledge and advance their career.

### **Q: What advice would you give to someone considering this line of work or new to the field?**

Chad: Learn. And seek out the opportunity to learn. Accept the fact that you will never know everything about your industry and be very skeptical of those who claim to.





Welcome the opportunity to get pushed out of your comfort zone and do something new as this is your best opportunity to learn and develop.

**Q: Can you talk about a project you recently worked on?**

Chad: I helped Viking Pump to develop a new line of shaft seals; in fact this is my first patent. This seal series, which we call O-Pro®, offers our customers an alternative to shaft packing and the leakage that packing requires. It was developed for our customers in the chocolate industry but word of its success quickly spread and today we have O-Pro® seals running successfully on peanut butter, molasses, wax, resin, asphalt, and many other liquids. It's been rewarding to talk to customers about the success they've had in getting rid of the leakage from packing that they'd accepted for so many years. And it's been great to watch this product evolve into 3 different designs and even a full line of pumps that utilizes this seal as standard.

**Q: Anything Else you would like to add?**

Chad: Prior to Covid I would travel frequently and hosted training at customer sites and events all over the world. But global pandemic has changed that dramatically. Today the bulk of my training time is spent developing videos that we post to our website, YouTube, and social media sites like LinkedIn. This is a big change for a 20 year veteran like myself, but it's been a fun new experience to develop these repair training videos and a brief technical training series we call "Pump Report". This has again pushed me out of my comfort zone, but I'm starting to find my stride and excel at this new style of training.



Connect with Chad Wunderlich on LinkedIn



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YouTube

# A Day in the Life

Meet Jaclyn Alm



Science has always been my favorite subject to explore, and being a Minnesota native, water was a part of daily life. Not having a pond, lake, stream, or river in sight at some point during the day is highly unusual. But like most Americans, I turned the tap on without a thought as to how water arrived there.

After a series of unfortunate personal events, a conversation with my father directed me into the industry. I returned to Minnesota three years after leaving for Utah to participate in the University's Division 1 Track and Field team while pursuing my Bachelors. I returned with an Associates of Science, a nine-month-old, no clue how I would establish myself professionally, and a defeated mindset. Fortunately, I also had my parent's support and encouragement. My father encouraged me to look at a Water Treatment program at the local Technical and Community College. I decided to visit during an open-house event which would allow me to meet the instructors, as well as see the environment. After returning home, I submitted my enrollment for the next semester.

During this program, I was the first to show up, the last to leave, and also came in every Friday which was an optional lab day. I dove into learning mechanics, treatment technologies, and laboratory practices for Water and Wastewater without hesitation,

knowing this amount of attention and time would lay the foundation for my future success in the industry. The program started with nineteen students, and nine graduated. I was at the top of my class, with my Grade 1 certifications and my Associates of Applied Science in Water Environment Technologies. Before graduating I had two job offers, accepting one at my hometown's surface water lime softening water treatment plant.

After two weeks, I accepted another position in a neighboring City. I operated and maintained three groundwater plants with green sand filtration, gas chlorination with both 150lbs and 1-ton cylinders, and fluorination within three pressure systems, each with a designated water tower as their only source of storage. I developed my skills further through practices of sampling, distribution system maintenance, collections system maintenance including ten lift stations, meter reading and replacement, curb stop locating, delinquent shut off's and service turn-ons, new service inspections, water bill payment collection, servicing two wading pools, plowing snow, and served on the safety committee. I also took it upon myself to update SOPs as well as the City's GIS mapping.

My career path then relocated me to Arizona where I temporarily worked in a City's Water and two Wastewater plants. During this





time, I discovered the Pretreatment sector and knew it was something I needed to pursue at some point in my career. I continued my work as an Operator for another City's Water Department. I operated six groundwater plants each on their own pressure system, sampled and ran laboratory tests, maintained an irrigation pond with my own pilot project, increased my certification levels, and became one of the National Hydrant Hysteria Champions.

Another relocation to California occurred after accepting a position as a Pretreatment Program Technician, allowing me to develop my Pretreatment skills under a unique program, while also obtaining my California Water Environment Agency Environmental Compliance Inspector I certification. I currently work as a Water Treatment Plant Operator III at Jurupa Community Services District (JCSD). JCSD operates facilities—Chino II and the Concentrate Reduction Facility (CRF)—which are part of the Chino Basin Desalter Authority (CDA), a Joint Powers Authority comprised of eight member agencies. Chino II treats brackish groundwater from one of the largest aquifers in Southern California through Reverse Osmosis (RO), and Ion Exchange (IX), before sending some RO process waste (concentrate) to the CRF. The CRF uses two types of softening processes to remove calcium, magnesium, and silica before being treated once more through RO. The final plant effluent is recirculated back to Chino II and blended with its product water.

The ability to remain adaptable has been essential to my career skill-set growth. Staying open to new methods to complete a task more efficiently, volunteering to do or learn something completely new, discovering new things on topics I am already familiar with, and the

ability to openly and honestly evaluate my skillsets has allowed me to become more effective and grow. Changes will always occur, and I believe it is essential people shift as well to not only better themselves, but to better the communities they are a part of.

The industry workplace is changing due to generational shifts as well as cultural and gender diversification. Knowing this dynamic was becoming reality while pursuing my AAS, I tailored the focus of my Bachelors to psychology. I wanted to be prepared to make a difference on any team and I wanted to learn how to create the most conducive environment for each individual based on core needs. I believe providing tailored support is how to help people reach their full potential as it looks different depending on personality and core needs. I've found it easier to communicate when personalities and core needs are prioritized regardless of generation, gender, or cultural identifications. If I had one hope for the future across industries, it would be for management choices to implement more inclusive methods to attract and retain the changing workforce. I believe this to be the starting point which leads to more industry attraction in young people, since the vast majority of exposure comes from parents, friends, and family. If the focus was on making those current parents, friends, and family members happy by having their individual core needs met, and ambitions supported, there would be a higher likelihood of recommending the same type of career for their child. I believe that is the first step in creating more industry knowledge and awareness, instead of just turning on the tap and not understanding how water got there.

Connect with Jaclyn on LinkedIn: [www.linkedin.com/in/jaclyn-alm](https://www.linkedin.com/in/jaclyn-alm)





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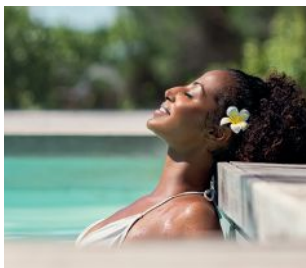


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