2018 - ISSUE FOUR

MPQ

MUNCIE POWER QUARTERLY

Michelle Vore discussing employee learning and development

ALSO INSIDE:

HYDRAULIC PUMP CAVITATION – WHAT IS IT, AND HOW CAN YOU PREVENT IT?

CROSSING OVER A POWER TAKE-OFF

TRAINING – ONE OF MY FAVORITE TOPICS

CONGRATULATIONS AND BEST WISHES **CHRIS FANCHER!**

THANK YOU FOR YOUR SERVICE

At the close of this year, Senior Vice President IT and Administration Chris Fancher will retire from Muncie Power Products after more than 40 years of dedicated service. Chris leaves behind a legacy of steadfastness, professionalism and integrity, embodying the values of our company and remaining ever committed to its mission and success.

Starting in the shop in August 1978, as many employees once did to have an understanding of product and business from the ground up, Chris ascended through the ranks serving in various capacities. He worked closely with Hamer Shafer, the late chairman and his late wife, Phyllis Craven Shafer, who played an influential role in the company as well. Over the course of his career, Chris was a part of many of our company's greatest milestones to date including the opening of its manufacturing division, move to the new corporate headquarters and product line expansion.

Thank you, Chris, for your dedicated service and contribution to our company and industry. Your knowledge of the industry, our brand and legacy are unmatched and will be deeply missed. Congratulations on your retirement and best wishes. We will miss you – our colleague and friend.

Christopher D. Fancher
Senior Vice President IT and Administration

Hydraulic Pump Cavitation

The second-leading cause of hydraulic pump failure behind contamination, cavitation is a condition that can also potentially damage or compromise your hydraulic system. For this reason, understanding cavitation, its symptoms and methods of prevention are critical to the efficiency and overall health of not just your hydraulic pump but your hydraulic system as a whole.

DEFINING CAVITATION

Cause and Result

Causes

- Poor plumbing
- Flow restrictions
- High oil viscosity

The product of excessive vacuum conditions created at the hydraulic pump's inlet (supply side), cavitation is the formation and collapse of vapors within a hydraulic pump. High vacuum creates vapor bubbles within the oil, which are carried to the discharge (pressure) side. These bubbles then collapse – i.e. cavitation.

This type of hydraulic pump failure is caused by poor plumbing, flow restrictions or high oil viscosity; however, the leading cause of cavitation is poor plumbing. Poor plumbing is the result of incorrectly sized hose or fittings and/or an indirect (not straight or vertical) path from the pump to the reservoir. Flow restrictions, for example, include buildup in the strainer or the use of an incorrect length of hose or a valve that is not fully open. Lastly, high oil viscosity – or oil that is too viscous – will not flow easily to the pump. Oil viscosity must be appropriate for the climate and application in which the hydraulic pump is being used.

Results

- Excessive heat
- Violent implosions
- Reduced lubrication
- Friction and wear

The greatest damage caused by cavitation results from the excessive heat generated as the vapor bubbles collapse under the pressure at the pump outlet, or discharge side. On the discharge side, these vapor bubbles collapse as the pressure causes the gases to return to a liquid state. The collapses of these bubbles result in violent implosions, drawing surrounding material, or debris, into the collapse. The temperature at the point of implosion can exceed 5,000 degrees Fahrenheit! Keep in mind that in order for these implosions to happen, there must be high vacuum at the inlet and high pressure at the outlet.

Without a pressure condition at the outlet, or discharge side, these vapors merely form voids in the oil that reduce lubrication

Ben Gillum
Warranty and Returns Manager

Since joining the company in 2007, Ben Gillum has served in various capacities including shipping and receiving clerk, CS assembly, customer service manager, product application specialist and training and education assistant manager. Ben and his wife, Pamela, have two sons, Christian and Sebastian. In his spare time, Ben enjoys playing the drums and is an avid supporter and coach of his children's sports teams.

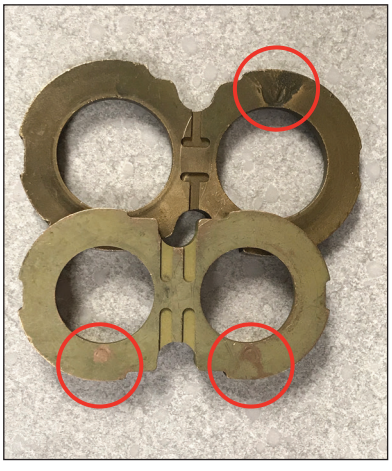
effectiveness. This results in friction and wear which, while seemingly mild compared to the excessive heat and violent implosions, can become detrimental over time.

RECOGNIZING CAVITATION

Sound

Cavitation is usually recognized by sound. The pump will either produce a “whining” sound (more mild conditions) or a “rattling” sound (from intense implosions) that can sound like marbles in a can. If you’re hearing either of these sounds, you first need to determine the source. Just because you hear one of these two sounds, doesn’t guarantee that your hydraulic pump is the culprit.

To isolate the pump from the power take-off (PTO) to confirm, remove the bolts that connect the two components and detach the pump from the PTO. Next, run the PTO with no pump and see if the sound is still present. If not, it is safe to assume your hydraulic pump is the problem.



Wear plates from gear pump showing damage from cavitation.

Physical Evidence

Another sign you may be experiencing cavitation is physical evidence. As part of your general maintenance, you should be inspecting and replacing the hydraulic oil filter’s elements at regular intervals based on the duty cycle of the application and how often it is used. If at any time during the inspection and replacement of these elements you find metallic debris, it could be a sign that you’re experiencing cavitation in the pump.

The easiest way to determine the health of your complete hydraulic circuit is to check the filter. Every system should have a hydraulic oil filter somewhere in-line. Return line filters should be plumbed in, you guessed it, the return line from the actuator back to tank – as close to the tank as possible. As mentioned earlier, this filter will have elements that should be replaced at regular intervals. If you find metallic debris, your pump could be experiencing cavitation. You’ll then need to flush the entire system and remove the pump for inspection.

Damage

Conversely, if you’ve already determined the pump to be damaged, you should remove the filter element, cut it open and inspect it. If you find a lot of metal, you’ll need to flush the entire system and keep an eye on the other components that may be compromised as a result.

Once cavitation has been detected within the hydraulic pump, you’ll need to determine the exact cause of cavitation. If you don’t, cavitation can result in pump failure and compromise additional components – potentially costing you your system.

PREVENTING CAVITATION

Straight Path

Since the pump is fed via gravity and atmospheric pressure, the path between the reservoir and the pump should be as vertical and straight as possible. This means that the pump should be located as close to the reservoir as is practical with no 90-degree fittings or unnecessary bends in the supply hose. Whenever possible, be sure to locate the reservoir above the pump and have the largest supply ports in the reservoir as well. And don’t forget, ensure the reservoir has a proper breather cap or is pressurized (3-5 PSI) – either

with an air system or pressure breather cap.

Fully Open

Be sure the supply line shut-off valve (if equipped) is fully open with no restrictions. This should be a "full-flow" ball valve with the same i.d. (inside diameter) as the supply hose. If feasible, locate a vacuum gauge that can be T'd into the supply line and plumb it at the pump inlet port. Activate the PTO and operate a hydraulic function while monitoring the gauge. If it reads >5 in. Hg, shut it off and resume your inspection.

Supply Flow

If a strainer is present in the reservoir, inspect it and remove any gunk or buildup that may be restricting supply flow. Next, check the inlet (suction) hose for any visible layline (descriptive markings on the hose). The industry standard "suction" hose nomenclature will read 100R4, or possibly SAER4. This will indicate the hose has an inner bladder that's been vulcanized to a heavy spiral wire.

A hose with an inner bladder vulcanized to a heavy spiral is designed to withstand vacuum conditions as opposed to outward pressure. The layline will also denote the size of the hose (i.d.). You can use Muncie Power's PPC-1 hydraulic hose calculator to determine the optimal diameter for your particular application based on operating flows.

Laminar Flow

Another consideration, in regards to the inlet plumbing, is laminar flow. To reduce noise and turbulence at the pump inlet, the length of the supply hose should be at least 10 times its diameter. This means that any type of shut-off valve or strainer at the reservoir should be at least 10 diameters from the pump inlet. A flared, flange-style fitting at the pump inlet can also reduce pump noise by at least 50 percent compared to a SAE, JIC or NPT fitting.

Proper Viscosity

Selecting the proper viscosity of hydraulic fluid for your climate and application is also critical. Oil that is too viscous will not flow as easily to the pump. Consult your local hydraulic oil supplier for help selecting the optimal fluid viscosity. ♦

- **More efficient and expensive pumps** are more susceptible to cavitation (in this order – piston, vane, gear)
- **Cavitation** doesn't necessarily mean your pump is ruined – depends on the duration and severity
- **Effects of cavitation** cannot be reversed
- **Poor plumbing** is the leading cause of cavitation and can be prevented by selecting a properly sized hose, choosing the appropriate fittings, ensuring the most direct, straight routing from the pump to the reservoir, etc.
- **Pump cavitation** is covered in the Muncie Product Application School and online training program, M-Power Tech

Crossing Over a Power Take-off

Let's be honest, with so many different work truck transmission options and application requirements, spec'ing out a power take-off can be challenging at times. However, often even more challenging is trying to cross over power take-offs from one manufacturer to another.

Andrew Dawson
Manager Marketing & Advertising

A Muncie native, Andrew Dawson holds a bachelor's degree in marketing from Ball State University and joined Muncie Power Products in 2013. Andrew and his wife, Dawn, have three children. In his spare time, Andrew enjoys spending time with his family, watching sports and playing golf.

The model numbers from manufacturer to manufacturer are very different. Of course, there is generally always a good reason for each company's product number configuration and, once you understand it, you can work through configuring their entire product portfolio.

Every manufacturer uses different model numbers and option configurations for their PTOs. Not only are its actual codes different, but they often vary in length and in order. This certainly makes it challenging if you are not fluent in each manufacturer's model number construction.

SO WHAT IS THE BEST WAY TO EFFECTIVELY CROSS OVER A POWER TAKE-OFF?

Well, the most effective way is to reconfigure the power take-off requirements with the manufacturer you are crossing over to. For a quick reminder, here is what you need to know to accomplish this:

1. **Transmission make and model**
2. **Which PTO aperture will be used**
3. **Speed requirement of the driven component and/or the PTO percentage**
4. **Required direction of rotation of the PTO shaft**
5. **Torque and horsepower requirement**
6. **If the driven component is a direct-mounted pump, you need the dimensions of the mounting face and shaft dimensions of the pump**
7. **How the PTO will be engaged**

Yes, that is a lot, but we have a great tool to make this configuration easy – our PTO designer tool will quickly walk you through each of these steps for Muncie Power PTOs.

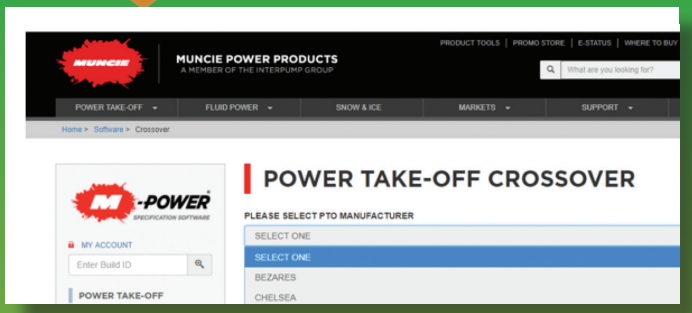
But if this tool doesn't meet your needs, there is an even easier way. We have an in-depth crossover tool that allows you to easily cross over any power take-off to the closest Muncie power take-off match. It's simple, head on over to our Competitor Crossover tool available at **munciepower.com/mpower** and follow the steps on the next page.

If you want to learn more about the product your previous power take-off crosses over to, the

SIMPLIFYING THE PROCESS

1 Visit munciepower.com/mpower.

2 **Click on the Competitor Cross-over tool. Choose the manufacturer you want to cross over from the available drop-down box.**

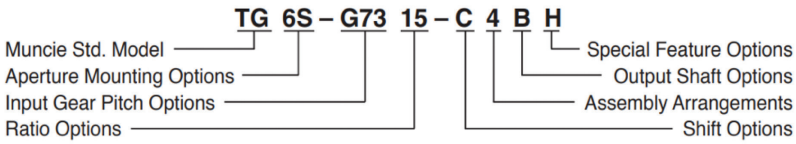


3 **Enter the model number of the power take-off you wish to cross over into the available fields.**

As soon as you enter the first four characters, you will see the Muncie Power model number begin to populate. > If you enter a configuration that does not cross over, a notification will appear. > The crossover tool will provide important notes as needed.

4 **Click the Price PTO button to view the list price. It's really that easy!**

Review the final model number configuration to make sure it will fulfill your needs.



best place to go is to the product page of the Muncie power take-off model that was provided. The easiest way to find that product is to click on our Power Take-off menu option, then select All Power Take-offs from the drop down. This will give you an alphabetical listing of all Muncie Power PTOs, or you can filter by using the search bar directly above.

As always, if you have any questions, or have trouble crossing over your power take-off, please call our customer service team at 1-800-367-7867. ♦

Employee Learning and Development

Muncie Power Products is devoted to providing quality products and services to build trust and to meet the needs of our customers. That same level of commitment is exhibited in the department of Learning and Development at Muncie Power Products. Our mission is to provide tools and resources for people to succeed. To do so, we utilize a variety of methods and resources to create a learning environment that is flexible, comprehensive and intentional.

Employee learning and development is an essential component of a skilled and happy workforce. There are numerous advantages to investing in learning and development, both to companies and employees. First and foremost, companies like Muncie Power Products that provide extensive employee training care about their people. Noteworthy company benefits of a learning and development program include:

- **Engaged employees**
- **Increased retention**
- **Positive reputation for recruiting**
- **Knowledgeable and skilled workforce**

Employee benefits of learning and development programs are abundant as well. Some specific advantages include:

- **Engaged employees**
- **Employees feel valued**
- **Continuation of learning in changing industry**
- **Employee learning and growth for advancement**

Let's look specifically at the impact of company training on employee engagement and retention. The 2016 Udemy Workplace Boredom Study found that 44 percent of respondents indicated an absence of learning opportunities as a reason for quitting their last job. The same study indicated that 43 percent of full-time employees were bored or disengaged at work. Finally, both funny and sad, 50 percent of employees who answered the survey would rather have a root canal than feel continually bored at work.

As a company's learning opportunities, or lack thereof, were listed as a reason 44 percent of employees quit their last job, having a robust training program can help an employer to combat this statistic and stand apart from

Michelle Vore
Learning & Development Manager

Enjoying her first year at Muncie Power Products, Michelle Vore holds a master's degree in adult education from Ball State University and an MBA from Western Governor's University. Her hobbies include Zumba, photography and riding her motorcycle. Michelle and her husband, Kerry, are celebrating 24 years together and they have one son, Logan.

A company that invests in its employees by offering a rich learning and development program demonstrates that it cares about employees.

---

others when recruiting top candidates. A company that invests in its employees by offering a rich learning and development program demonstrates that it cares about employees.

While we have categories of training sessions at Muncie Power Products directed toward specific groups such as our People Leaders (supervisors and managers), we are proud that 85 percent of our training is open to all employees.

Some learning sessions available to our All Employees category for training in 2018, for example, included the following:

- **Lean manufacturing 101**
- **Customer service**
- **Bookends (employee book club)**
- **Software training (Word, Excel, Outlook and PowerPoint)**
- **Emotional intelligence**
- **Body language**
- **Time management**
- **Harassment prevention**
- **Women in leadership**

Another category for training includes Emerging Leaders. This cohort is comprised of employees who have volunteered or been recommended. Emerging Leaders attend scheduled meetings, but they also talk with a member of the learning and development staff once per quarter to discuss career development.

Learning and Development at Muncie Power Products is an exciting place to be and I am thrilled to be a part of such a wonderful company that cares greatly about the professional growth of its employees. As former United States Secretary of Health and Human Services Sylvia Mathews Burwell said, “Job training empowers people to realize their dreams and improve their lives.” Therefore, we strive to provide valuable resources and information for all of our employees to learn, grow and develop. Considering the benefits of employee learning and development, what’s stopping your organization from devoting resources to professional growth if it hasn’t already? ♦

Training – One of My Favorite Topics

David Busser
Market Specialist –
Chassis Manufacturers,
Dealers & Fleets

Having been in sales management roles for more than 30 years, David Busser has experience working for both domestic and European manufacturing companies. David holds a BSME from the University of Cincinnati and an MBA from Carnegie Mellon University. Outside of work, he is an avid golfer, hiker, duck hunter, outdoorsman, hands-on repair guy and serves as a deacon at his church where he helps run a ministry that assists with simple home repairs. David and his wife, Judy, have been married for 36 years and have three grown children – Molly, Jake and Max. In their free time, he and his wife enjoy traveling and visiting family and friends.

As a market specialist, I get to meet with customers on a regular basis. In these meetings, I have my list of topics to cover and the one I am most surprised about is how often our training capabilities become the *wow* topic of my meeting.

First, we have it all for you – online, in person, and onsite at your location. You have the flexibility to move through our training in whichever ways best fit your schedule. And, it's free! Our training covers our complete product line, applications using our products, useful formulas and more. Those who are responsible for selecting power take-offs (PTOs) and hydraulic components will find our training especially useful. Plus, we offer our training literature and online program in Spanish too.

For most truck dealers, they have one service technician that is their go-to for PTOs. If not, they need to train someone to be that person. For this reason, I always start by discussing our free, online training called M-Power Tech where users can go at their own pace through our 14 training modules. As our now retired director of training and education, Dave Douglass, said, "The online access makes it possible to get more people educated quickly and at a pace they can set themselves."

Each online training lesson takes you around 30 minutes to complete. The information from each of these lessons is then reinforced by a quiz, which requires a score of 80 percent or better to move on to the next lesson. This is where our training literature comes in handy, which you can either download and save to your computer by clicking on the links at the bottom of the page under "Training Literature" or order as a hard copy through our customer service team. There are two pieces of literature that serve as key resources for our training: Understanding Power Take-off Systems and Understanding Truck Mounted Hydraulic Systems.

Next, after the online training, I recommend the Muncie Product and Application School under "In Person" on the training page for our customers, i.e. classroom training – which is held four times a year at either our headquarters in Muncie, Indiana, or our manufacturing division in Tulsa, Oklahoma. The classroom training allows you to ask the instructor questions and get an

even better understanding of PTOs and truck mounted hydraulic systems. This training consists of four days of lecture, homework and a test on Thursday to demonstrate your understanding of the material.

My final recommendation is for large customers and large dealers with multiple locations that have 10 or more people that need this type of training. We can bring the classroom to you; all you have to do is provide the classroom space and food and drinks for breaks. Muncie Power covers the travel costs of our instructor, and all materials are shipped ahead of time and at no cost. Upon completion of either of our classroom trainings or online training program, the participant receives a certificate from Muncie Power Products designating that they have met all requirements.

Big companies or small companies, they all need training. I have seen this help a service technician increase their knowledge and become a more valued employee, aiding them in the pursuit of their goals.

To access our training on our website, click on the button labeled “Training Programs” located in the middle of our homepage or on “Training” within our drop-down menus located on the homepage under “Support” and “Company.” These links will take you to view the details of our online and classroom training. Once on the training page, you must create an account by clicking on the “Create a New Account” button for our online training. After filling in the required fields and creating your account, your account will be verified – at which point you will then be given access to all of our online training modules.

Thanks to our team for putting these training materials and modules together; it has not only made my life easier, but has become a great, free resource for others within our industry. ♦

“ Big companies or small companies, they all need training. ”

Muncie®
Power
Products

201 EAST JACKSON STREET • MUNCIE, INDIANA 47305 USA
800-367-7867 • WWW.MUNCIEPOWER.COM/MPQ