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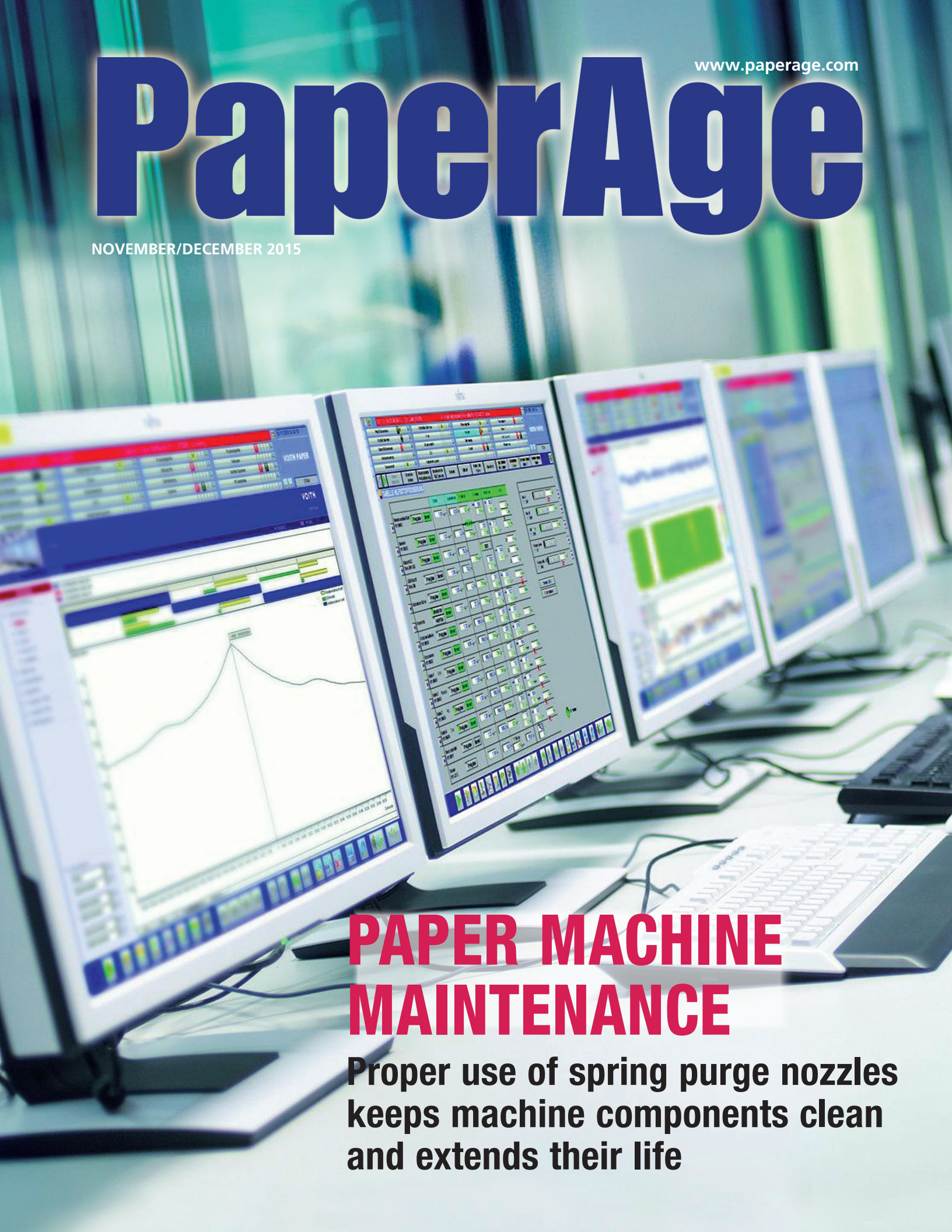


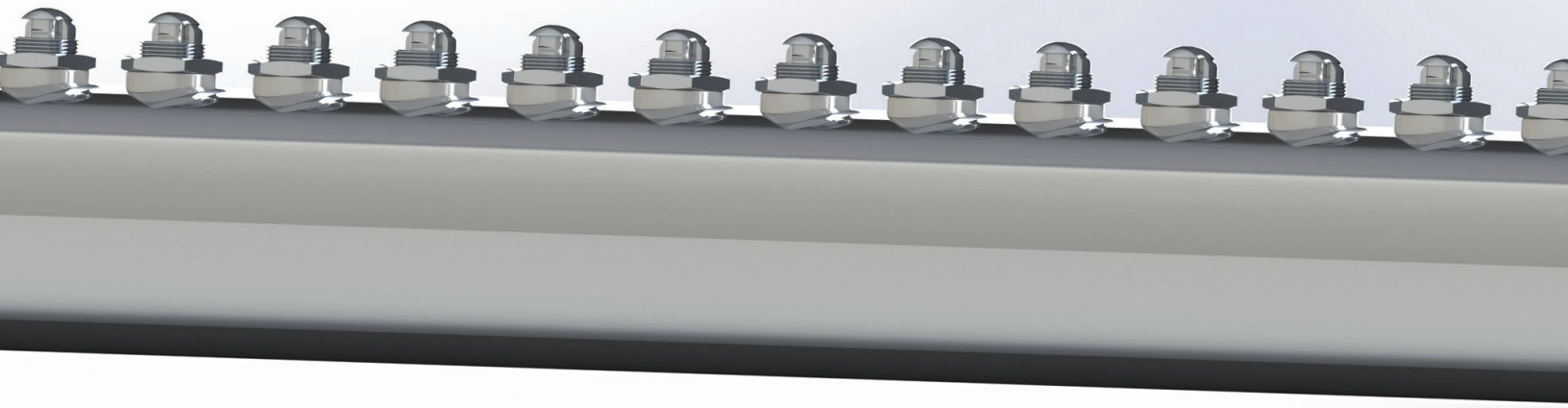
PAPER MACHINE MAINTENANCE

Proper use of spring purge nozzles keeps machine components clean and extends their life

Purge Your Nozzle Woes Away

Plugged spray nozzles on a paper machine are not only frustrating, they negatively impact the machine's performance and product quality. But keeping those nozzles clean may be simpler than you thought

By Steve Corlew



You may be surprised at how many nozzles on any given paper machine right now are plugged, and those are only the ones an operator can see from the side of the machine. And what about the nozzles in the middle of the machine that are out of sight? The fact of the matter is, nozzles are eventually going to plug; it's inevitable.

The result of all these plugged nozzles are frustrated pulp and paper mills who assume a new showers is the answer. At Southern Paper Group (SPG), we supply a wide range of equipment and services to the paper industry, and one of those pieces of equipment are showers. And as much as we like to build them, there are times when a new type of nozzle may be a more cost effective and longer term solution to the problem of constantly plugged nozzles.

To back up a bit, for some applications, a new brush shower is a perfect solution. However, in many cases, changing the nozzle type to nozzles that clean themselves, i.e. spring purge nozzles, and keeping the existing shower header in service, will lead to better nozzle performance.

The purpose of this article is to explain how and why the decades-old spring purge nozzle type works, how it can improve your process, and what needs to happen to keep the nozzles spraying for a very long time.

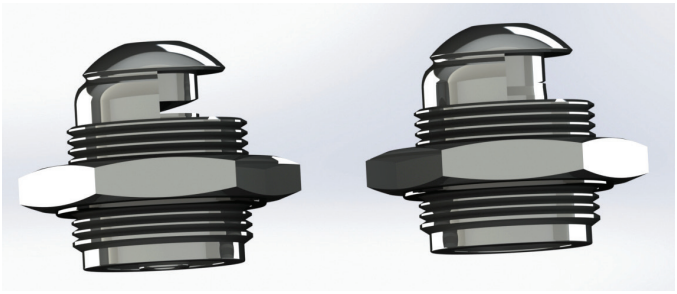
WE HAVE A PROBLEM

When it comes to brush showers, a frequent request is, 'We would like a quote for a new brush shower assembly as ours is worn out' or 'what we have is not working and we need a solution that will keep our nozzles from plugging.' The reality is this: nozzles are going to plug sooner or later regardless of how clean a mill's water supply is and/or how many filters are in place in the system. In some case, nozzles eventually plug even with a brush installed.

To compound the problem, the brushes themselves begin to degrade the moment they go into use and progressively wear out depending on the application. Although brushes can be replaced every 5 years or so, the alternative is to simply change the nozzles, which is much easier than changing out a brush assembly.

Before going further, it's important to note that users of spring purge nozzles either like them or they don't. In regards to the latter, the frustration is not unsubstantiated. But, there is hope and a proven path forward.

Success with spring purge nozzle types has less to do with the nozzle itself and more to do with the supplier schooling the user on the workings and operation of this type of nozzle. Furthermore, it is of the utmost importance that these nozzles



Nozzle on left shown in "purge" or cleaning state (or inlet valve to shower header closed). Nozzle on right shows Nozzle in normal operation state with piston and button mated together creating a precision metal to metal orifice seal which creates the fan or jet pattern (depending on nozzle type of fan or jet).

are accompanied by an operation manual, which SPG offers for both spring purge nozzles and the automation process that can be implemented to work with the nozzles.

PURGE THEM, AND PURGE THEM OFTEN.

So your mill's current spring purge or non-spring purge nozzles aren't doing the job expected of them and you're thinking about a new shower to replace the existing header. But what if it's a case of plugged nozzles?

This problem can be remedied quite easily, quickly, and doesn't necessitate a capital project to accomplish. It simply requires the user understanding what makes the nozzles in question operate properly over the long term. The answer: purge them, and purge them often.

How often should nozzles be purged? We recommend at least one purge cycle every 24 hours. The daily purging regenerates the nozzles to a clear state for most freshwater applications and allows the nozzle to open and close, i.e. allows the moving parts to move and eliminate any debris that has built up inside the nozzle area. In some cases, depending on what is in the shower water, the user may want to purge every 30 minutes (via a valve on a timer) as purged nozzles can work well in applications where solids loading can be as low as 20 ppm to as high as 1,000 ppm.

To clarify the term "purge" when related to spring purge nozzles means decreasing the water supply to the nozzle so that the internal spring can allow the internal piston and top button to separate and allow low-pressure water to wash out any debris that may be plugging the nozzle orifice. The nozzle orifice, in this case, exists when the nozzle is in "operating condition," which means the piston and button at the top of the nozzle are mated together and create the spraying orifice. Whether it be a fan or needle jet, the process is the same.

Spring purge nozzles can be employed in a variety of showering applications including: oscillating high-pressure needle jet, fan shower applications — knock off, chemical, lube, breast roll apron, rotating gravity strainer showers, etc. Benefits of clean nozzles include:

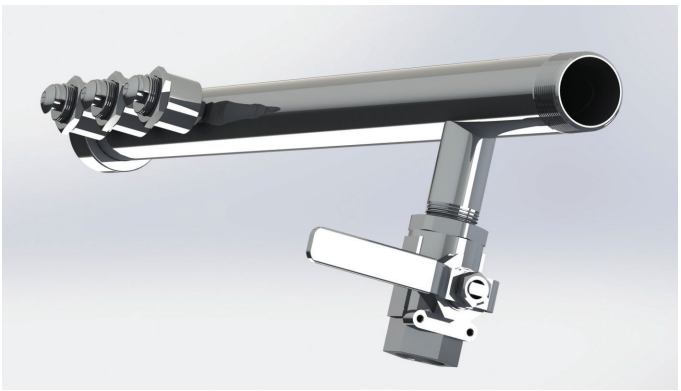
- Improvement in moisture profile.
- Decrease in sheet defects.
- Increase lifetime of consumables, such as wear surfaces (UHLE box covers, wear strips, doctor blades, rolls, high cost consumables, i.e. forming fabrics and press felts.
- Consistent sheet dewatering characteristics at the formation level that transfer through to the press section, and continue all the way to the finished product.

CLEAN SPRAYING NOZZLES

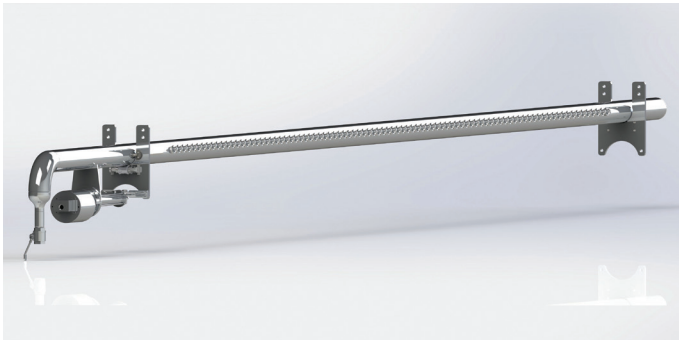
Of course we all want unplugged clean spraying nozzles, and spring purge nozzles can help us accomplish that easily, economically and safely via automation — no manual valve manipulation required — and in most applications without having to purchase new shower headers.

Almost all shower header nozzle bases can accept an adapter that will allow the installation of a standard spring purge nozzle. In some cases, such as brush showers with worn brushes, users have removed the brushes (or left them in) and installed custom-size threaded spring purge nozzles that screw directly into their existing shower headers. Automation is not required, and a manual inlet valve can also allow for purging. However, climbing a paper machine to turn a valve can be a safety concern that can be eliminated via automation.

Once the spring purge adapter and nozzles have been installed, the shower header is then typically rotated to accommodate the non-perpendicular spray from the centerline of the shower header. The new spring purge nozzles transform the once 'pain in the neck' shower to something that, with an automated AutoPurge™ valve, can be a 'set it and forget it' solution.



Trim knock-off conversion from quarter NPT to spring purge nozzles.



HP needle jet conversion from brush to spring purge with custom nozzles.

The AutoPurge system is an automated inlet valve controlled via a PLC in a NEMA 4 enclosure with a few adjustable parameters that can be factory preset and also changed onsite by the user to fine-tune the purge frequency for each shower.

By simple adjustments of timers, it is possible to have showers running off the same water source purge at different times so there is only one shower purging at a time. In addition to the repeat timer purge cycle, there is also a purge "on demand" function, which, for example, is helpful for during a clarified whitewater upset condition.

RESULTS

Actual reported results from customers using spring purge nozzles in the manner described above:

- Up to 50% increase of life in press felts.
- Greatly reduced wear on Herringbone, Slotted and Wear Strips on UHLE box wear surfaces.
- Moisture profile consistency markedly improved due to machine cross direction fabric uniformity directly related to changing only the past nozzle type to spring purge type nozzle (and purged often).

When nozzles are spraying so well that you forget you have showers, then you've purged away your water woes, and that's a nice place to be.

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