

Neles™ SwitchGuard™ in the pulp and paper industry



Fig. 1. The SwitchGuard valve package brings intelligence to switching applications

Introduction

Neles SwitchGuard is an intelligent valve controller designed for on/off valve applications. With the unique diagnostics features of SwitchGuard, you can continuously monitor the condition of your on/off valves while the process is running. This means that problems that occur can be detected at an early stage – before they can disturb the process itself. Due to its large air capacity, there is no longer any need for expensive boosters or other additional instrumentation. To prevent harmful pressure shocks, valve opening and closing profiles can also be adjusted with SwitchGuard.

SwitchGuard is based on proven technology from the Neles ND9000 digital control-valve positioner and it can operate on all valve actuators. SwitchGuard is designed especially for process-critical and high-cycling on/off applications, which require exceptional reliability. SwitchGuard replaces the need for a solenoid valve, limit switches and part of the pneumatic accessories, thereby reducing installation costs and engineering work because it is a more easily integrated solution.

SwitchGuard in the pulp & paper industry

Approximately 30 – 40 % of all valves used in the pulp and paper industry are automated on/off valves. Basically, SwitchGuard can be used in all of these on/off applications, but it provides the greatest benefits in process-critical and high-cycling applications, where you can take full advantage of its features, such as health monitoring, configuration features etc. The diagnostic features of SwitchGuard are especially designed for on/off valves. In on/off applications SwitchGuard offers far better diagnostics features than the ND9000. This is because, in these specific applications, the valves are usually fully open or closed most of the time, whereas the diagnostic features of the ND9000 are designed for valves that are moving all the time.

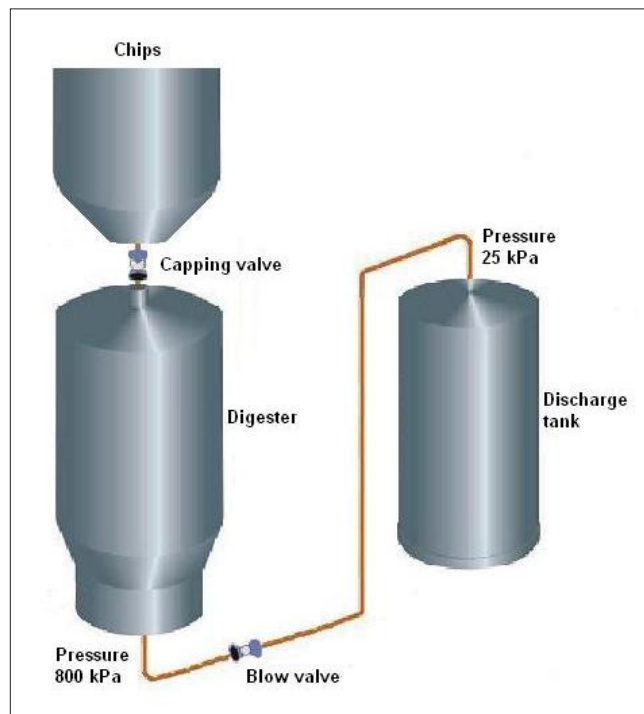


Fig. 2. Cooking process

You can increase process cost-efficiency and extend the lifetime of a valve and pipeline by adjusting the valve opening and closing profiles with SwitchGuard. The pulp mill cooking section is one particularly appropriate process stage for SwitchGuard (picture 2). For instance, before the digester you can use linear opening and closing profiles and faster capping valve opening to improve your process efficiency with SwitchGuard (picture 3).

After the digester, it is best to open the blow valve carefully by using SwitchGuard, because of the high pressure and temperature (picture 4). In this way, you can gently heat the system and prevent harmful pressure shocks to valve and pipeline. In addition, in the cooking and chemical recovery section there are usually long pipelines for liquors, where SwitchGuard could and should be implemented. Otherwise opening the valves too fast can cause serious vibration and damage to the construction, pipelines and all the instrumentation.



Fig. 3. SwitchGuard and capping valve atop the digester



Fig. 4. SwitchGuard and blow valve after the digester

Another sub-process in the pulp and paper industry where it is highly advantageous to use SwitchGuard is the centrifugal cleaning stage. No failures can be tolerated in this stage, because this is where most of the heavy unwanted particles are removed from the pulp. A slow valve opening profile, which can be implemented with SwitchGuard, is needed before the centrifugal cleaning stage, so that fiber material can be accelerated into the spiral flow. Heavy particles sink downwards to the separation tube, where they are removed by sand traps (picture 5). Sand traps are on/off valves that operate quite frequently, which also makes them a good application for SwitchGuard.

In addition to cooking and centrifugal cleaning, further potential application areas for SwitchGuard in the pulp and paper industry are causticizing, washing, oxygen plants, depressurizing valves, feed valves, lime milk switching valves, black liquor extraction, etc.

SwitchGuard simplifies installation

SwitchGuard offers a simpler solution for on/off applications than a conventional on/off concept with limit switch and solenoid valve. Picture 6 shows the difference between the two concepts. Conventional construction is shown on the left and the simpler solution with SwitchGuard on the right. Because of its integrated construction, SwitchGuard replaces the solenoid valve, limit switches and throttle and check valves. In practice, it means more reliable construction at a lower unit price.



Fig. 5.

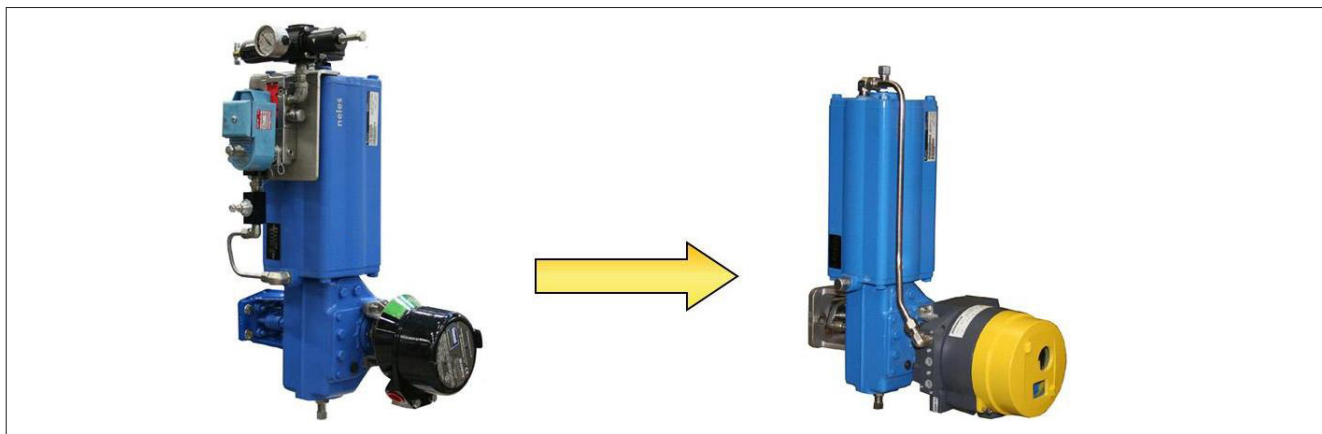


Fig. 6. Picture 6. SwitchGuard simplifies installation

Savings

Our calculations prove that you can achieve remarkable savings with control valves by using ND9000s and applying condition monitoring and predictive maintenance strategy. Now, for the first time, it is possible to obtain the same benefits with on/off valves and achieve even bigger savings. When compared to the traditional on/off valve package, SwitchGuard also has lower installation costs due to the integrated design.

Correct and planned maintenance actions save money and time. When on/off valves are updated with diagnostics features, unexpected device failures can be avoided. You will be informed immediately if valve performance degrades, so you can avoid poor quality end-products and production losses due to the failure of field devices. The diagnostic information creates the means of preparing shutdown work lists in advance and also of ensuring the availability of all the spare parts, human resources and equipment required during the shutdown.

One study, from a pulp mill, shows that almost half of all valves that were overhauled during a shutdown did not require an overhaul (picture 7). By using SwitchGuard and condition monitoring, you can focus on the right targets at the right time and there are no more unnecessary check-ups. In turn, this means higher productivity in maintenance work. The saving potential from on/off valve maintenance costs with SwitchGuard is up to 50 %!

Typical condition of overhauled valves during shutdown

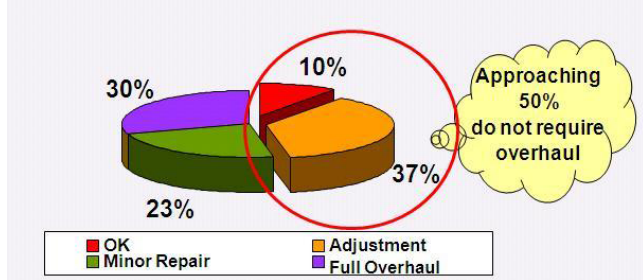


Fig. 7. Almost 50 % of valves do not require overhaul

SwitchGuard technical bulletins and more information are available on our website:

<http://www.neles.com/sg9000>

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