

U.S. Paper Mill Significantly Reduces Process Variability with Fisher® Control-Disk™ Valves

RESULTS

- Process Variability Significantly Reduced
 - Loop 1: from 8.0% to 3.0%
 - Loop 2: from 3.5% to 1.6%



APPLICATION

Vacuum control loops that remove water from pulp stock

CUSTOMER

A paper manufacturer in the U.S.

A paper-producing machine at a U.S. paper manufacturer outputs more than 5,000 feet per minute on a 30-foot-wide roll. It uses a twin wire former to turn pulp stock, which is approximately 98% water, into paper. The former is the first place that water is removed from the pulp stock, using a vacuum control loop on the multi-foil shoes.

Water removed from the pulp stock at this point has a big effect on the operation of the rest of the paper machine. Poor control in the former can lead to problems with consistency and sheet formation.

CHALLENGE

The two troublesome high-performance butterfly valves were both operating below 20% travel. The valves spent most of their time in manual control after their installation 7 to 8 years prior. Plant personnel made unsuccessful attempts at placing these loops in automatic control. High-performance butterfly valves have an

After replacing two troublesome valves with Fisher® Control-Disk™ valves, poor control was not an issue anymore.



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inherent flow characteristic that is linear. With an inherent linear characteristic, valves commonly have a narrow travel band over which they exhibit an optimum installed process gain. Typically, this range is 30 to 50 percent of total travel. This band is called the control range. Outside the ideal range, process gains become very high or very low, and high process variability results.

Installed process gains were greater than 4 (the EnTech desirable range is 0.5 to 2). Process variability in the loops were 3.5% and 8%. The vacuum loop was manually adjusted. The valves displayed excessive backlash, as illustrated in the graph.

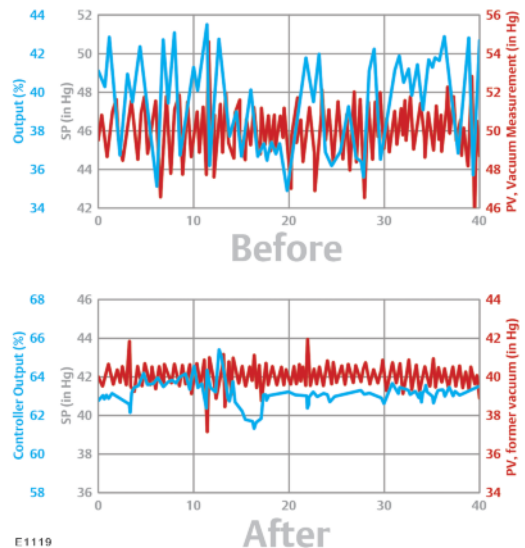
Piping space is too limited to allow changing to segmented ball valves. Swaging down to a smaller valve size would be very expensive and time consuming.

SOLUTION

Fisher® Control-Disk™ valves replaced the two troublesome valves, and operators left the loops in manual to observe the valves' behavior. Then, operators put loops in automatic and saw good control immediately. One valve was operating at 30% open, the other at 60% open.

Variability was significantly reduced: from 8.0% to 3.0% in one loop and from 3.5% to 1.6% in the other. Variability was further reduced after the loops were tuned.

Vacuum control loops that were once troublesome were now not an issue.



Tracking of valve input signal and valve output (vacuum) before and after installation of Control-Disk™ valves shows dramatic reduction in process variability.

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NORTH AMERICA

Emerson Process Management
Marshalltown, Iowa 50158 USA
T 1 (641) 754-3011
F 1 (641) 754-2830
www.EmersonProcess.com/Fisher

LATIN AMERICA

Emerson Process Management
Sorocaba 18087 Brazil
T +(55)(15)3238-3788
F +(55)(15)3228-3300
www.EmersonProcess.com/Fisher

EUROPE

Emerson Process Management
Chatham, Kent ME4 4QZ UK
T +44 (0)1634895800
F +44 (0)1634895842
www.EmersonProcess.com/Fisher

MIDDLE EAST & AFRICA

Emerson FZE
Dubai, United Arab Emirates
T +971 4 883 5235
F +971 4 883 5312
www.EmersonProcess.com/Fisher

ASIA PACIFIC

Emerson Process Management
Singapore 128461 Singapore
T +(65) 6777 8211
F +(65) 6777 0947
www.EmersonProcess.com/Fisher

