CASE STUDY • PULP & PAPER

NORSKE SKOG BRUCK RESTORES AUTOMATIC BASIS WEIGHT CONTROL AND INCREASES PAPER PRODUCTION WITH HIGH-PROCESS NOISE DIAGNOSTIC

Application

Basis Weight Control

Customer

Norske Skog Bruck is a leading global producer of newsprint and magazine paper, with 16 paper mills around the world.

Challenge

This customer experienced instability in the output from the magnetic flow meter installed in the basis weight flow line. As a result of the instability and variation in the signal, they were unable to reliably run their basis weight control loop in automatic mode. Even with damping applied in both the meter and the control system, there was still too much noise to control the speed of the basis weight pump effectively (See Figure 1). After pipe cleaning operations with a caustic soda solution, it would take up to 20 minutes for the competitor's meter to respond to a change in flowrate.

In order to compensate for the unstable signal from the basis weight flow meter and ensure the final paper product met quality specifications, the basis weight set point needed to be set higher than the desired target point. In an effort to resolve the unstable output from the magnetic flow meter, this customer made a service call to the manufacturer of the flow meter. They were unable to find a problem with the existing flow meter or provide a solution to combat the noise issue.

Solution

Emerson supplied a 16-inch magnetic flow meter with the high-process noise diagnostic on a trial basis. A planned shutdown was scheduled in three weeks, at which time the Rosemount™ magnetic flow meter was installed. The other manufacturer's magnetic flow meter was left in-line in order to compare the performance of the two units.

Results

- Increased paper production by 1.5%
- Restored automatic control
- Reduced measurement variation from 10 L/s to 2 L/s
- Reduced raw material costs

> *"Several hours after commissioning the magnetic flow meter, we had full confidence in the signal, allowing us to have automatic basis weight control."*

Christian Trieb
Line Responsible PM4 - E - Automation - IT

EMERSON

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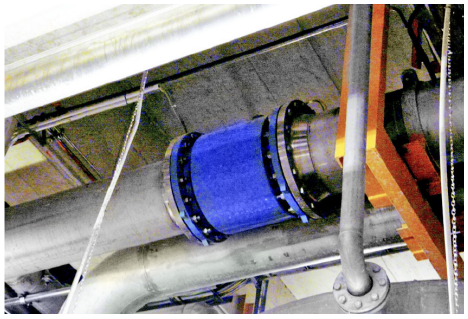
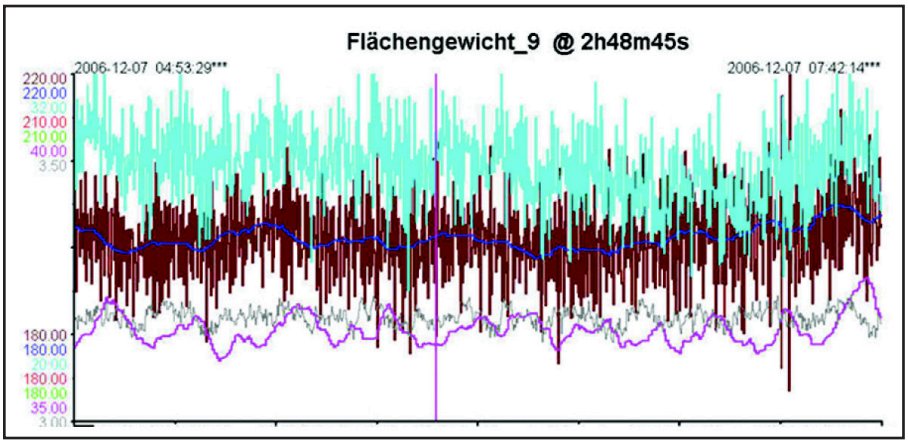
The existing flow meter was set with four seconds of damping, while the Rosemount flow meter was left at two seconds damping, the factory default.

After installation, the Rosemount high-process noise diagnostic indicated a low signal to noise ratio at 5 Hertz. By changing the coil drive frequency to 37 Hertz, the noise was significantly reduced when compared to the other manufacturer's flow meter (See Figure 2). Within an hour of operation, there was enough confidence in the stability of the signal that automatic control of the loop was restored (Figure 3). When directly comparing the two meters, the other manufacturer's meter had a variation of approximately 10 L/sec, while the Rosemount magmeter only showed a variation of 2 L/sec, a five times decrease in the measurement variation (Figure 4). By reducing the measurement variation, the customer is now able to more accurately control the process. More accurate control resulted in reduced raw material usage and cull, and was one of the reasons for a 1.5% increase in paper production. After cleaning operations, the Rosemount magmeter responded to flowrate changes in 3 to 4 minutes, compared to a 20-minute response time of the competitor.



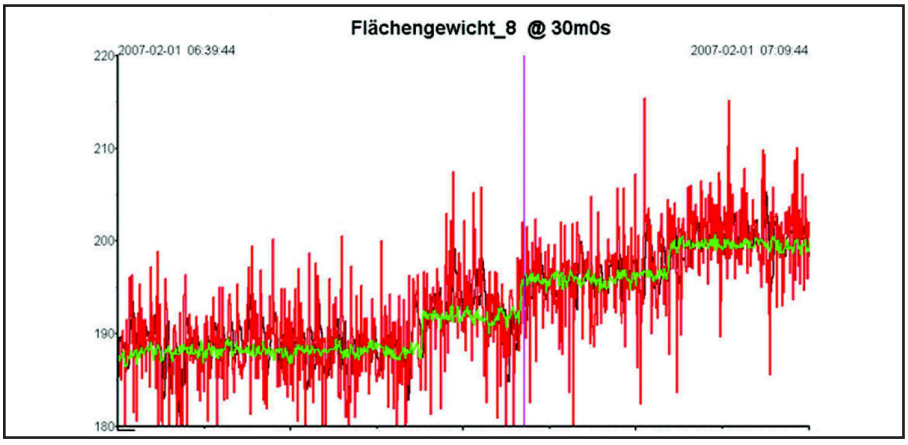
Rosemount 8700 magnetic flow meter installed

Figure 1.



The light blue is the output from the controller to the frequency drive of the basis weight pump. The dark red is the other manufacturer's meter signal after it has been conditioned in the control system. Even with damping applied in both the meter and the control system, there is too much noise to control the speed of the basis weight pump.

Figure 2.



This graph shows the performance of both flow meters at the same time. The red line is the output from the other manufacturer's magnetic flow meter with four seconds of damping. The green line is the output from the Rosemount magnetic flow meter with two seconds of damping.

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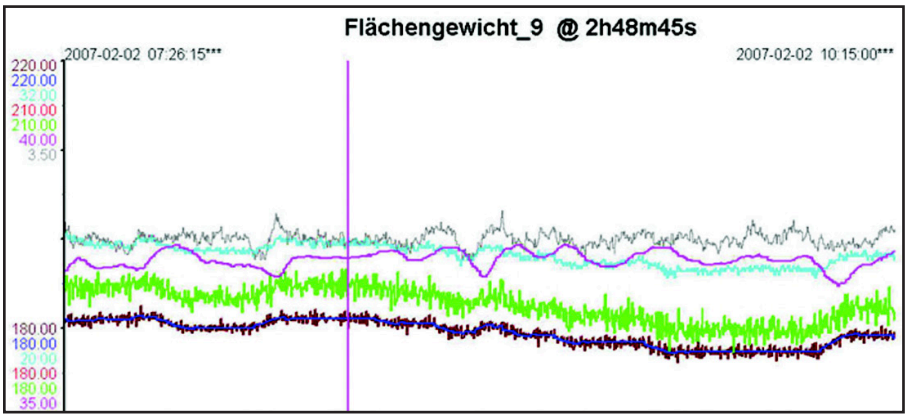
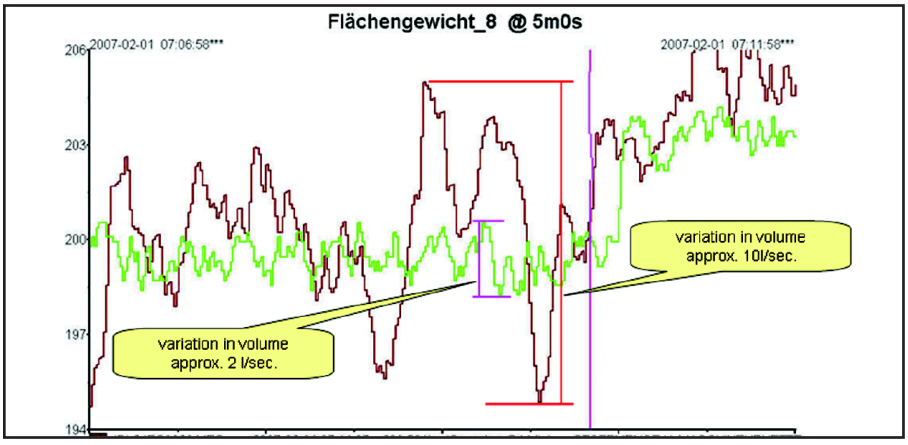
Figure 3.



This graph shows the situation after the Rosemount magmeter was installed. The green signal is the raw signal from the magmeter with two seconds of damping and the dark red line is the conditioned signal from the control system. The light blue line is the output from the controller to the frequency drive of the basis weight pump. There is much less variation in the output signal providing a much more stable control signal to the basis weight pump.

Figure 4.



This graph shows the improvement in the output variation. The green line shows the Rosemount magnetic flow meter with 2 L/s variation, while the other manufacturer shows 10 L/s in variation.

> *"The successful installation of the Rosemount magnetic flow meter increased the throughput of the paper machine and was one of the reasons that we could increase paper production by 1.5%."*

Christian Trieb
Line Responsible PM4 - E - Automation - IT

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