Continuous Digester in Pulp Plant

Industry: Pulp & Paper
Product: Magnetic Flowmeter ADMAG AXF
Keywords: Stable Measurement in Slurry Application
 Reduced Maintenance Cost

Introduction
The pulp and paper industry has very aggressive and challenging applications for magmeters. There are corrosive chemical, high temperatures and pressures, and abrasive slurries. Yokogawa delivers optimized solution with the best-in-class reliable and accurate meters for each application.

Application
In the digester application, pulp is produced by placing wood chips into a digester where it is cooked under high pressures and temperatures in a caustic solution termed white liquor (a mixture of sodium hydroxide (NaOH) and sodium sulfide (Na2S)). The mixture of wood chip and liquor is steam heated, and the wood chips are dissolved. The spent mixture of white liquor and lignin is known as “black liquor”. After the cooking, the pulp is discharged from the bottom of the digester using a blow-unit through the blow valve and into the blow tank.

Challenges
In the flow measurement in the digester applications, following two applications are the most challenging.

- Black liquor measurement in circulation/extraction process - Pulp slurry measurement in Blow line.

In these applications conventional magmeters may have following problems.

- Heavy pulp slurry generate the slurry noise and produce an unstable output with resulting the loss of accuracy and control.

- Measuring heavy slurry the pulp stock due to problems related to the electrode seals and liner abrasion which results in a short life expectancy.

- The adhesive black liquor require frequent maintenance for the electrode cleaning.
Solution
ADMAG AXF series delivers stability and durability in each application that contributes to maximize the plant productivity and reduce the maintenance cost.

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<td>Blow Line</td>
<td>Fluid: Pulp Consistency: 10w/o&lt; Process Temperature: 80 - 120 deg.C Process Pressure: 2MPa max.</td>
<td>-Liner abrasion -Slurry noise</td>
<td>- Dual frequency excitation - Ceramic Liner (&lt;=200mm) - PFA lined AXF with metal hat(&gt;200mm)</td>
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Dual Frequency Excitation
ADMAG AXF’s dual frequency excitation has the advantages of both the high and low frequency meters. Dual frequency excitation provides, good zero stability, accuracy of 0.35%, 0.2% as option of reading and immunity to slurry noise. Further, the “Enhanced Dual Frequency Excitation Method” is optionally introduced in the ADMAG AXF to cope with more difficult application such as high concentration slurry measurement. Enhanced Dual Frequency option provides an even higher excitation frequency of 165Hz for maximum slurry noise reduction when needed, without sacrificing zero stability.

Leak-free Electrodes and PFA liners
Non-retained liners (extruded liner), which are commonly used in conventional meters, are susceptible to failures as a result of vacuum conditions that can be created due to a pump or valve failure. In addition, meters that have extruded liners generally have a shorter life due to the aggressiveness of the chemicals used. Yokogawa uses an injected molded PFA liner with a retaining grid. This retaining grid plate, used to reinforce the PFA liner, acts like rebar in concrete. This rugged construction holds the liner in place and prevents the liner from caving in due to vacuum conditions. The thickness and durability of the injection molded PFA liner provides a flow tube that is capable of handling the most severe applications. Flowtube, electrodes can easily be removed and cleaned without removing flowtube from piping.

Ceramic Liner
AXF ceramic liner delivers accurate and stable flow measurement of the line measuring very aggressive slurry. The purity of alumina reaches 99.9% and provide better corrosion resistance and mechanical strength. This design allows no room for leakage, and provides extremely slurry resistant, enabling stable and accurate measurement. In addition, the optional mirror finished surface reduce the adhesion level by having smooth surface.

Electrode Coating Diagnostics
AXF advance diagnostics function delivers the four levels of coating. This function can be optimization by each customer for his individual process, and the values for the four levels can be individually set in the field. This allows the user to predict when preventive maintenance is needed, and remove the meter for cleaning before an interruption in the measurement occurs.

VigilantPlant
The clear path to operational excellence

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