

SMS2000

Soap Management System 2000

PROBLEM

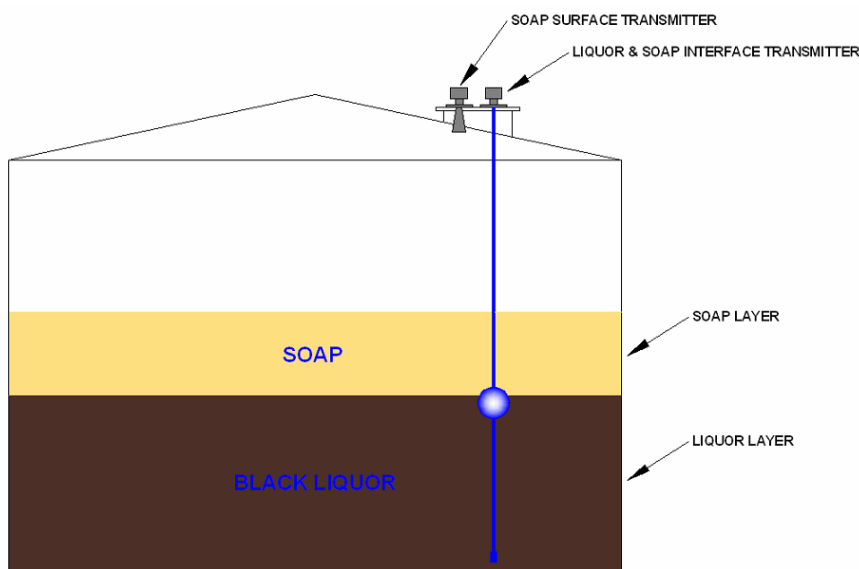
Many pulp and paper mills have storage tanks filled with black liquor and soap. Since black liquor and soap are a commodity, their containment must be monitored and controlled and their quantities measured. Measuring the soap and liquor interface and or soap layer thickness in the Kraft pulping industry has been uncertain and often very difficult to achieve. Black liquor is a highly alkaline material with high solids and a variable density. Soap separates from the liquor and forms a layer on top which can vary in density and thickness from a few inches to several feet. Unreliable knowledge of the soap / liquor interface can increase fouling in evaporators, decrease recovery of soap, spills through overflows, decrease liquor recovery and provide unknown tank levels for operators.

SOLUTION

Now with the use of a specially engineered and proven flexible sensor hose, transmitter electronics and a float design, this soap and liquor interface measurement can be accurately achieved. Even though the thickness and density of the black liquor and soap varies, it still achieves accurate results. Combined with knowledge of the top surface level of the soap with a properly applied microwave radar measurement, it is possible to control tank levels and soap skimming with confidence.

EQUIPMENT AND SYSTEM BENEFITS

- Minimal operator attention of the soap level in tanks.
- Prevents soap from entering liquor pumps and evaporators.
- Reduced fouling, increased Evaporator efficiency and Tall Oil quality control.
- Prevents soap environmental spills.
- Better tank inventory control.
- Does not require calibration adjustments over time.
- Simple calibration and set-up via HART PC software.
- Maintenance free



Liquor & Soap Interface Level Principal of Operation

The Liquor and Soap interface is detected by a transmitter consisting of a flexible stainless sensor hose. The hose is flange mounted at the top and has a weighted anchor suspended at the opposite end. Traveling up and down the flexible sensor hose is a specially designed float that follows at the soap/liquor interface. As the float position changes along the flexible sensor hose it closes very small reed contacts within its magnetic field through the wall of the flexible sensor hose. The closed reed switches provide an uninterrupted measurement voltage from a resistance chain (a potential divider) to the transmitter and this voltage is proportional to the liquid interface level. This variable voltage is then converted into a standard 4-20mA analog level signal. The most important piece of equipment is the specially engineered 15" diameter large interface float which has the ability to be adjusted to provide the needed buoyancy, based on calculations and the customer's process data. A correctly adjusted buoyancy allows the interface float to maintain its position at the liquor and soap interface with ease.



15" Interface Float with fill ports



Interface Transmitter Head

Specifications

Soap and Liquor Interface Detector

Measurement:	Range: Maximum 60 feet
Material of Construction:	All wetted materials 316 / 304 SS
Mounting Flange:	2"(50mm) / 150# ANSI(NP10) rated RF flanged connection
Interface Float:	15" diameter, Specific gravity adjustable within +/-0.01 S.G., smooth finish
Enclosure:	Aluminum epoxy coated
Power required/Output:	8-28 VDC/4-20mA continuous with Hart
Flexible Sensor Float Guide:	1.07"(27 mm) diameter
Resolution:	+/- 12.7 mm
Approvals:	CSA, UL & ATEX

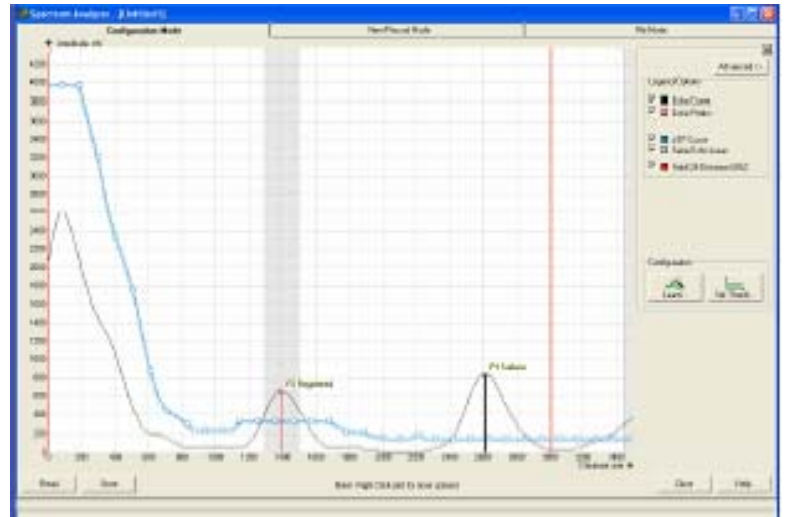


Soap Surface Level Principal of Operation

The soap surface level is detected by using a microwave radar gauge. Extremely short microwave pulses at low power levels are emitted by the antenna system to the measured product, reflected from the product surface and received again by the antenna system. The pulses travel with the velocity of light and the time from emission to reception of the signals is proportional to the level in the vessel. From this a soap surface level can be measured with a 4-20mA analog level signal. The advantages of using a microwave radar gauge is that it is not affected by temperature, condensation build-up, process composition changes and pressure changes. Any false echo's within the tank can be mapped out with the software as seen below. The low frequency radar also has the ability to measure the top surface of soap with very low density or air entrained.



Flanged Microwave Level Transmitter



Radar setup software with False Echo mapping

Specifications

Soap Surface Level Detector

Measurement range:	Maximum distance 90 feet
Material of Construction:	All wetted material 316SS
Mounting Flange:	6"(150mm) / 150# ANSI(NP10) rated RF flanged connection
Enclosure:	Aluminum epoxy coated
Horn:	6"(150mm) diameter
Frequency:	6.0 GHz
Power required/Output:	10-30 VDC/4-20mA continuous with Hart
Resolution:	+/- 10 mm
Approvals:	CSA, UL & ATEX



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