

ABB level measurement

Industrial power applications



Commercial power applications

In industrial power generation there are many opportunities to lower operating expenses, optimize plant efficiency, and increase safety. This can be accomplished through a collaboration among vendors, planners, and engineering- but the path can be convoluted. ABB has simplified the process .

Measurement made easy

The challenges

The challenges- coal or biomass supply

The nature of these environments is riddled with heavy dust and level measurement is the primary control for the federate of conveying, positioning, and crushing. Issues with overfeeding causing unit shutdowns and costly suction trucks as well as prevention of fire in the pulverizer is a primary concern for reducing unplanned operational expenditures.

The challenges- demineralization process

Material selection for instrumentation can vary in these applications as it may not match tank construction. Vibration from heavy equipment can cause false state changes in switching technology. The switches are connected to a PLC to monitor the level and control the pumps vs 4-20mA as it's cost effective.

The challenges- Maximizing boiler efficiency

The feedwater heater is a series of tubes carrying feedwater through a tank shell, into which steam is injected to heat the water. The steam condenses in the shell, creating a liquid level of condensate. The

level is controlled to create a seal and prevent steam blow-through. Maximum thermal transfer occurs when the largest tube area is exposed to the steam without allowing steam blow-through condensate drains from the shell through the normal drain. When the tubes become submerged, heat is transferred to the condensate. Even a small increase in condensate level greatly reduces boiler fuel efficiency.

The challenges- condenser hotwell and condensate storage

Loss of vacuum in the hotwell will trip a plant. Maintaining water level here is critical for maximizing up time especially during steam augmentation.

The challenges- Ammonia vaporizer control

Ammonia vaporizer for NOx emission control, is important for the environment, plant operations and avoiding government penalties for excessive emissions. Any atmospheric releases can be hazardous as flashing normally occurs due to the nature of aqueous ammonia. Outdated pneumatic systems often have trouble with this as they trip false alarms.

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01 Coal supply

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02 KM26 magnetic level gauge and teflon coated magnetic float

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03 LMS200 10A, DPDT magnetic level switch

Challenges (continued)

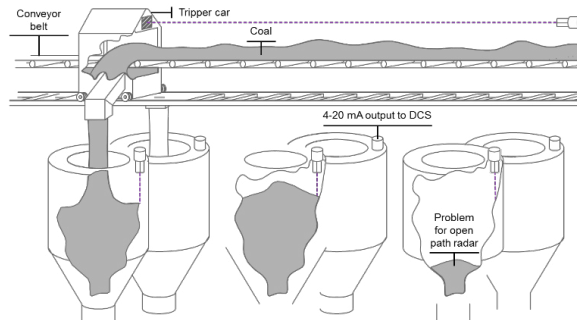
The challenges- Ash measurement

Ash inherently is difficult to measure due to low dielectric constant and build up on side walls of silos and vibration.

Solutions

The solution- coal and biomass supply

ABB's [LLT100](#) laser level measurement offering offers plant engineers the ability to mount units at very far distances away from [storage](#) conveyers, crushers, and tripper cars. The beam angle on laser is far superior to open path radar and since it can be mounted from much further distances, it mitigates any interference caused by heavy dust particles. This allows for the plant to run optimally with little manual measurements and keeps operators away from hazardous areas.



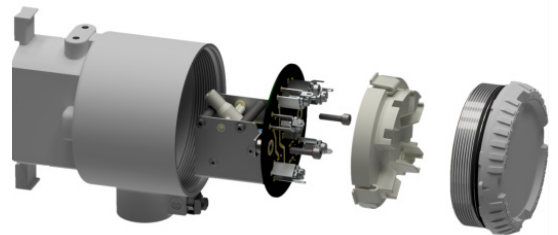
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The solution- demineralization process

Depending on the media and service, material selection can greatly vary from plastics to exotic alloys in these applications. It's recommended to evaluate through engineering, but an example of how ABB mitigates cost is to use coated level instrumentation over alloys which offer immediate ROI. In addition to this, heavy duty connection reinforcement can be used, and our switching technology is impervious to vibration as the [LMS200](#) is magnetically coupled until activated by the magnet in the float.



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— 04 MW05 MagWave dual chamber with LMT200 magnetostrictive and GWR transmitter

— 05 Oversize KM26 MLG with guide rods and LMT200 magnetostrictive transmitter

— 06 LLT100 laser level transmitter

— 07 LWT320 guided wave radar transmitter and KCAP400 RF capacitance switch

The solution- boiler efficiency

ABB's [MW05](#) has two tightly integrated but independent chambers. An externally mounted magnetic gauge visually indicates the level. In the secondary chamber, the [MT5000](#) series GWR provides continuous level measurement output and enables accurate level measurement even with changes in feedwater temperature. ABB's solution typically allows users to manage level measurement with their control system to a set point of nine inches, achieve a 5°C (8°F) differential on their heaters and improve efficiency by six percent, saving fuel costs.



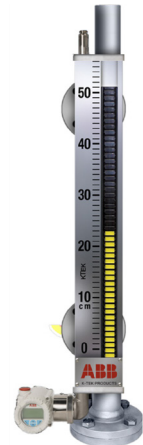
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The solution- ammonia vaporizer control

The original [KM26](#) was designed with oversize chamber with guide rods so that the effects of flashing on the float would be minimized; and therefore, the local indication and transmitter output would be reliable. With the new [LMT200](#) non-intrusive magnetostrictive level transmitter which can be mounted outside of the KM26 gauge chamber, exposure to vapors and leak potential are eliminated as a problem when a technician works on it. The [LMT](#) being having all global hazardous approvals and use in this environment and application. On installation, the technician only needed to check the signal quality on the built in waveform display which was acknowledged by the customer as a huge benefit for commissioning and troubleshooting.



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The solution- condenser hotwell and condensate storage

These applications are typically monitored with smaller magnetic level gauges. Retrofitting these with an externally mounted [LMT200](#) will offer the accuracy needed to maintain vacuum with a low threshold of investment. This is especially critical during steam augmentation as the system is utilizing twice the amount of water to remain online. The condensate storage tank can be monitored via the LLT100 as it can be mounted close to the tank wall and mitigate common issues with through air radar such as echo profiling.



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The solution- ash measurement

A combination of ABB's [LWT320](#) series guided wave radar and [KCAP400](#) series capacitance level switch allow for continuous measurement of ash buildup while offering redundant high level alarms. The LWT guided wave radar with a remote option, mitigates high temperatures on the transmitter electronics as well as isolation from vibration. This also allows for local display as these units offer an industry leading remote mount distance of 197'. The LWT320 series also comes standard with the [LevelExpert™](#) guide rods that filter out false echoes due to probe build up.

The KCAP400™ unit fitted with a fly ash probe, exceeds high temperature ratings and performs reliably as a redundant high level alarm to prevent damage to the precipitator.



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Measurement solutions

A comprehensive portfolio

Did you know? ABB is a world leader in the design, supply and lifecycle management of power and automation technologies for power generation applications.









Plant components	Level								
Measurement type	Guided Wave Radar	Guided Wave Radar	Guided Wave Radar	Laser	Laser	Magneto-strictive	Magneto-strictive	Magnetic Level Indicator	Magnetic Level Indicator
Product series	LWT310	LWT320	LWT400	LLT100	LM80	LMT100	LMT200*	KM26	MW05
Product image									
Fuel system	•					•	•	•	•
Gas cleaning system	•					•			
Coal bin		•		•	•				
Coal mill									
Feed storage	•			•		•			
Fermenter	•			•	•	•			
Fuel oil storage	•			•		•	•	•	•
Solid dosage		•		•	•				
Water treatment	•			•	•	•	•	•	•
Deaerator	•					•	•	•	•
Boiler feed water	•					•	•	•	•
Boiler drum	•					•	•	•	•
Boiler blowdown tank	•					•	•	•	•
Steam line			•			•	•	•	•
Cooling water system	•			•		•			
Condensate drip legs			•			•			
Cooling tower intake	•			•	•	•			
Deionization tanks	•			•	•	•	•	•	•
Condenser hotwell			•			•	•	•	•
Condensate receiver tanks	•					•	•	•	•
Flue gas desulphurization	•			•					
Demineralization tank	•			•			•	•	
Feedwater heater			•			•	•	•	•
Flash tanks	•						•	•	•
HRS	•						•	•	•
Condensate storage	•			•	•	•			
Residuals storage	•			•	•				
Ammonia Storage	•					•	•	•	•
Ammonia Vaporizer	•						•	•	•
Water wash tank	•			•	•	•	•	•	•
Fly ash		•		•	•				

* LMS200 asterix info

Measurement solutions

Serving the steam loop

Did you know? ABB manufactures and supplies a wide range of chemical analyzers that is used to eliminate the issues associated with poor boiler chemistry and therefore helps to avoid corrosion, impaired efficiency and unplanned shutdowns.

Plant components	Level							
Measurement type	Ultrasonic	Ultrasonic	Float Level Switch	Float Level Switch	Capacitance	Capacitance	Thermal Dispersion	Tuning Fork
Product series	LST400	LST300	MS50	LS	KCAP300	KCAP400	TX	RS85
Product image								
Fuel system		•					•	•
Gas cleaning system		•					•	•
Coal bin		•			•	•		•
Coal mill		•						
Feed storage	•	•						
Fermenter								
Fuel oil storage							•	•
Solid dosage	•	•			•	•	•	•
Water treatment	•	•						
Deaerator				•				
Boiler feed water				•				
Boiler drum								
Boiler blowdown tank								
Steam line								
Cooling water system		•	•				•	•
Condensate drip legs				•				
Cooling tower intake	•	•	•	•			•	•
Deionization tanks		•	•	•			•	•
Condenser hotwell			•	•				
Condensate receiver tanks			•	•			•	•
Flue gas desulphurization		•						•
Demineralization tank		•						
Feedwater heater								
Flash tanks			•	•			•	•
HRSG			•	•				
Condensate storage	•	•	•	•			•	•
Residuals storage	•	•						
Ammonia Storage			•	•				
Ammonia Vaporizer								
Water wash tank	•	•	•	•			•	•
Fly ash					•	•		

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Measurement & Analytics

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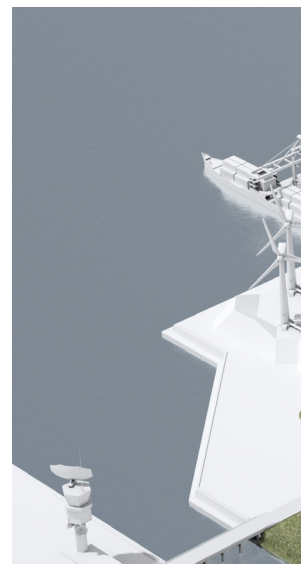
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Measurement & Analytics

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