



AUTOMATION AND DIGITALIZATION SOLUTIONS FOR SMELT SPOUT DECK

Smart Series
ANDRITZ Intelligent Instruments

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Safety Solutions for Smelt Spout Deck

Due to the presence of molten smelt and a high temperature environment, the smelt spout deck of a recovery boiler is one of the most dangerous places to work in a modern kraft pulp mill. ANDRITZ offers automation solutions to reliably improve the safety and performance of the smelt spout deck. By ANDRITZ automation solutions for smelt spout deck you can significantly increase safety and operational efficiency of the recovery boiler.

SAFETY AWARENESS IS PARAMOUNT IN MODERN PULP AND PAPER INDUSTRY

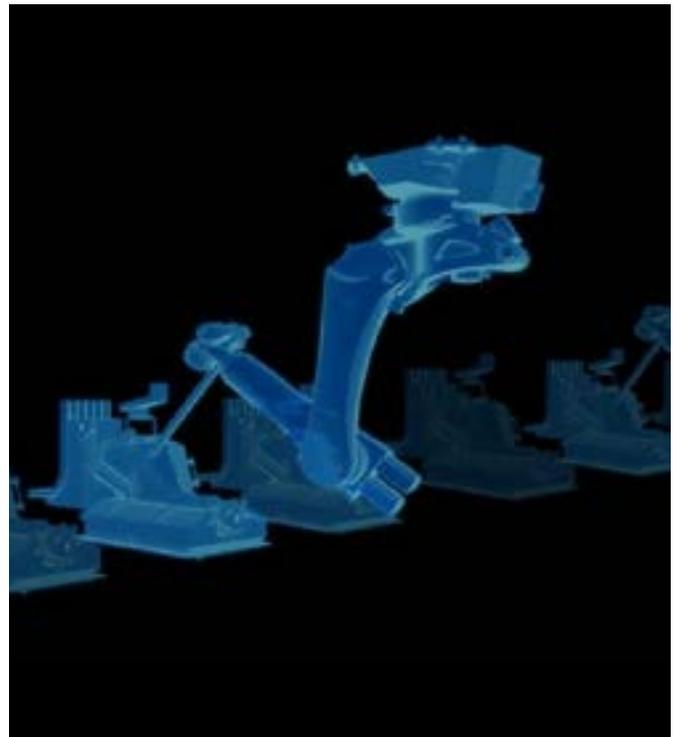
The spouts are a metal trough specifically designed to transfer smelt (1600°F molten salts) from the boiler furnace to the dissolving tank. Smelt tends to coagulate and plug along the spouts, so operators are required to regularly clean the spouts. By cleaning the spouts manually every two to four hours, operators are exposed to risks related to smelt or green liquor splashes, and smelt rushes. Manual spout cleaning is a repetitive task that increases the risk of ergonomic injuries. Manual cleaning is stressful for operators. Spout deck is a high temperature environment, which alone is stressful for operators. Automated solutions do not only replace human intervention in the most hazardous areas of a pulp mill increasing safety in the area but also improve reliability and availability of the plant.

OPERATIONAL EFFICIENCY

The non-contact cleaning feature of the robot eliminates the need for physical scraping of the spouts, which is currently done manually. Reduced mechanical wear on spouts ensures optimal spout lifetime.

When paired with Smart Smelt Flow Measurement, the robot will always clean the spouts that need it the most, thus avoiding production losses due to a plugged spout. Consistent smelt flow along the spouts reduces thermal cycling, which in turn improves spout reliability by mitigating thermal cracking. Clean spouts with consistent smelt flow from all spouts will also improve green liquor TTA stability.

Enhanced operator efficiency is another key benefit. Operators can focus on more value-added tasks, reducing operator fatigue and keeping the operators alert for process troubleshooting and optimization tasks. Improved job conditions also enhance operator retention by reducing job-related stress.



Safety Solutions

Get to know with ANDRITZ solutions to improve the safety of your smelt spout deck.

SMART SMELT SPOUT ROBOT

Improve operator safety by more than 90% with the installation of the Smart Smelt Spout Robot.

The Smart Smelt Spout Robot automatically cleans the smelt spouts & spout hoods without requiring human intervention - significantly reducing time spent on the spout deck. The robot system is a precision instrument, cleaning build-up along the spouts without physically contacting the spouts. Laser sensors track the thermal movement of the boiler and continuously update the robot's cleaning movements. Frequent cleaning maintains a consistent smelt flow from all spouts which improves green liquor stability and boiler availability.

SMART CHAR BED MEASUREMENT

Preventing a smelt rush and keeping char bed in safe state begins with proper char bed management, enabled with the Smart Char Bed Measurement.

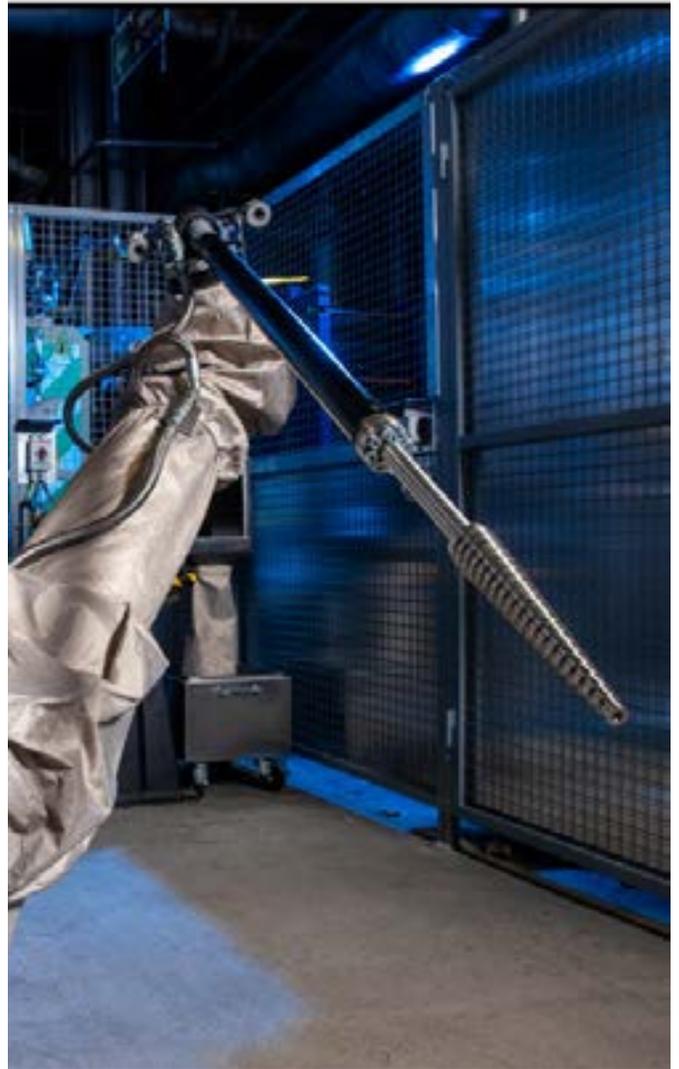
The Smart Char Bed Measurement uses the existing bed cameras to provide a real-time 3D model of the bed, allowing operator decision making on measurements instead of subjective interpretation of an camera feed. The Smart Char Bed Measurement converts bed camera feeds into numerical data, such as bed volume and height, that can be used in the DCS to alarm operators when boiler adjustments are required. Maintaining a stable char bed prevents safety excursions and allows for maximum reduction efficiency.

SMART SMELT FLOW MEASUREMENT

Further automate the functionality of the Smart Smelt Spout Robot through the Smart Smelt Flow Measurement.

Machine vision technology is paired with the spout cameras to calculate the smelt flow rate and a fouling index of each spout. The measurement results are sent to the Robot's PLC to prioritize cleaning of the spout that has highest urgency or that is rapidly fouling. Sudden high smelt flow quantity from an spout can be an

indicator of a smelt rush, when system can automatically close the hood doors to protect equipment and humans in the spout deck.



Smart Smelt Spout Robot does not only improve safety in the area but can lead to chemical savings and increase cost efficiency with additional measurements and automated features.





CONTACT US FOR MORE INFORMATION

Advancing autonomous operations is our vision and is becoming an integral part of industrial processes. ANDRITZ is at the forefront of this transformation, leveraging digital innovations along with deep operational and technical expertise to improve process efficiency, quality management, and production reliability and availability.

We focus on developing autonomous pulp mills and process optimization, to support efficient and sustainable operations by combining automation, electrification, intelligent instrumentation, and digitalization to create measurable value throughout the full life cycle and the entire value-stream.

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