



AUTOMATION AND DIGITALIZATION SOLUTIONS FOR SMELT SPOUT DECK

ANDRITZ

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.

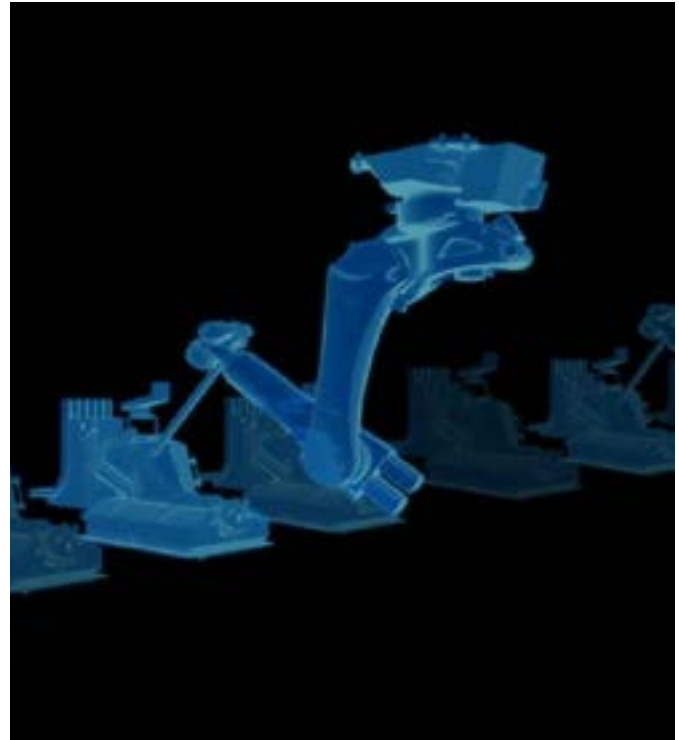
SAFETY AWARENESS IS PARAMOUNT IN MODERN PULP AND PAPER INDUSTRY

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 routinely clean the spouts. By cleaning the spouts manually, operators are in a direct line of fire for potential smelt exposure. Manual spout cleaning is a repetitive task that increases the risk of ergonomic injuries. Manual cleaning of the smelt spouts creates a risk for heat stroke due to the ambient temperatures of the environment, PPE requirements to work around the molten smelt, and the physical effort required to break-up debris.

OPERATIONAL EFFICIENCY

The non-contact cleaning feature of the robot eliminates the need for physical scraping of the spouts, which is currently done while cleaning manually. Reduced mechanical wear on the spouts ensures optimal spout lifetime. By maintaining consistent smelt flow, the robot reduces thermal cycling and mitigates thermal cracking – enhancing overall spout reliability. Cleaner spouts also contribute to greater stability in green liquor TTA. When paired with Smart Smelt Flow Measurement, the system intelligently targets the spouts that need cleaning most, helping to prevent blockages and avoid production losses.

Enhanced operator efficiency is another key benefit. Following the installation of the Smart Smelt Spout Robot, operators can focus on more value-added tasks like process troubleshooting and optimization. Improved job conditions also enhance operator retention by reducing job-related stress.



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.

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 the char bed in a 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 a spout can be an

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

AUTOMATED SHATTER JET ADJUSTER

A smelt water interaction causes water to go from a liquid phase to a vapor phase (steam); this expansion increases the volume by a factor of 1600x at standard pressures. Improve the safety and reliability around the dissolving tank by installing Automated Shatter Jet Adjusters. The shatter jet uses steam to break up the smelt stream into fine droplets, by dispersing the interaction of smelt/water interaction the mill is able to safely dissolve the molten smelt into a solution to form "green liquor". Equipping each shatter jet with a camera view and an actuator allows operators the ability to optimize the smelt shattering from a safe, remote location. The Automated Shatter Jet system also allows operators the ability to continuously monitor the cleanliness of the minihoods from the comfort of the control room.

AUTOMATED MINIHOOD DOORS

Improve smelt spout area safety by equipping the minihoods with automated doors.

ANDRITZ's automated hood doors use a pneumatic cylinder to open/close each door. When operators request access to the robot's work area to service the robot, the hood doors will automatically close to provide a physical barrier between the operators and the smelt stream.





CONTACT US FOR MORE INFORMATION

ANDRITZ is one of the leading global suppliers of systems, equipment and services for the pulp and paper industry. Your technology and service partner for the production of pulp, paper, tissue, and board – and in the generation of power from renewable resources.

NORTH AMERICA

ANDRITZ Inc.

p: +1 470 258 2082

automation.digitalization@andritz.com

ANDRITZ.COM



All data, information, statements, photographs and graphic illustrations in this leaflet are without any obligation and raise no liabilities to or form part of any sales contracts of ANDRITZ AG or any affiliates for equipment and/or systems referred to herein. © ANDRITZ AG 2024. All rights reserved. No part of this copyrighted work may be reproduced, modified or distributed in any form or by any means, or stored in any database or retrieval system, without the prior written permission of ANDRITZ AG or its affiliates. Any such unauthorized use for any purpose is a violation of the relevant copyright laws. ANDRITZ AG, Stattegger Strasse 18, 8045 Graz, Austria. Safety Solutions for Smelt Spout Brochure, 1/04.2025 EN

