



NETTINGSDORF WLA

MACHINE LEARNING IN WATER LEAKAGE DETECTION



A STORY FROM
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ANDRITZ

ENGINEERED SUCCESS

KEEPING IT SAFE

MACHINE LEARNING IN WATER LEAKAGE DETECTION

In the search for maximum safety in recovery boiler operation, ANDRITZ has developed its state-of-the-art Metris Water Leakage Advisor (WLA) to reduce the risk of explosions in the furnace of the boiler. Smurfit Kappa Nettingsdorf in Austria is the first mill to receive delivery of the WLA, and has been instrumental in the co-development of the new solution.

Safety is of major importance to ANDRITZ and its customers. A lot of work and resources have been invested in the development of autonomous solutions for improving safety in pulp mills. The recovery boiler is an area of particular concern as it bears the risk of large accidents as well as being an indispensable part of profitable production.

As part of the contract for its new recovery boiler, which started up in second part of 2020, Smurfit Kappa's Nettingsdorf mill received the first Metris WLA tool from ANDRITZ. The system has been developed to offer a simple yet effective tool to operators to support their decision making when dealing with suspected leaks in the recovery boiler and to improve capability of detecting leaks. Leaks left unnoticed can cause serious injury, or in the worst case, boiler explosion. There are several recorded cases where such explosions

have occurred, including fatalities, in the pulp industry globally.

The WLA tool is unique in the fact that it comes complete with machine learning that supports the traditional leakage detection methods. "Technically, the principle of the tool is measuring the mass balance of water and steam; this sounds basic, but it's very important," says Niki Lankila, Product Manager, Automation & Digitalization, ANDRITZ. "When monitoring incoming water and outgoing steam, the balance should add up close to zero to ensure that none of the elements are being lost.

"What sets the Metris WLA apart from other water leakage methods is the machine learning feature to detect unusual situations and cross-connections of the measurements. This is essential as it builds a model of the normal boiler operation condition. This princi-

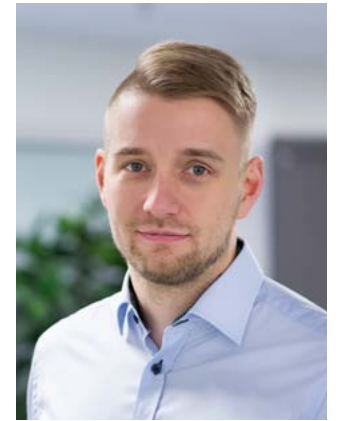
pal model status can then be used as a reference point for the operating condition of the recovery boiler. As well as the solution searching for leaks, machine learning enhances knowledge gained in boiler operation by using accumulated data to also search for signs of leaks by monitoring other parts of the process, for instance, the flue gas balance."

MUTUAL, PROACTIVE COLLABORATION

The WLA product initially delivered to the Smurfit Kappa's Nettingsdorf mill was based only on the traditional methods of searching for leaks, without the machine learning features. After the takeover of the boiler in 2020, ANDRITZ presented a proof-of-concept with machine learning technology to the Nettingsdorf recovery boiler management. It was agreed to set up a co-development and piloting program to bring the Metris WLA to life.

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Niki Lankila
Product Manager
Automation & Digitalization, ANDRITZ



"When we first received the WLA, although the information we were receiving from it was useful, there wasn't really enough information provided," says Walter Marchgraber, Pulp Mill Manager, Smurfit Kappa Nettingsdorf. "The system we have subsequently co-developed with ANDRITZ is now a completely different one."

Although the solution was initially functional, ANDRITZ wanted to develop it further to improve the everyday usability, which is why the collaboration with the Nettingsdorf mill was so important.

"The co-development and piloting stage was an amazing time for us at the mill," says Marchgraber. "To bring the ANDRITZ WLA experts together with the recovery boiler team was an excellent idea. These experts listened to all our needs and put into place almost all of the suggestions

we had to enable the solution to give us all the information we needed."

Lankila adds, "From the ANDRITZ point of view this was an excellent collaboration as we were approaching the development from two different angles; a company running a recovery boiler and a technology supplier. We took all Nettingsdorf's requirements into consideration, then implemented them to the system.

"After many meetings, calls, and inputs from the mill team, accompanied by a multitude of fine tuning and trials, we ended up with a very successful result that suits both parties."

A JOURNEY NOT JUST A DESTINATION

The result of the collaboration is the Metris WLA, which uses standard instrumentation in the recovery boiler enhanced with

modern machine learning tools to detect possible leaks. Operators have one all-inclusive display to check all relevant data connected with the boiler's water and steam system, which improves the capabilities to detect even the smallest leaks and will alarm operators in case a leak is suspected.

"This has been a journey and not just a destination," concludes Marchgraber "The way the WLA system reported when first delivered to Nettingsdorf was completely transformed after this close collaboration between ANDRITZ experts and the mill operators. We now have a system that fully suits our needs, and one that gives us much more confidence when it comes to possible leaks."

The new Metris WLA system from ANDRITZ is available for all new and existing recovery boilers.

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Walter Marchberger
Pulp Mill Manager
Smurfit Kappa Nettingsdorf



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