PICTURE THIS:

CRITICAL DATA FROM LIVE FEED IN THE RECOVERY BOILER

Recovery boiler sample taken with Metris AVA

ANDRITZ has utilized visual technology, combined it with the latest in digitization methods and created the Metris AVA Recovery Boiler Toolbox, designed to revolutionize the monitoring and managing of critical boiler operations and activities.

The concept sounds quite simple; have a live video feed from various recovery boiler operations and analyze the images to enable smooth operation. But the Metris AVA Recovery Boiler Toolbox goes much further than that – which is where the real beauty of the new concept lies. The five tools in the box analyze images and spot potential problems using algorithms and then convert the information into usable numbers on a screen. This means operators can be warned of any potential problems, identify trends, and ensure the boiler

is operating to its maximum efficiency – all from images sent via existing installed cameras or even handheld phones and tablets.

There are already huge proven benefits with the implementation of the new technology, including personnel and mill safety, increased production, chemical use reduction, less maintenance costs, and increased availability of the recovery boiler.

The toolbox has been designed for simplicity of installation and operation. It is

an independent platform, either cloud-based or server-based at the mill that can be applied to operate in any recovery boiler to visually monitor five different essential activities during operation; carry-over, the char bed, liquor/fuel spray orientation, smelt flow, and smelt reduction.

SAFETY FIRST

As always with ANDRITZ equipment and technology, safety is first on the list of priorities.
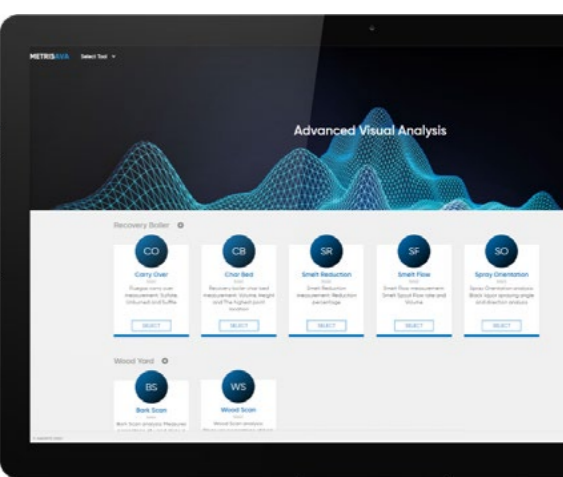
Heikki Lappalainen, Development Manager, ANDRITZ, says, "We have the digital technology, we have the process knowledge, and we know recovery boiler systems and equipment inside out. With AVA we have brought all these elements together to create a unique concept for efficient and safe running of recovery boilers both old and new.

"What we have now is a tool that can tell operators exactly what the situation is inside the recovery boiler, particularly in regard to safety issues. We are now able to measure, for instance, carry-over or when liquor or fuel spray are increasing, or when the char bed may collapse. The operator can now see all this information in numbers, on a screen, without the need to check the boiler itself manually when there might be a potentially hazardous situation."

The visual connection to the AVA platform not only acts as the 'eyes' in the recovery boiler hot spots, it also intelligently reports back on the exact situation. Jarkko Brunou, Head of Business Development, ANDRITZ Warkaus Works, adds, "This is a totally new approach to safety of the recovery boiler, you still have the eyes through the visual connection, but you also have the analysis and information that allows decision making to take place remotely."
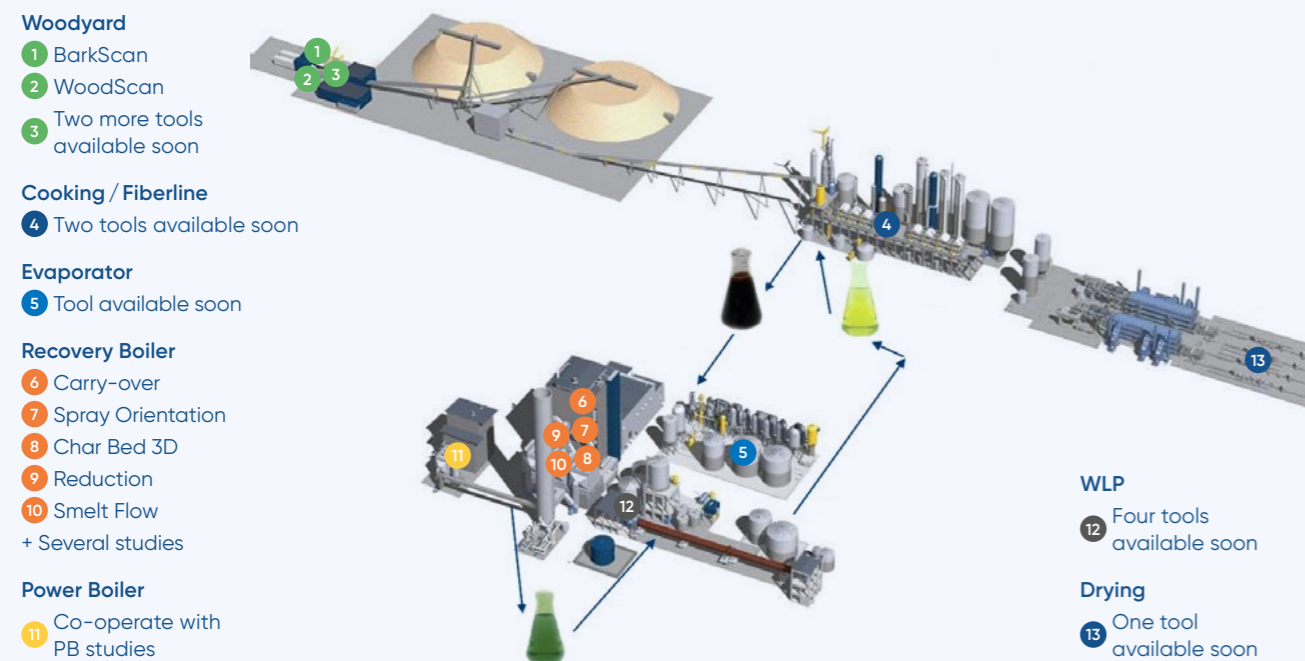
COMPLETE RANGE OF METRIS AVA TOOLS FOR PULP MILLS

As well as the toolbox for recovery boilers, ANDRITZ has also developed Metris AVA technology for other key areas of the pulp mills.

RECOVERY BOILERS – OFTEN THE BOTTLENECK IN PULP PRODUCTION

While safety is a key factor to the AVA concept for recovery boilers, when it comes to process optimization, it is the benefits that really attract attention. Lappalainen explains, "Number one in our customers' eye is, of course, safety, but the economical benefits of the AVA tools are huge. The visual technology, combined with intelligent reporting enables operators to see inside the process in a different way, making the

boiler much easier to tune and identify bottlenecks.

"This means first of all they can produce more pulp, but also they can increase steam production at the same time as recovering more chemicals."

Juho Nurmi, ANDRITZ Technical Specialist for AVA, adds, "When a recovery boiler is fine-tuned and operating at optimal efficiency, there is much less wear and tear on critical parts; for instance, if there is

Woodyard
1 BarkScan
2 WoodScan
3 Two more tools available soon

Cooking / Fiberline
4 Two tools available soon

Evaporator
5 Tool available soon

Recovery Boiler
6 Carry-over
7 Spray Orientation
8 Char Bed 3D
9 Reduction
10 Smelt Flow
+ Several studies

Power Boiler
11 Co-operate with PB studies

WLP
12 Four tools available soon

Drying
13 One tool available soon

less carry-over, or the combustion is better managed, there is much less need to stop and clean, which is obviously expensive when it comes to downtime.

FIVE TOOLS FOR ESSENTIAL ACTIVITIES BRING BIG RESULTS

Results so far indicate that the Metris AVA Recovery Boiler Toolbox is making a big difference at mills. A pulp mill in Finland took delivery of the first tool from ANDRITZ

in November 2018, with all five tools put into action by June 2019. It reports that the new measurements being derived from the images have resulted in a smoother operation and the mill has been able to keep the recovery boiler operating in the optimum range. The mill utilized its own cameras where possible and the algorithms were optimized at the beginning of the process, with ANDRITZ supporting activities closely since the installation.

Johanna Laaksonen, Project Manager, SYNERGY at ANDRITZ, concludes, "With Metris AVA we are focused on increasing the availability and steam production of the recovery boiler, and at the same time improving the chemical recovery. One of the ways we are doing this is by developing the recovery boiler's combustion and char bed control with the aim being to reduce fouling and plugging. Metris AVA enables operators to see properties not usually seen in recovery boiler operation in an objective way."

CONSTANT IMPROVEMENTS FOR LIFE-CYCLE MANAGED AVA SERVICE

"AVA software is designed with latest technologies, for instance, Kubernetes containers and AMQP messaging," says Metris AVA Solution Architect Tatu Liimatainen, Manager – Site Connections, Cyber Security Advisor P&P+SE, ANDRITZ. "This allows running the same Metris AVA code packages on-site or in the cloud independent of which platform. One of the AVA focus areas has been in DevOps, streamlining the agile development, building, testing, packaging, release, delivery, and monitoring process together with ANDRITZ Global Software development teams. AVA benefits from ANDRITZ global IT resources for infrastructure and services, for example, AzureAD as an authentication provider to ANDRITZ users and customers.

"Remote connection to the site is mandatory for enabling AVA updates, monitoring, and life-cycle services. As the Communication Center manages AVA deliveries and maintenance, the AVA setup to any existing pulp and paper customers is simple and straightforward and new connections are carried out following cyber-security standard IEC-62443. The benefit for the customer is that they receive a secure, life-cycle managed, and future proof solution that they can rely on in the production environment."

THE FIVE TOOLS IN THE METRIS AVA RECOVERY BOILER TOOLBOX

1 CARRY-OVER TOOL
Designed to measure flue gas particles and provide data to control liquor temperature and flow, sootblowing and air distribution. Analyzing the carry-over data, for example, increases availability and decreases emissions.

2 SPRAY ORIENTATION TOOL
Measures the liquor spray direction and opening angle from the liquor burner. It provides data to control carry-over, char bed location, and spray burner maintenance. Analyzing the data can improve chemical recovery, ensure longer spray burner lifetime, and balance char bed.

3 SMELT FLOW TOOL
Measures smelt volume and velocity, and gives numerical information for spout fouling and flashing. By analyzing the data from fuel supply, air distribution, spout cleaning and green liquor quality, safety and savings can be achieved.

4 CHAR BED TOOL
Creates 3D models from char bed and measures volume and highest points in order to provide data to control fuel supply and air distribution. By analyzing the data, the mill can improve safety and chemical recovery, balance combustion, and reduce carry-over.

5 SMELT REDUCTION TOOL
Designed for reduction efficiency measurement and provides data to control fuel supply, char bed, air distribution, and green liquor quality. Regular measurement of the smelt reduction can improve chemical recovery and reduce carry-over.

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