RECOVERY BOILER SAFETY THROUGH AUTOMATION

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RECOVERY BOILER SAFETY THROUGH AUTOMATION



- PLANT SAFETY LAYERS, PROCESS AND SAFETY AUTOMATION

- ENVIRONMENTAL SAFETY





- AUTOMATION SOLUTIONS FOR IMPROVED SAFETY

- CYBER SECURITY



PLANT SAFETY LAYERS

What are the building blocks for plant safety?

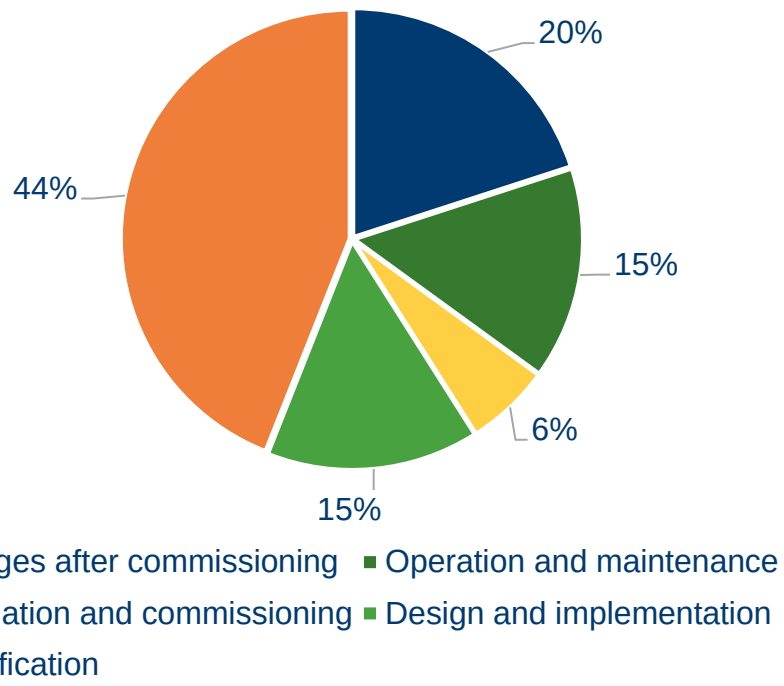
- Process control system & safety-related systems are parts of plant safety layers, that together form a total safety solution

- Community Response
- Emergency Response
- Physical Protection
- Automated Safety
- Alarms and Manual Intervention
- Basic Controls
- Design



LIFECYCLE PHASE EFFECT ON INCIDENTS

PRIMARY CAUSE BY LIFECYCLE PHASE



Source: “Health and Safety Executive UK: Out of control;
Why control systems go wrong and how to prevent failure”



PROCESS AND SRS LIFECYCLE PHASES

SPECIFICATION

- Risk identification, risk evaluation & functional description

DESIGN AND IMPLEMENTATION

- Design of reliable system
  - Equipment selection & system structure
  - Documentation

INSTALLATION & COMMISSIONING

- Installation quality
- Commissioning report & documentation updates
- System testing & training



PROCESS AND SRS LIFECYCLE PHASES

OPERATION AND MAINTENANCE

- Equipment maintenance
- Periodic testing
- Equipment replacement when needed
- Operator & maintenance training

CHANGES AFTER COMMISSIONING

- Change management & testing
  - Simulators as testing environment
- Operator & maintenance re-training



RECOVERY BOILER ENVIRONMENTAL SAFETY



	ANDRITZIN SOLUTIONS
EMISSIONS	CEMS systems Emission-free RB
SOLID & LIQUID WASTE	Waste handling Side streams
ENERGY & WATER CONSUMPTION	HERB solutions Process optimization

SUSTAINED VALUE THROUGH AUTOMATION AND DIGITALIZATION

PROCESS EFFICIENCY & OPTIMIZATION



- Capacity
- Reduction
- Steam economy
- Emissions

AVAILABILITY & RELIABILITY



- Condition Monitoring
- Assets Availability
- Process availability
- Predictive maintenance

SUSTAINABILITY & SAFETY



- Energy and water consumption
- Emissions
- Waste management
- Safety of operations
- Equipment safety

DATA MANAGEMENT & ANALYTICS



- Data management
- Data collection
- Data-driven decision-making
- Root cause detection

CYBER SECURITY



- Cyber-secure solutions
- OT network monitoring
- Cyber security culture
- Secure remote connection

AUTONOMY

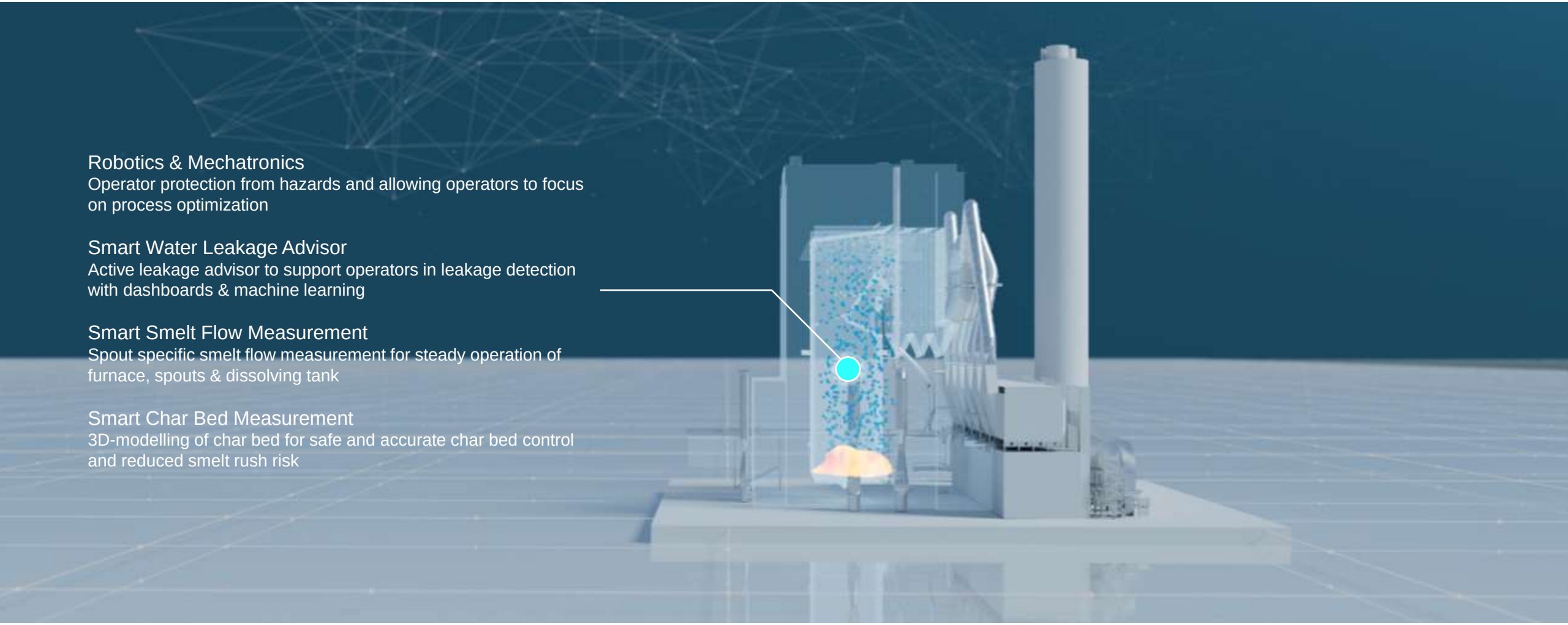


- Decreasing variability
- Autonomy as a response to the lack of workforce
- Automatically reacting process
- Process monitoring

Life Cycle Services

To sustain and further improve value over time

AUTOMATION SOLUTIONS FOR IMPROVED SAFETY



Robotics & Mechatronics
Operator protection from hazards and allowing operators to focus on process optimization

Smart Water Leakage Advisor
Active leakage advisor to support operators in leakage detection with dashboards & machine learning

Smart Smelt Flow Measurement
Spout specific smelt flow measurement for steady operation of furnace, spouts & dissolving tank

Smart Char Bed Measurement
3D-modelling of char bed for safe and accurate char bed control and reduced smelt rush risk

AUTOMATION SOLUTIONS FOR IMPROVED SAFETY



	ANDRITZIN SOLUTIONS
SMELT SPOUTS • Smelt rushes • Hazards related to dissolving tank	SMART SMELT SPOUT ROBOTS
LIQUOR BURNER OPENINGS • Liquor burner replacement • Opening cleaning	SMART BLACK LIQUOR RACK
WATER LEAKS • Risk of smelt water explosion • Active leakage detection as assistant	SMART WATER LEAKAGE ADVISOR

AUTOMATION SOLUTIONS FOR IMPROVED SAFETY

SMART CHAR BED MEASUREMENT

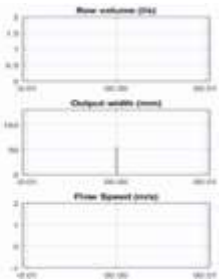
- Char bed measurement from furnace cameras
  - Char bed 3D-model, height & volume
  - Decision making & control based on numerical values, not subjective perception
  - Alarm limits for height and size of bed

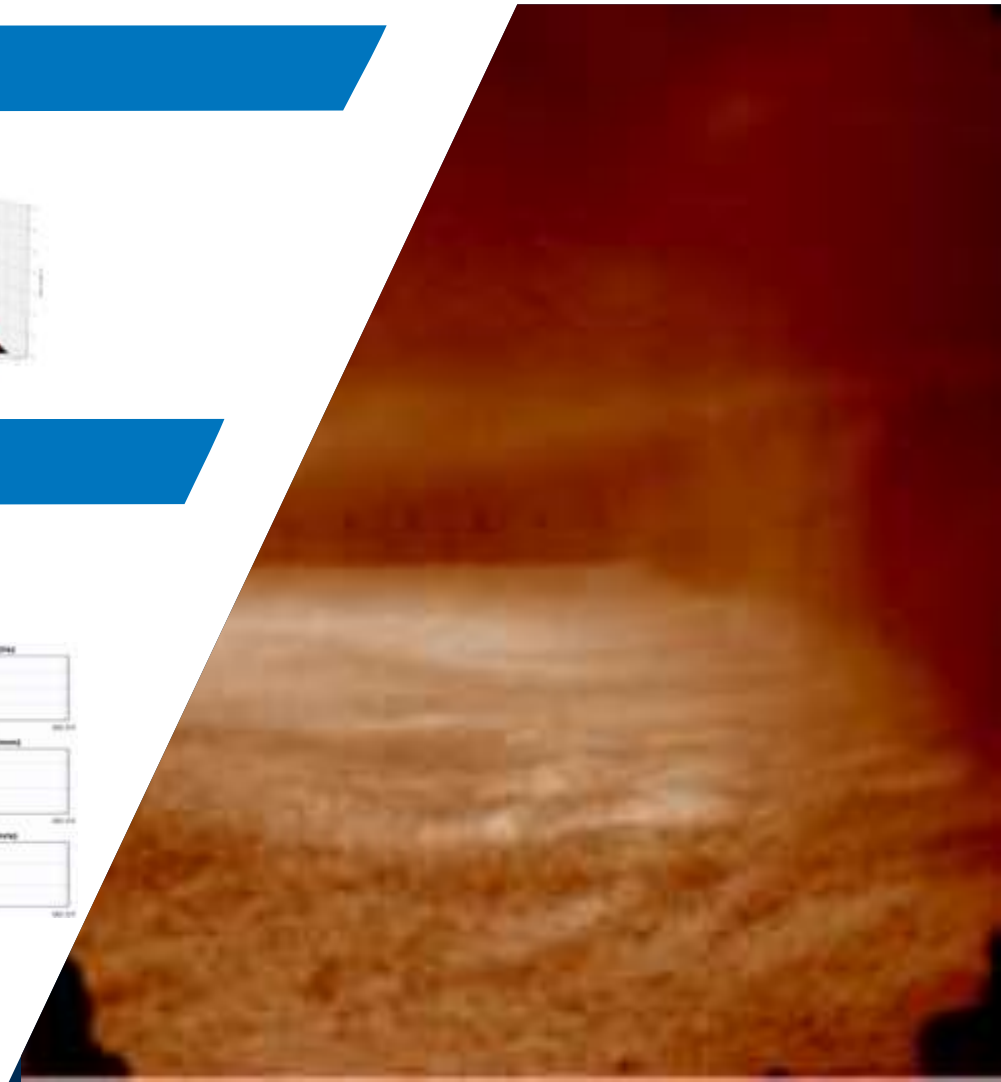


SMART SMELT FLOW MEASUREMENT

- Spout specific measurement of smelt flow
  - Spout specific volume flow & spout cleanness index
  - Smelt rush risk management related to poor flow
  - Spout cleaning need measurement
  - Smelt flow balance from furnace







CYBER SECURITY

Cyber security risks concern all of us

A. Cyber threats do not concern only ”IT”. It is also related to physical world

B. Cyber crime is a real threat that is present all time time
”Internet is always on”

C. Data protection and cyber threat related requirements and standards have developed significantly



CYBER SECURE PRODUCTS & BEHAVIOR

A Cyber security is related to whole lifecycle of a product

B Activation of only required features and accounts in all products and services

C Software updates to the latest versions



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