

INTEGRATED TEST & MEASUREMENT (ITM) SOOTBLOWER FOULING DETECTION (SFD) BLRBAC SPRING 2019

Presented by: ITM
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Integrated Test & Measurement (ITM)

Industrial Monitoring



- 18+ years of experience developing and installing boiler monitoring solutions

Testing Services



- In-Vehicle testing, data acquisition, condition monitoring, and product validation.

Structural Testing/Analysis



- Design validation, condition monitoring, consulting services



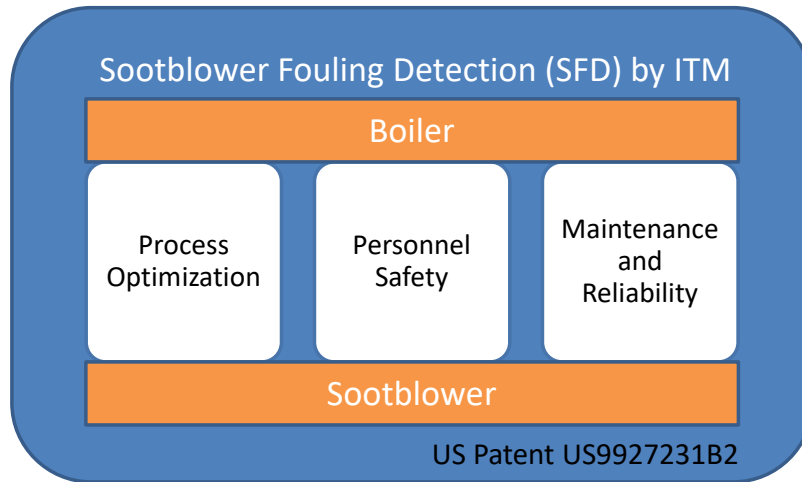
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Sootblower Fouling Detection (SFD) Monitoring Technology by ITM



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Sootblower Fouling Detection (SFD)

Process Optimization

- Fouling/Slagging along the path of a Sootblower
- Overall Boiler Fouling/Slagging
- SFD based Sootblower Optimization Strategy

Predictive Maintenance and Safety

- Mechanical Health of your Sootblower
- Sootblower Steam Quality (Flow, Condensate, etc.)
- Packing Leaks / Sootblower Safety
- Developing a data driven Sootblower Maintenance Strategy



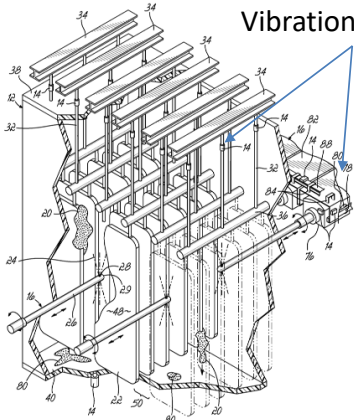
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SFD Dynamics



US Patent US9927231B2

- The SFD technology measures the Force/Response Energy Transfer between the sootblower jet and the boiler heat exchanger surfaces.
- The two most influential variables are **boiler fouling** and **sootblower steam quality**.



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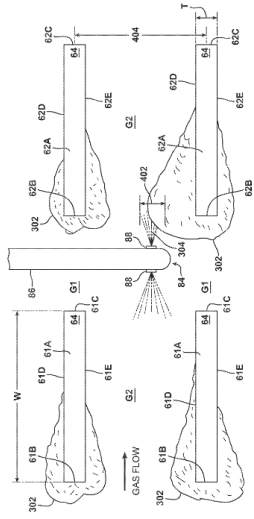
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SFD Operational Benefits

- Determine location of fouling
- Increase overall boiler efficiency
- Mitigate risk of plugging the boiler
- Decrease tube erosion
- Reduce tube failures due to sootblowing
- Optimize steam consumption



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Questions the SFD Addresses

- **Where is my fouling and slag building up in my boiler?**
- **Which sootblowers should I be running to remove slag buildup?**
- **Is my sootblower working correctly?**
- **Do I need to schedule service on a sootblower?**
- **My maintenance crew serviced a sootblower, did they fix it?**
- How can I prioritize my sootblower maintenance?
- Is my control valve working correctly?
- Which sootblowers have potential safety concerns due to packing leaks?
- Am I getting good steam flow?
- Do I have a condensate problem?
- What order can I run my sootblowers to minimize condensate in supply steam?
- Is my buildup localized or spread out along the sootblower path?
- Is my poppet valve leaking?
- Is my poppet valve stuck open?
- Is my poppet valve stuck closed?



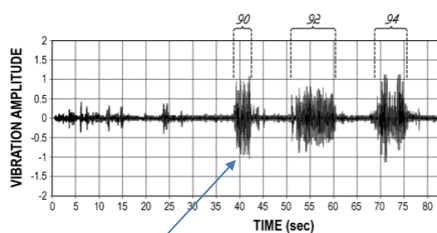
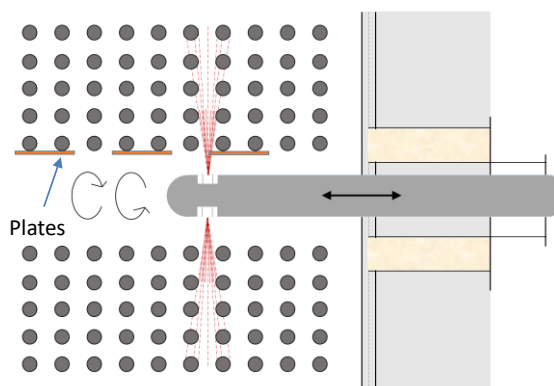
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SFD Fouling Detection Plate Test Validation



Reference ITM US Patent# US9927231B2

Plates



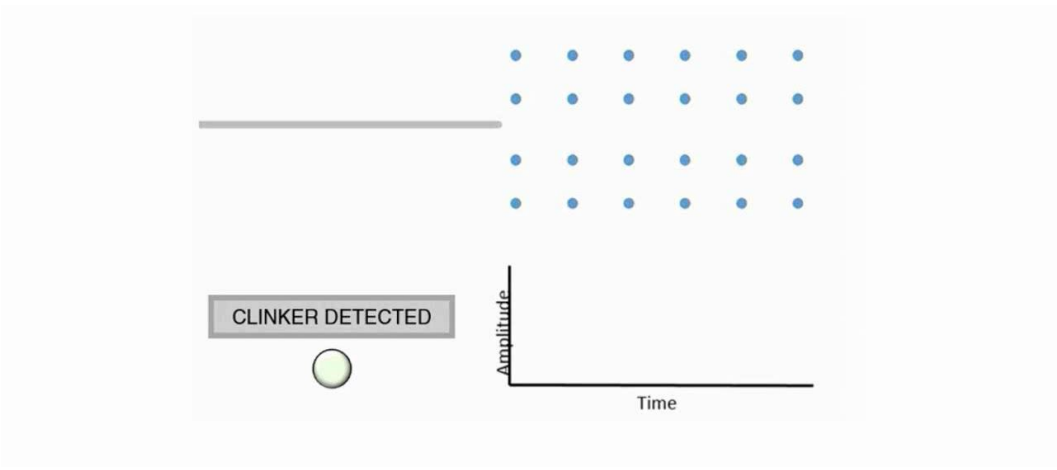
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SFD – Cleaning Optimization



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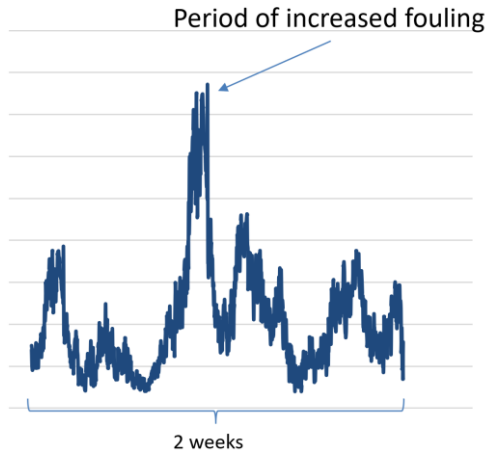
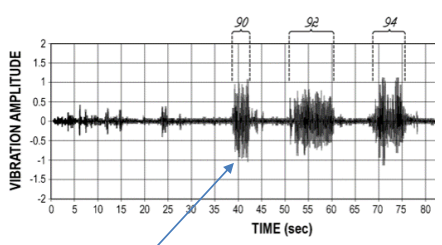
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SFD Sootblower Fouling Percent Above Threshold (PAT)

Sootblower Operation



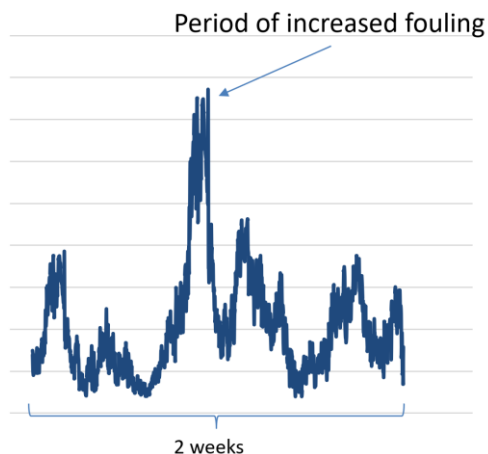
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SFD Sootblower Fouling (PAT)



- The Percent Above Threshold (PAT) is an indication of fouling along the path of the sootblower.
- The PAT is reported every time a sootblower operates.
- The PAT is used to calculate the Fouling Index (FI), which is used to prioritize sootblower operations. PI Tag naming convention:
UFL.[AssetName]_SFD_PAT_SB[#]



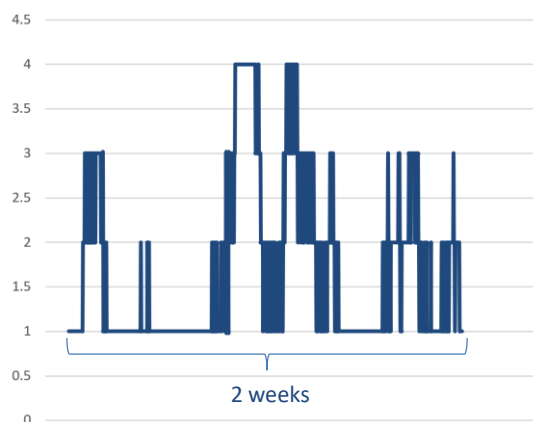
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Fouling Index (FI)



- The Fouling Index (FI) is calculated based on the PAT.
- FI = -2 : Disable SFD for that Sootblower-Maintenance required.
- FI = -1 : Disable SFD for that Sootblower
- FI = 0 : Decrease operations level 2
- FI = 1 : Decrease operations level 1
- FI = 2 : No change in sootblower operation count
- FI = 3 : Increase in operations level 1
- FI = 4 : Increase in operations level 2
- The FI is used by the sootblower control system to set the operating priority of the sootblowers. PI Tag naming convention:
UFL.[AssetName]_SFD_FI_SB[#]



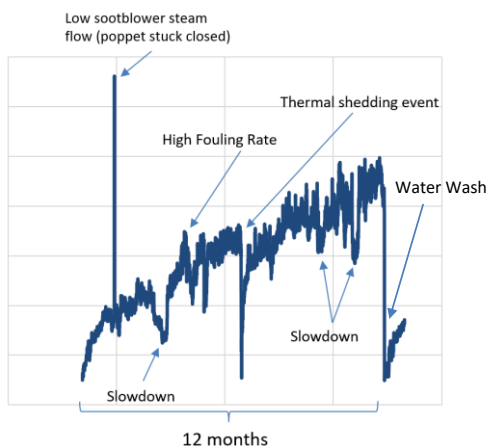
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Overall Fouling Indicator (OFI)



- The Overall Fouling Indicator (OFI) is a measure of fouling on the boiler areas stimulated by a specific sootblower.
- An increase in OFI indicates an increase in the fouling rate.
- A decrease in OFI indicates a decrease in the fouling rate.
- A significant increase or spike in OFI over a short period of time is a sign that the sootblower is running at a reduced flow rate.
- The PI Tag naming convention: UFL.[AssetName]_SFD_OFI_SB[#]



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SFD Safety and Maintenance Benefits

- Effective maintenance tool to alert operators of mechanical issues with:
 - Packing leaks
 - Wall rollers
 - Carriage rollers and tracks
 - Poppet valves
 - Supply steam issues



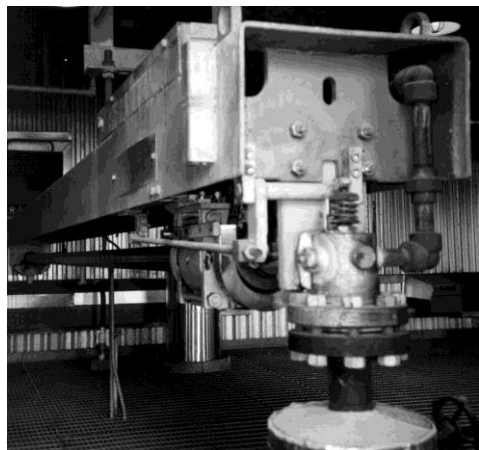
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Mechanical Fault Indicator(MFI)



- The Mechanical Fault Indicator (MFI) is an indication of the sootblowers mechanical condition (e.g. condition of gears, racks, rollers, wheels).
- The MFI is reported every time a sootblower operates.
- PI Tag naming convention: UFL.[AssetName]_SFD_MFI_SB[#]



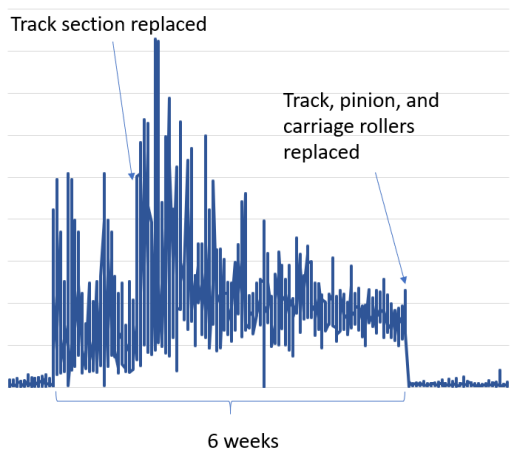
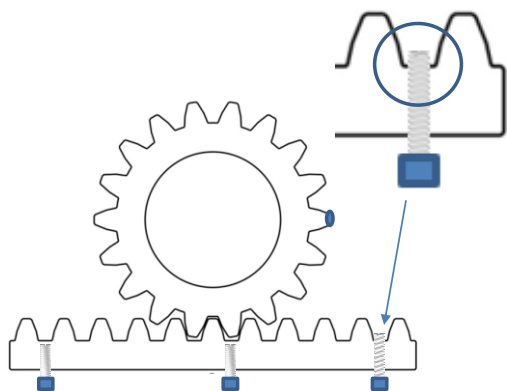
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Mechanical Fault Indicator (MFI) Practical Example



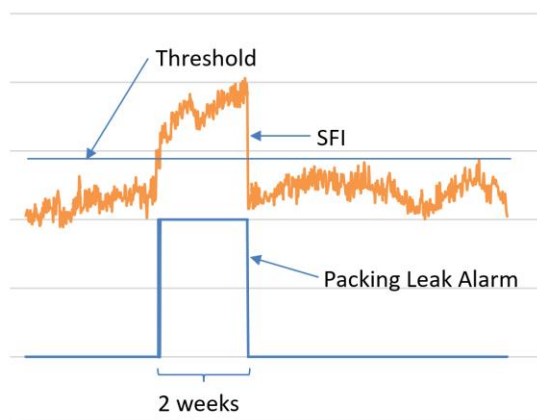
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Sootblower Steam Flow Indicator (SFI)



- The Sootblower Steam Flow Indicator (SFI) is an indication of sootblowers steam flow.
- The Packing Leak Alarm (PKLA) identifies steam leaks at the sootblower packing.
- The SFI and PKLA are reported every time a sootblower operates.
- The PKLA goes high when the SFI > threshold.
- PI Tag naming convention:
 UFL.[AssetName]_SFD_SFI_SB[#]
 UFL.[AssetName]_SFD_PKLA_SB[#]



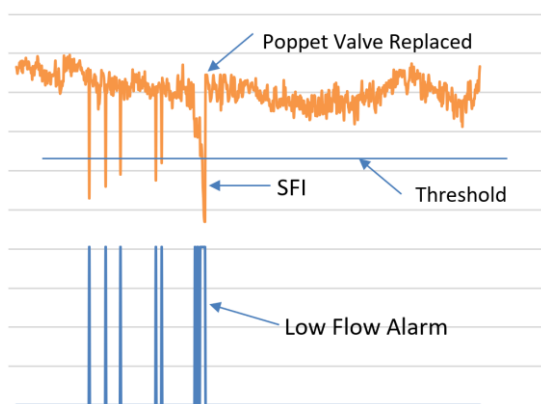
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Low Flow Alarm (LFA)



- The Low Flow Alarm (LFA) goes high when the SFI < threshold.
- The LFA identifies issues with sootblower poppet valves and the supply steam header control value.
- The LFA is reported every time a sootblower operates.
- PI Tag naming convention:
 UFL.[AssetName]_SFD_LFA_SB[#]



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SFD Predictive Maintenance Benefits

- Reduction in maintenance costs
- Reduction in labor costs by increasing efficiency of employee time
- Reduction in major sootblower failures
- Reduced downtime for repairs
- Increased service life of parts
- Verification of repairs
- Improve safety around sootblowers



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Potential Savings

- **Safety:** Packing leaks, sootblower lance stuck in boiler, tube erosion, lance failure.
- **Maintenance:** As with other assets at your mill a predictive maintenance strategy will increase uptime of the sootblower and reduce your maintenance cost.
- **Operation:** Potential steam savings of **1-4% MCR. 1-3 year ROI on steam savings alone.**



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Comments

- An SFD based sootblower optimization strategy adjusts sootblower priorities around your established sequencing baseline
- A healthy sootblower is an effective sootblower



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Next Steps

- Contact ITM
- Onsite visits and boiler audits
- Potential temporary pilot installation
- How can we help?



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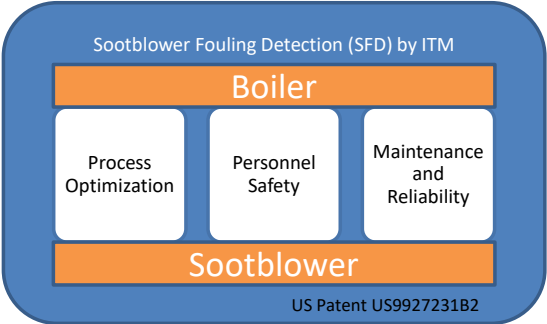
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Questions/Comments

- Any questions or comments?



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Contact Info



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