Sootblowing Best Practices for Energy Saving & Operational Cost Reduction

Western Regional Boiler Association 2014
Introduction to Our Group

Global Presence:
- 30 Divisions Worldwide
- Revenues > $500M

Clean Energy Solutions:
- AQCS
- Material Handling
- Combustion Control
- Air Gas Handling
- Boiler Cleaning

European Offices
- Clyde Bergemann GmbH, Wedel / Germany
- Clyde Bergemann Ltd., Glasgow / Scotland
- Clyde Bergemann Service GmbH, Grevenbroich / Germany
- Clyde Bergemann Forest SA, Waasberge / Belgium
- Clyde Bergemann Environmental Elements SRL Ltd., Burton-on-Trent / England
- Clyde Bergemann Eesti Ltd., Tallinn / Estonia
- Clyde Bergemann Materials Handling Doncaster / England
- Clyde Bergemann SPRCON GmbH, Weil / Germany
- Clyde Bergemann Scandinavia AB, Espos / Finland
- Clyde Bergemann Polska Sp. ZO, Bielsko-Biała / Poland

Asian Offices
- Shanghai Clyde Bergemann Machinery Company Ltd., Shanghai / China
- Clyde Bergemann Huating Ltd., Beijing / China
- Clyde Bergemann Beijing Energy & Environmental Technology Co. Ltd., Beijing / China
- Clyde Bergemann Maharashtra Renewable Energy Ltd., New Delhi / India

AMERICAS
- Clyde Bergemann Inc., Atlanta / GA-USA
- Clyde Bergemann Environmental Elements Corp., Baltimore / MD-USA
- Clyde Bergemann Material Handling, Baltimore / MD-USA
- Clyde Bergemann Canada Ltd., Ottawa, Ontario / Canada
- Anthony Ross Company, Beaverton / OR-USA
- Clyde Bergemann do Brasil Ltda., Mingiu Guaru / Brazil
- Customer Support Center, Atlanta / GA-USA
- Customer Support Center, Erie / PA-USA
- Customer Support Center, FL Collins / CO-USA
- Customer Support Center, Chicago / IL-USA
- Customer Support Center, Ottawa, Ontario / Canada
- Customer Support Center, Baltimore / MD-USA

Africa
- Clyde Bergemann South Africa (Pty) Ltd., Kya Sands / South Africa

Clyde Bergemann Companies  Clyde Bergemann Associates
Clyde Bergemann Power Group Americas

- Serving North and South America
- HQ located in Atlanta, GA
- Over 350 Employees
- 5 Regional Support Centers
- 39 Field Technicians
- 80 Local Sales Representatives
The Importance of Sootblowers

- Currently, your plant is utilizing outdated boiler cleaning technology, resulting in high maintenance costs, high parts costs and unreliable equipment.
Clyde Bergemann products will lower your cost of ownership, while improving your boiler cleaning and reliability.
Retractable Sootblower RS-H

- Top Access For Easy Maintenance
- Galvanized Housing
- NEMA 4X Junction Box
- CFEIII Nozzle
- Electrical P-Chain
- Single Limit Switch
- Infinity Carriage
- Externally Adjustable Poppet Valve
Externally Adjustable Poppet Valve

- Locking Tab
- Seat
- Plug
- On-Line Pressure Adjustment
- Pressure Control Disk
- ANSI Flange
Sootblower Carriage Assembly Design

- Clyde Bergemann: Balanced Design (Modular Construction)
- Other: Unbalanced Design (Single Housing Construction)
Sootblower Carriage Assembly Design

Seal Pack Packing Cartridge.

Separate gearbox and lower spindle housing.
Infinity Carriage

- **Competitive Advantages**
  - MaxPacking
    - Lasts 3-5 times longer than conventional packing
  - Permalube Bearings
    - Eliminates maintenance and failures associated with lubrication
  - High Strength Spindle Bearings
    - Offers longer life and greater robustness
  - Extended Warranty
    - Warranty is extended from 1 to 5 years
Infinity Carriage Lower Spindle Housing

Permalube Bearings

Seal Pack
Equipped with MaxPacking

High Strength Bushings
MaxPacking

- Lasts a minimum of 3-5 times as long as conventional packing
- No need to retention after installation
- Lower labor and material costs

![Diagram of MaxPacking with labels:
- Quick Change Cartridge
- Proprietary Packing Material
- Constant Tension Springs]
Sootblower Electrical Components
Sootblower Electrical Components

- P-Chain Cable Carrier.
- Single Travelling Limit Switch.
CFE Nozzle

Upstream Nozzle

Downstream Nozzle

CFE III
Experimental Measurements were conducted at Combustion Laboratory, Dept. of Aeronautical Engineering, Georgia Institute of Technology to measure the PIP performance of CFE III Nozzles.

The test was witnessed by:

- International Paper Selma, USA
CFE III vs Conventional Nozzle

IDEAL NOZZLE
(100% Efficiency)

CFE III Nozzle

Conventional Nozzle

P_Nozzle (psig)
P_IP (psig)
## Summary

<table>
<thead>
<tr>
<th>STANDARD FEATURE</th>
<th>CUSTOMER BENEFIT</th>
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<tbody>
<tr>
<td>Balanced Drive Carriage</td>
<td>✓ Eliminates oil leaks and pinion failures in “handed” carriages</td>
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<td></td>
<td>✓ Eliminates excessive rack wear due to uneven load distribution</td>
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<tr>
<td></td>
<td>✓ Reduces number of spare parts needed</td>
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<tr>
<td>Modular Drive Carriage</td>
<td>✓ Shortens gearbox removal from 4 hours to less than 1 hour</td>
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<tr>
<td></td>
<td>✓ Easy removal of gearbox, without removing lance or feed tube</td>
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<tr>
<td></td>
<td>✓ Extends service life due to reduction of heat transfer to gears</td>
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<tr>
<td>SealPack™ System</td>
<td>✓ Extends packing life</td>
</tr>
<tr>
<td></td>
<td>✓ Reduces packing replacement time</td>
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<tr>
<td>Externally Adjustable Poppet Valve</td>
<td>✓ Allows for easy On-line pressure adjustment</td>
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<td></td>
<td>✓ Eliminates safety issues and lock-out/tag-out requirements</td>
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<tr>
<td>Hot-Dipped Galvanized Housing</td>
<td>✓ Superior corrosion resistance</td>
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<tr>
<td></td>
<td>✓ Lifetime warranty</td>
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<tr>
<td>CFEIII Nozzle</td>
<td>✓ Reduces blowing media consumption, while maintaining cleaning power</td>
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<tr>
<td>Single Limit Switch</td>
<td>✓ Eliminates failure prone fixed limit switches</td>
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