



Building Leadership Excellence



Novel Press Fabric Cleaning Method Increases Productivity in a Sustainable Manner



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RETHINK PAPER:
Lean and Green

Agenda

- Traditional Press Fabric Cleaning
- Pulsed Cleaning Methods Comparison
- Case Studies



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Key “Takeaway” Points

- Every mill should expect press fabric cleaning to provide a measurable Return On Investment
 - Machine Efficiency
 - Increased Production
 - Lower machine operational cost
 - Improved ecological footprint
- The new “pulsed” method of press fabric cleaning has been demonstrated to increase productivity, lower costs, while providing ecological benefits



Impact of Press Fabric Contamination

- Degraded water transport
- Increased MD& CD moisture variability
- Decreased energy efficiency
- Increased pick-out and break rate
- Sheet quality issues
- Shorter clothing life



Eco-efficient Press Felt Cleaning Objectives

- Eco-efficiency in the Paper Industry
 - Seeking sustainable ecological improvements with parallel economic benefits
- Produce more tonnage with same inputs
 - Maintain press stability and performance
 - Reduced press breaks
- Maximize press efficiency
 - Reduces energy use in dryers
- Eliminate unnecessary showers
 - Heated water savings
- Optimum chemical cleaning efficiency with reduced effluent impact



Traditional Press Fabric Cleaning Methods

- Continuous Conditioning / Cleaning
 - Low concentration application continually to fabrics
 - Typically via lower pressure dedicated or Uhle box fan spray showers
- Batch on the Run
 - Intermittent application of higher concentrations than continuous
 - Typically via dedicated low pressure fan spray showers
- Downtime batch cleaning
 - Higher concentration cleaning
 - Applied when the machine is not producing paper



Deficiencies of Continuous Press Fabric Cleaning

- Uses an excess of cleaning chemistries in an inefficient manner
- Often fails to reach optimum “threshold” cleaning chemistry concentrations.
- May fail to consider:
 - Shower and resident press water buffering and dilution
 - Application time and fabric coverage are per minute
- Increases use of shower water inputs (capital costs, filtering, effluent handling & heat energy)



Deficiencies of Downtime & On-the-Run Batch Press Fabric Cleaning

Batch on-the-run cleaning

- Press stability and water removal during cleaning issues
- Increased shower water use (water, energy, system maintenance)
- Worker safety during cleaning events

Downtime batch cleaning

- Lost production up-time, press performance stability issues
- Does not provide for consistent press conditions
- Increased risk to equipment, worker safety and process impact



NEW METHOD OF “PULSED” PRESS FABRIC CLEANING

- New patented method trademarked as “DuPulse®”
- Addresses limitations of traditional press fabric cleaning methods
- Provides advantages in productivity
- Ecological advantages - water & energy savings.
- Greater total ROI than traditional fabric cleaning



Pulsed Press Fabric Cleaning

- Intermittent feed through existing high pressure needle shower
- Cleans only small sections of the fabric at one moment for press stability
- Can economically achieve more optimum threshold cleaning concentrations



Pulsed Chemical Cleaning Advantages

- Press hydraulic and web dewatering stability
 - Improved runnability during cleaning events
- More effective at reaching threshold cleaning concentration
 - H.P. Needle showers (40 thou. Dia. On 6" centers) covers 150 times less fabric surface area/minute than fan showers
- Can utilize chemistries in combination to optimize soil removal
 - Acids, solvents, oxidizers, alkalis
- Mechanical and chemical cleaning synergy
 - H.P. Needle shower mechanical energy
 - Cleaning chemistry



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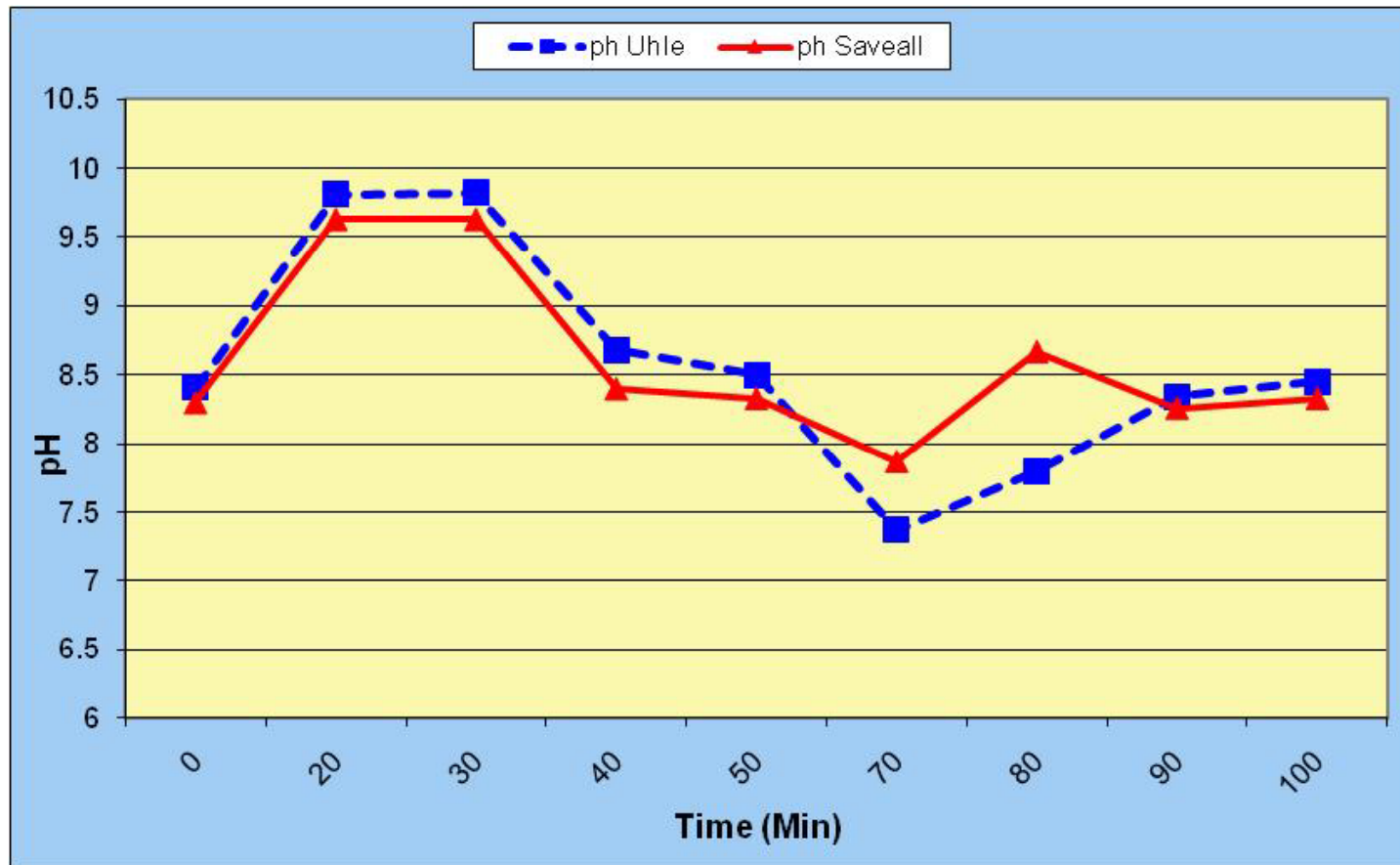
Importance of Press Stability in Fabric Cleaning

- Variability in the press section hydraulic stability can impact sheet quality and break rates.
- Cleaning chemistries applied over entire fabric surface
 - Can impede water transport during cleaning events, producing press instability.
 - Cause pH swings
 - Cause fines trapped in the press fabric can swell from high pH and impede water transport
- Press fabric performance and water removal uniformity is enhanced by a contaminant control strategy that employs more frequent, less chemically intense applications.



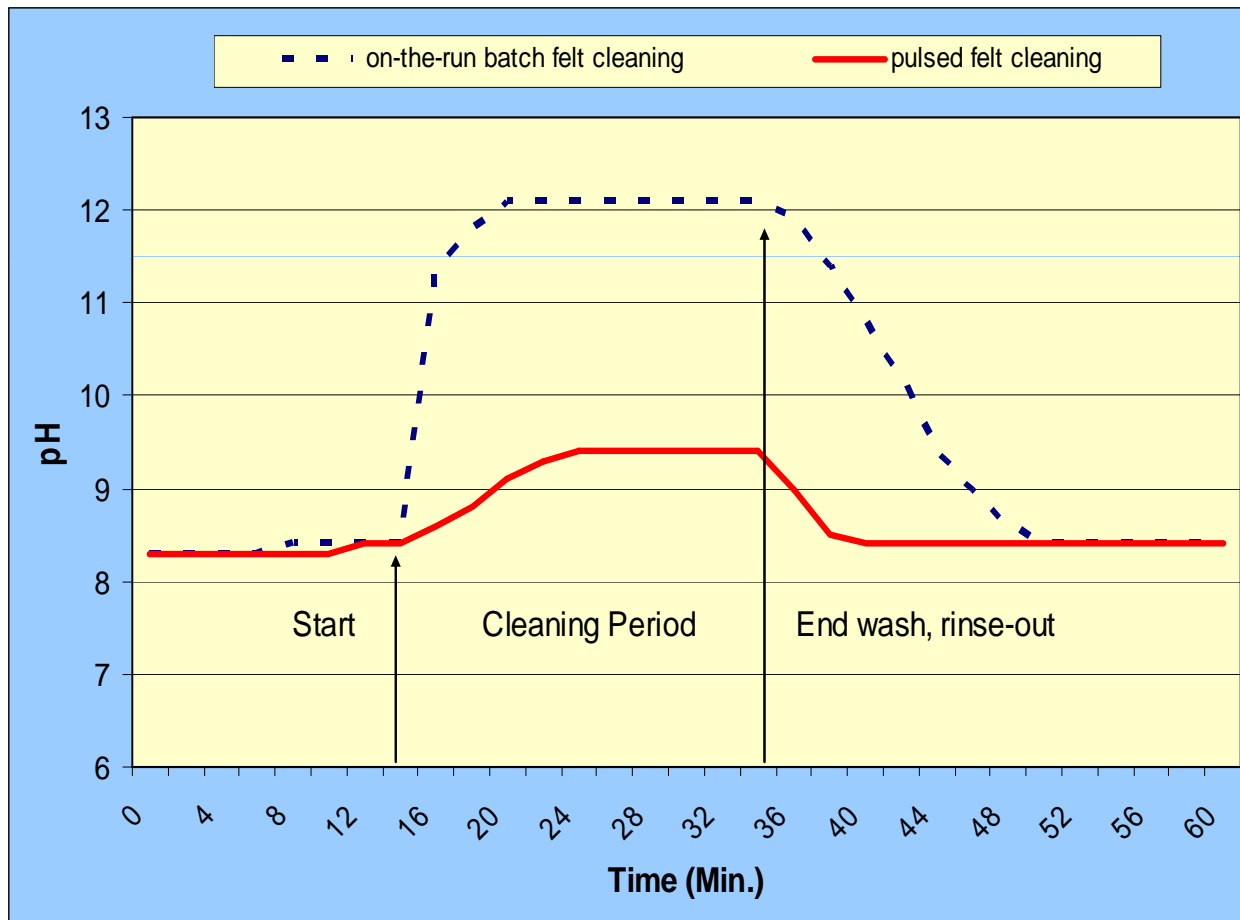
Impact of Press Fabric Pulsed Cleaning on pH

Alkaline and Acid Cleaning Events



Press Filtrate pH Impact

Pulsed Cleaning compared to Batch-on-the-Fly



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Importance of Achieving Threshold Chemical Cleaning Concentrations

Continuous Felt Cleaning Limitation Example

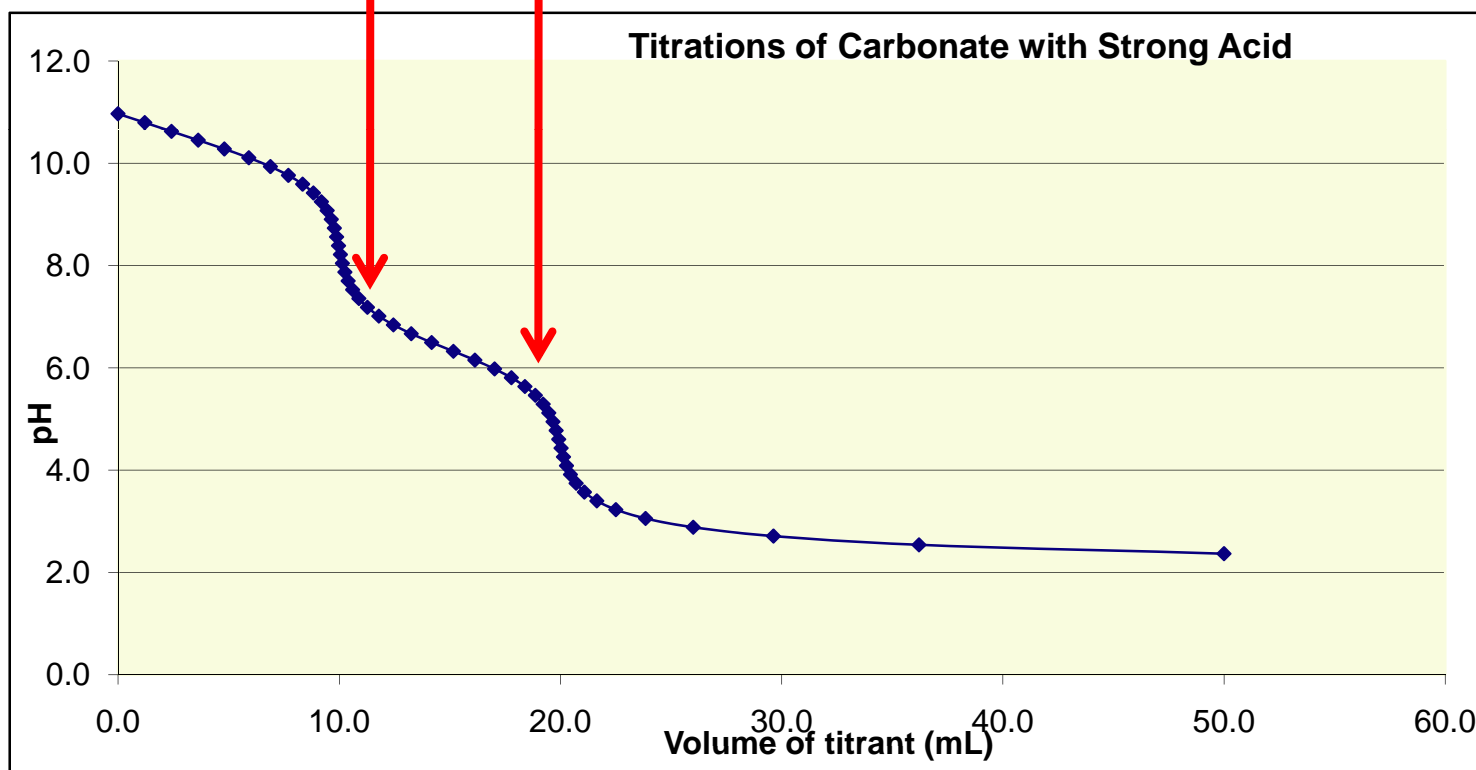
- Example: Acidify Calcium Carbonate Deposits
 - 200 ppm Ca hardness in shower water
 - pH 7.8 white water
 - High carbonate contaminant levels in the felt
- Requirements for cleaning
 - 1st enough acid to overcome hardness and alkalinity in shower water and water in the felt (300-800 ppm)
 - 2nd enough additional acid to lower pH in press fabric and react with free carbonate (200 ppm depending on buffering)
- May need up to 600-1200 ppm acidic cleaning chemistry in the press fabric structure before any deposit cleaning begins



Cleaning of Carbonate Based Deposits

Removal of Background
Carbonate Here

Cleaning Starts Here



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Application set-up by Fabric Position

- All aspect of pulsed cleaning via needle shower should be tailored to specific felt position need
 - Number of cleaning events / day
 - Cleaning event duration
 - Chemical concentration
 - Chemistry
- Benefits
 - Improved results
 - Lower cost

SETUP SELECTION MENU 1			
DPAL Auto Start Menu	DPAL Timers	DPAL Pump Speeds	DPAL Counters
DPAC Auto Start Menu	DPAC Timers	DPAC Pump Speeds	DPAC Counters
DTAL & Misc.	Password Clock & Contrast	Startup Control	RETURN



Comparison of Press Fabric Cleaning Method

Method	Continuous	Batch on-the-run	D.T. Batch	Pulsed
Application	Fan or Needle Shower	Fan Shower	Fan Shower	Needle Shower
Press Stability	Better	Lower	Lower (Downtime used)	Better
Mechanical Energy	Lower	Lower	Lower	Better
Cost to Reach Threshold Cleaning Concentration	Higher	Higher	Better	Better
Soil Prevention	Better	Lower	Lower	Better
Removes Accumulated Soils	Lower	Better	Better	Better



Case History

Midwest Printing and Writing Machine

Problem

- Poor press stability during batch on-the-run felt washing.
- Insufficient cleaning resulted in poor press felt de-watering performance
- The mill was interested in improved safety around the machine press section.



ROI Calculation

Key Process Savings	Results	Value
Defect/Rejects Saving	12 tons/yr	\$2,460
Production Savings from Reduced Breaks	864 min/yr	\$79,950
Production Savings from Reduced Batch Washing	720 min/yr	\$66,625
Production Savings from increased Speed	965 tons/yr	\$197,896
Press Water Savings (Heated Water)	1.8M gal/yr	\$8,503
Dryer Steam Savings	6.1M lbs/yr	\$24,461
Increased Fabric Life Savings	2.7 felts/yr	\$79,787
Total Returned Value		\$459,683
Net Return on Investment (%)		222%

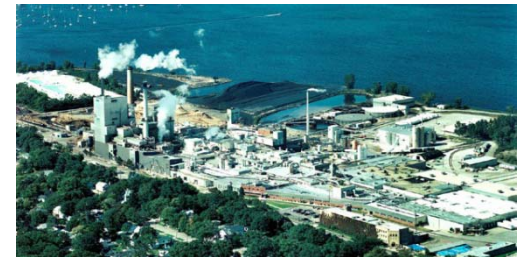


Case History

Midwest Coated Free Sheet Machine

Problem

- Experiencing poor press dewatering
- Relatively short felt life
- The mill was interested in improved safety around the machine press section.



ROI Calculation

Key Process Savings	Program Results	Value
Production Savings from Reduced Breaks	360 min/yr	\$19,113
Production Savings from Reduced Batch Washing	720 min/yr	\$38,225
Production Savings from increased Speed	931 tons/yr	\$161,790
Press Water Savings (Heated Water)	18.1M gal/yr	\$90,702
Dryer Steam Savings	13.4M lbs/yr	\$67,200
Increased Fabric Life Savings	2.7 felts/yr	\$66,489
Total Returned Value		\$443,518
Net Return on Investment (%)		493%



Conclusion

- Rethinking press fabric deposit control program to help meet continuous improvement goals
- Every mill should audit their current press fabric cleaning strategy to provide a measurable Return On Investment baseline for that program
- Investigate the potential of new chemical cleaning strategies such as the pulsed method to provide increased productivity, lower costs, while delivering superior ecological benefits

