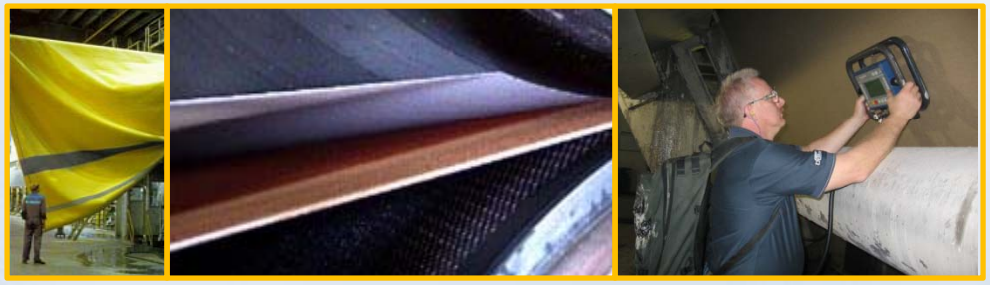
Better Machine Profitability using DuPulse® Press Fabric Cleaning

DuBois
Sustainable Cleaning Solutions



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Cost & Energy Savings from Effective Felt Cleaning

- Efficient press section operation is a key to improving productivity and lower operating costs
- Effective felt cleaning should provide at least a **2-5X return** with an effective program and technical support
- Press Felt Cleaning should provide sustainability benefits
  - Energy Savings
  - Water Savings

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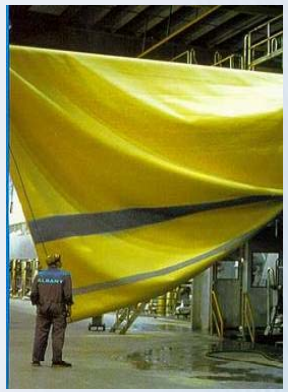
Press Fabric Cleaning Cost & Energy Savings

- Higher sheet solids entering the dryers
- Increased average machine speed
- Eliminate dedicated felt cleaning showers
  - Less water applied to the press
  - Eliminates energy used to heat that shower water
- Reduce sheet break & defects
  - Increases tonnage
  - Fewer culls, rejects
- Eliminate or reduce down-time batch felt washing
  - productivity gains
- Increase Felt Life



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Traditional Press Fabric Cleaning

Continuous Conditioning / Cleaning

- Low concentration application continually to fabrics
- Limitations
  - High chemical cost for marginal results.
  - May fail to reach threshold product concentration for effective cleaning
  - Often utilizes dedicated showers

Batch on the Run

- Intermittent application at higher concentrations than continuous cleaning
- Limitations
  - Can upset machine chemistry or inhibit felt water transport during cleaning
  - Reduced overall press stability during cleaning
  - Often utilizes dedicated showers
  - Safety

Downtime Batch Cleaning

- Higher concentration cleaning during downtime
- Limitations
  - Decrease uptime
  - Performance variability between cleanings

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Press Stable Felt Cleaning Method

- Unique method of felt cleaning with patents issued in 2009, 2010, and 2011
- Utilizes H.P. needle showers to deliver cleaning chemistries during normal paper production
- Achieves effective concentrations only in small sections of the felt
  - Press section stability
  - No effects of gross chemical addition to entire felt
- Concentration only a fraction of a percent
- Mechanical & chemical cleaning synergy

U.S. Patent # 7,597,782, 7,850,824, 7,918,968

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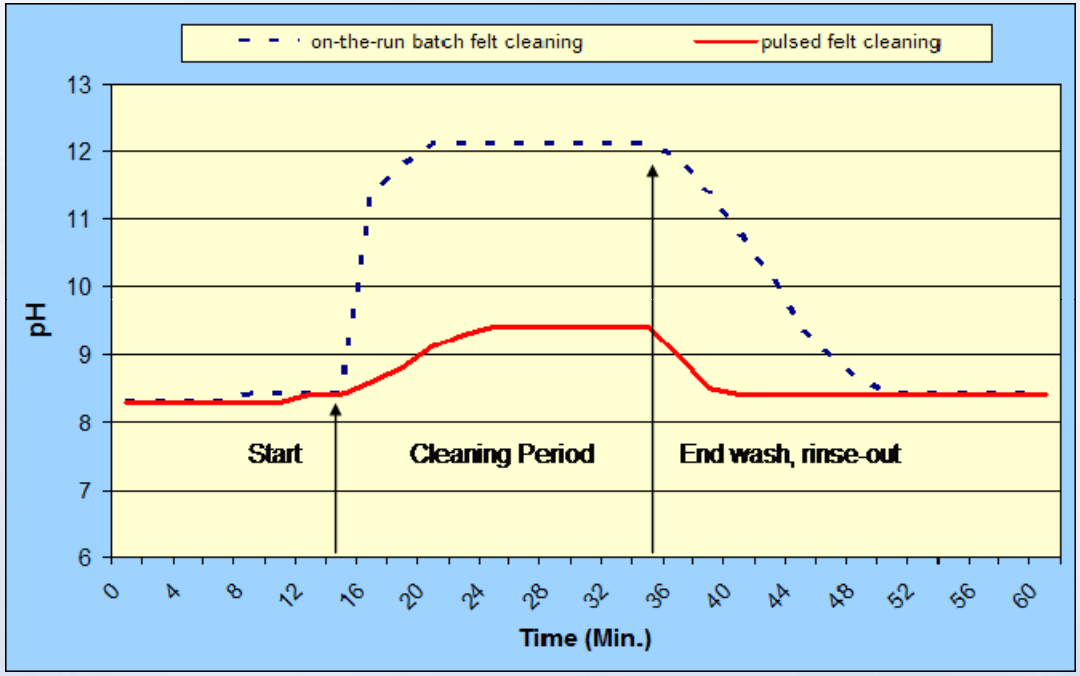
Press Stability

- Press stability
  - Cleans only small sections of the fabric at one moment
- No large pH swings
- Safety benefits for workers in the area



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DuPulse Equipment

- Skid mounted stand alone unit
- Automated control with remote operator touch screen interface
- Application customized by felt position

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DuPulse 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.

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DuPulse Case History

Midwest Printing and Writing Machine Results

- Total productivity gains of $ 252,000/yr
- Production
  - 0.4% average machine speed gain
  - 15% break reduction
- Sheet solids into dryers increased 1.3%
- 6.1 million lbs/yr steam.
- Press water load reduction
  - 1.9 million gal/yr saved
  - 944 million BTU's saved
- Safety
  - chemical concentrations were 7-8 times lower.

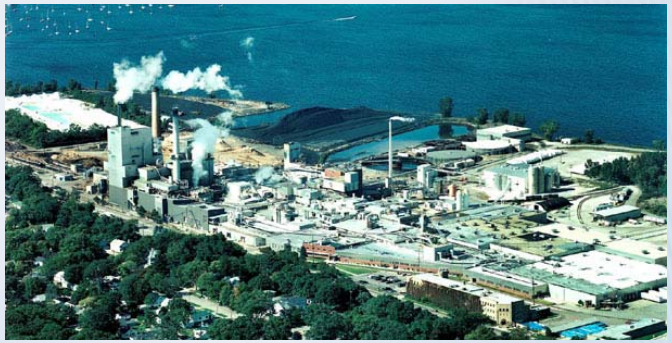
Key Process Savings	**DuPulse Program Result**
Defect/Rejects Saving	$2,460
Production Savings from Reduced Breaks	$79,950
Production Savings from Reduced Batch Wasing	$66,625
Production Savings from increased Speed	$197,896
Press Water Savings	$8,503
Dryer Steam Savings	$24,461
Increased Felt Life Savings	$79,787
Total Returned Value	$459,683
Annual Felt Cleaning Cost	$207,228
Net Annual ROI	**$252,455**
ROI Percentage	**222%**

DuPulse Case History

Midwest Coated Free Sheet Machine

Problem

- Experiencing poor press dewatering
- Relatively short felt life
- Interested in improved safety around the machine press section.



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DuPulse Case History

Midwest Coated Free Sheet Machine Results

- Total productivity gains of $ 353,000/yr
- Production
  - 0.6% average machine speed increase
  - 5% reduction in breaks
- Sheet solids
  - Increased 2% (from 42.3 to 44.3%)
  - 13.4 million lb/yr steam
- Press water load reduction
  - Felt cleaning shower eliminated
  - 18 million gal/yr
  - 9,000 million BTU/yr
- Average Felt Life
  - Increased by 5 days

Key Process Savings	DuPulse Program Result
Production Savings from Reduced Breaks	$19,113
Production Savings from Reduced Batch Washing	$38,225
Production Savings from increased Speed	$161,790
Press Water Savings	$90,702
Dryer Steam Savings	$67,200
Increased Felt Life Savings	$66,489
Total Returned Value	$443,518
Total Annual Felt Cleaning Cost	$90,020
Net Annual ROI	**$353,498**
ROI Percentage	**493%**

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Conclusion

DuBois
Sustainable Cleaning Solutions

- Effective Press Felt Cleaning is a means to:
  - increase productivity
  - reduce operational cost
  - reduce energy use, and water needs
- Felt cleaning ROI should be documented & the program should be set-up to maximize return.
- Effective felt cleaning should provide at least 2-5 times it's cost in total return
- DuPulse provides a unique method to provide a substantial ROI and energy savings

DuPulse System on Display in DuBois Booth # **322**

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