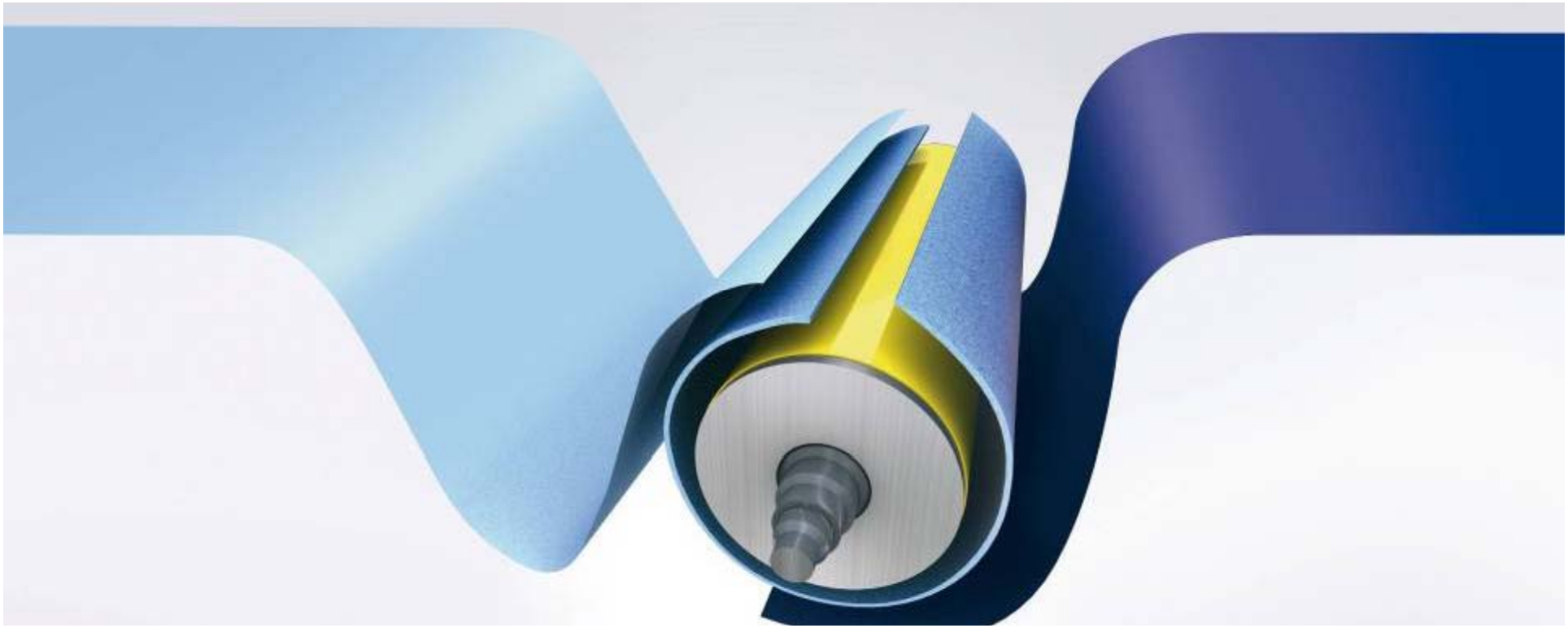
May 1-4
PaperCon 2011

VOITH

How to Manage Clothing to Optimize Machine Performance

May 3, 2011



Clothing Management Strategies to Optimize Paper Machine Performance

- Optimize performance of existing fabric and equipment
- Evaluate new fabric technology to improve machine performance

Paper Machine audit and optimization programs for best asset utilization and performance

Determine improvement opportunities

Establish a baseline for rebuilds

Optimize Paper Machine Performance

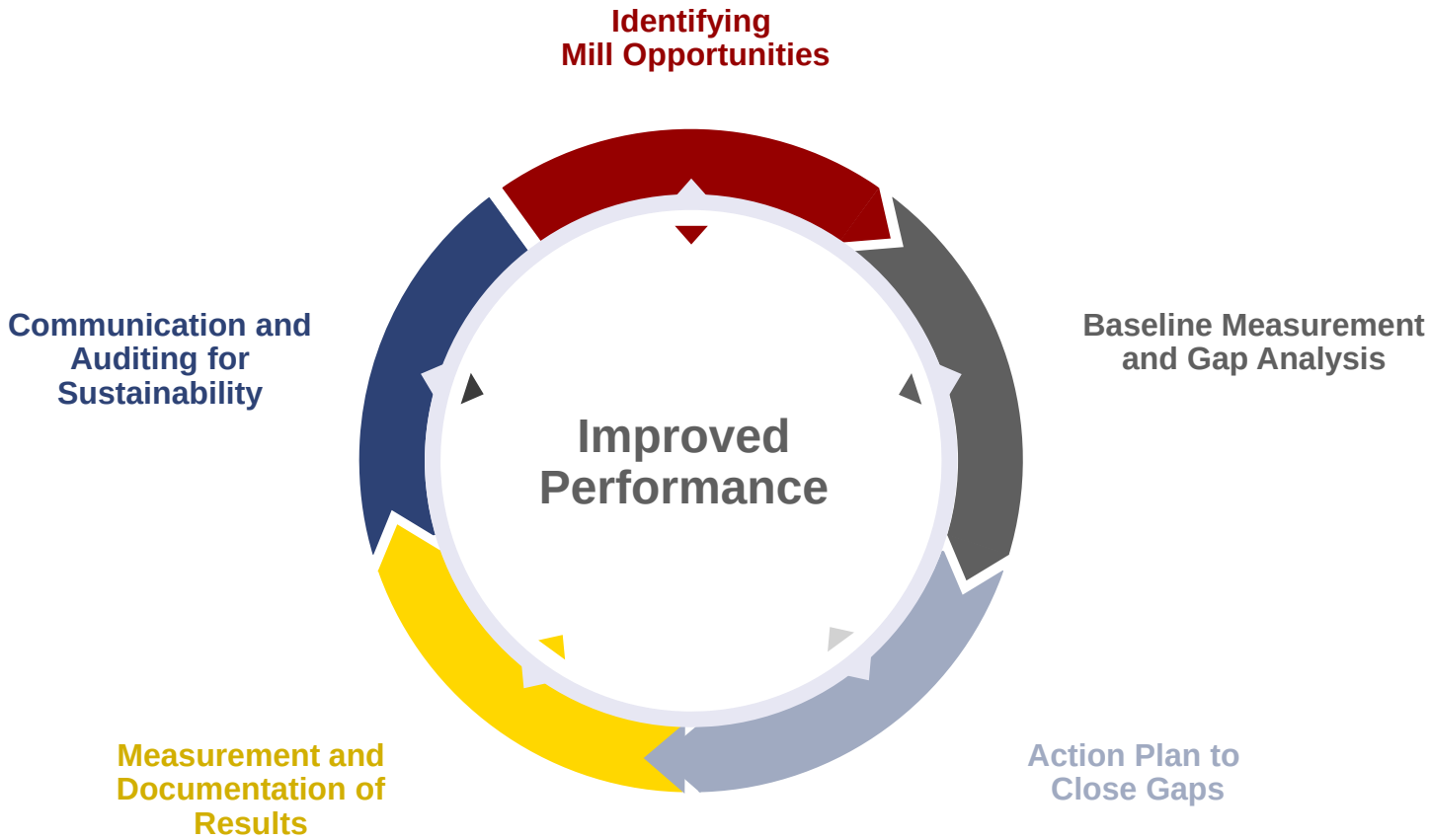
- **Paper machine process audits**
- **Machine operation audit**
- **Mechanical condition tests**
- **Machine Optimization Programs**
- **Machine concept evaluation**
- **System layout evaluation**
- **Capacity and bottlenecks**

Clothing Management Strategies to Optimize Paper Machine Performance

Optimize performance of existing fabric and equipment:

- Utilize optimization tools to improve machine efficiency
  - Implement optimization systems, Audits, Lean, Six Sigma, multivariate analysis, etc.
- Utilize vendor partners to address key issues
- Monitor key variables which relate to machine performance
- Benchmark for best of class performance
- Implement best practices

Structured Optimization Process



Clothing Management Strategies to Optimize Paper Machine Performance – Case Study Example

Objective
42-day Press Fabric life with consistent sheet dewatering and no sheet handling issues

Root Cause
– Factors limiting life
– Factors influencing sheet transfer

Action Plan

What	Who	When
Confidential		

Initial Results
• Record Speeds and Production
• 35 days Scheduled Off

New Target
• Obtain 46-day press fabric life with good press dewatering, machine speed, and runnability.
• Improve sheet smoothness and bulk.

Current Results
• Production increase over standards
• 46 day life
• Improved sheet quality

Clothing Management Strategies to Optimize Paper Machine Performance

Evaluate new fabric technology to improve machine performance:

- Reduce Energy, Water, Fiber and Chemical consumption
- Increase machine output
- Improve fabric life time

Utilize system approach with other components to produce an optimized solution

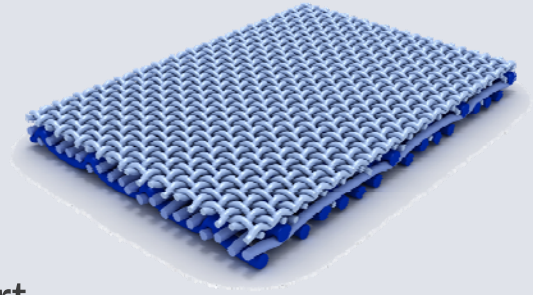
Clothing Management Strategies to Optimize Paper Machine Performance

Evaluate new fabric technology to improve machine performance:

- Next Generation **Triple Layer Forming Fabrics**
- **Press Fabrics** utilizing **non conventional materials** and constructions

Next Generation Triple Layer Forming Fabrics

New fabric concept with a Unique blend of Properties



Finer Top Surface

Industry High Fiber Support
- **Mechanical Retention**
- Sheet Quality
- Cleaner run

Industry high Open Area;
Thin Calipers
- **Drainage / Couch Solids**
- Clean run

Unique Wear Surface

Industry High Wear Volume
- **Fabric life**
- Increased CD Bending Stiffness
- Sheet profiles
- in machine stability
- Reduced Drive Load potential

Next Generation TL Fabric - Case Study 1
BelBaie – WoodFree Coated / Uncoated

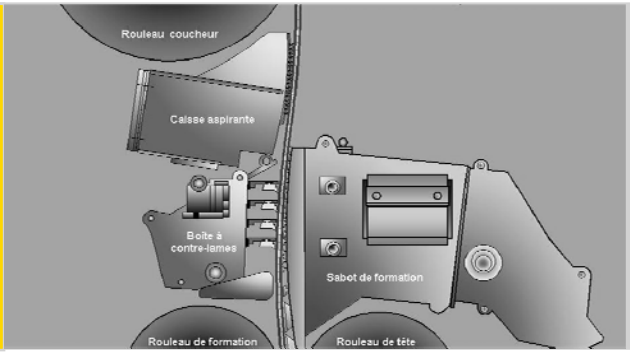
Machine Data

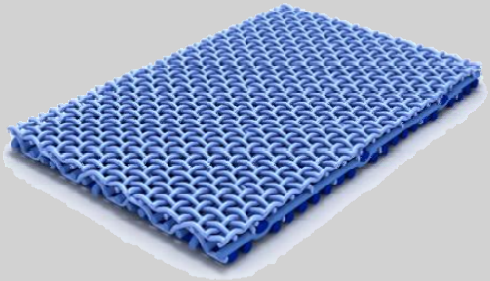
Grade	Woodfree-Coated
Furnish	Pulp
Former	BelBaie
Speed	4100 fpm (1250 m/min)
Width	330” (8.50 m)

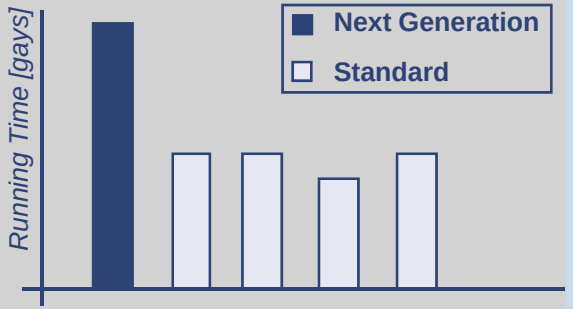
Fabric cost savings = $ 250,000
Down time savings = $ 120,000
Total Annual Savings = **$ 370,000**

Results / Benefits

- Industry high Wear Volume
  - **Standard SSB averaged 42 days**
  - **Next Generation SSB has run 104 days**
- Exceptional fabric stability
  “most stable design we have ever run on Backing Position.”
  - Improved sheet CD profiles
- Increased Drainage
  Sheet Formation improved with higher headbox flows
- Runs cleaner than other designs







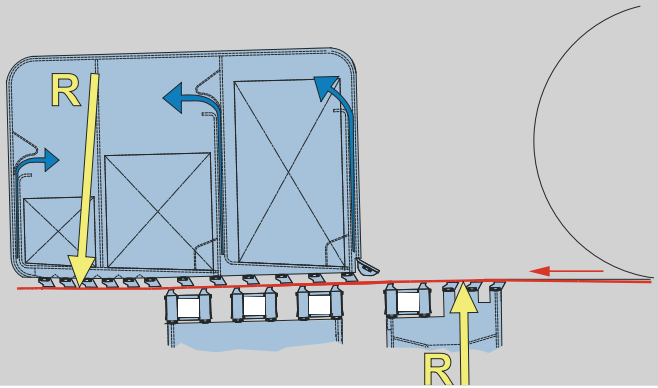
Next Generation TL Fabric - Case Study 2
Hybrid Former – Top/Btm

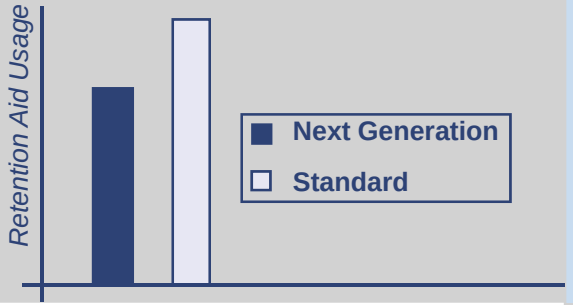
Machine Data

Grade	Woodfree Uncoated
Furnish	Pulp
Former	HybridFormer
Speed	4000 fpm (1212 m/min)
Width	266” (6.7 m)

Results / Benefits

- Retention Aid Reduction
  - **27% average over full grade range**
- Increased Drainage
  - Reduced Draws at pickup
- High Wear Volume potential
  - **Life Increase 25-33%**
- Runs cleaner than other designs





Next Generation TL Fabric - Case Study 3
Fourdrineer with Mini Top

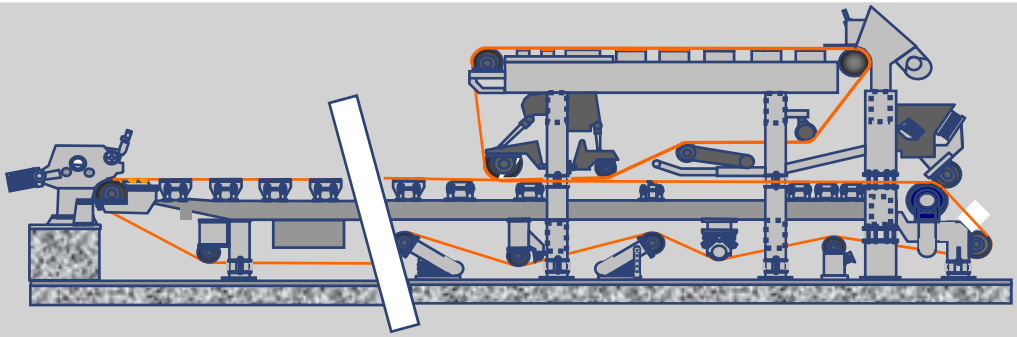
Machine Data

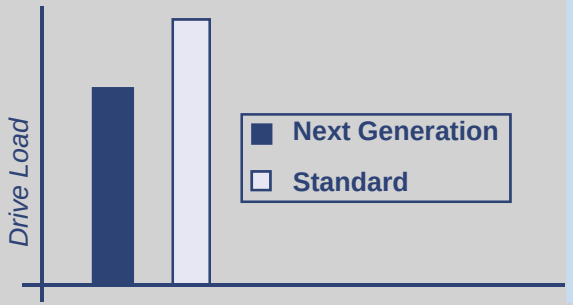
Grade	Liner 35-46lb/1000
Furnish	100% OCC
Former	Fourdrinier with Mini Top
Speed	2600 fpm (788 m/min)

Annual Steam Savings = $ 100,000

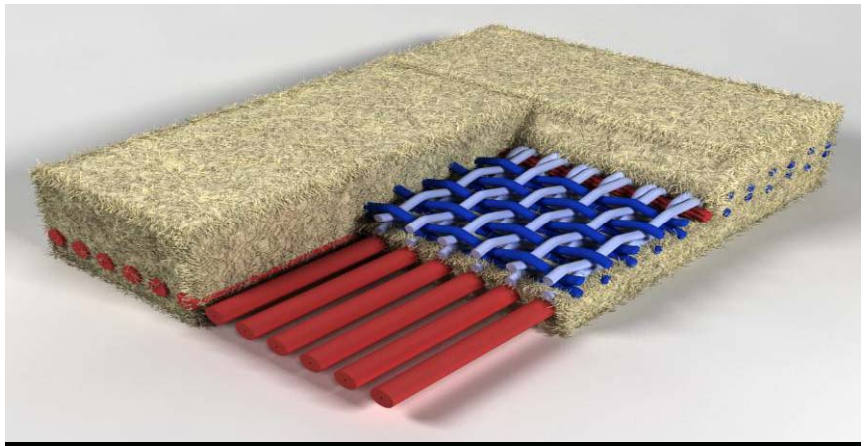
Results / Benefits

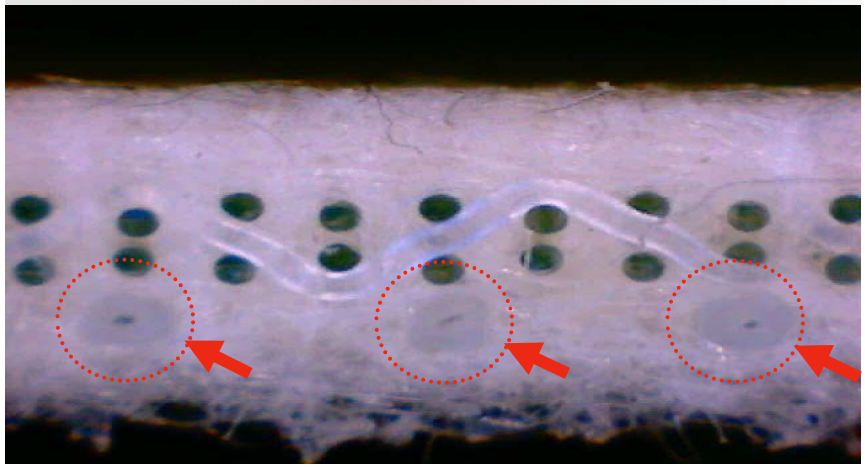
- Increased Drainage
  - Increase Headbox flows by 10%
  - improved Formation, reduced hard flocs
  - improved drying rates
- Reduced Drive Loads
  - **20% reduction in WTR and Coach loads**
  - **increased vacuum levels run in Flat boxes**





Press Section Optimization
Hybrid Press Fabric Technology -

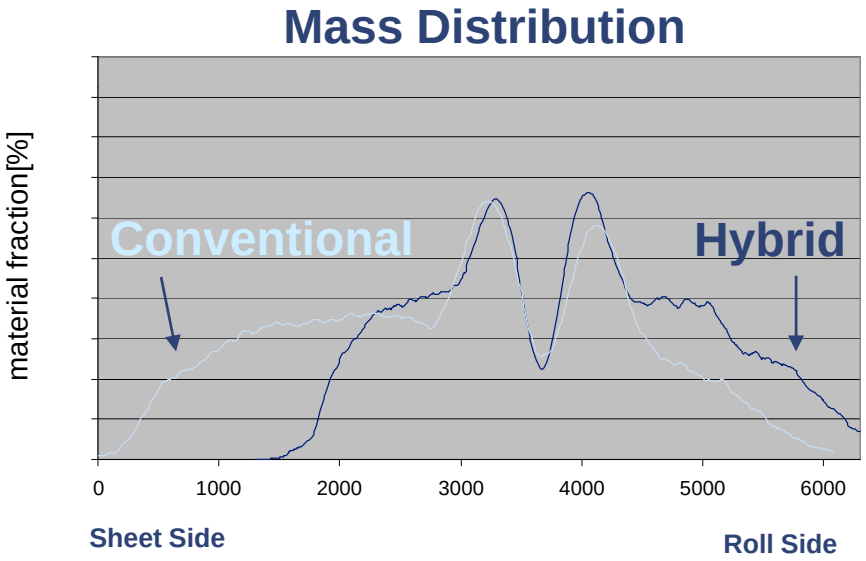


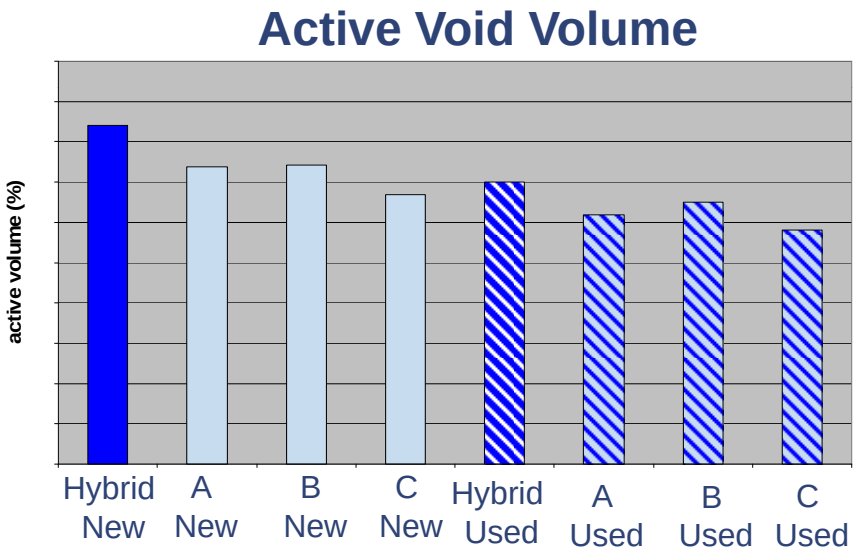


Non-woven, elastomeric roll side structure.

- Elastomeric Yarn provides additional void volume on roll side, resiliency for vibration dampening and steady state pressing throughout felt life.
- Compressibility provides a quick startup and increased nip dewatering if applicable.
- MD rollside Flow Channels provide low Z direction flow resistance and increased dewatering rates.

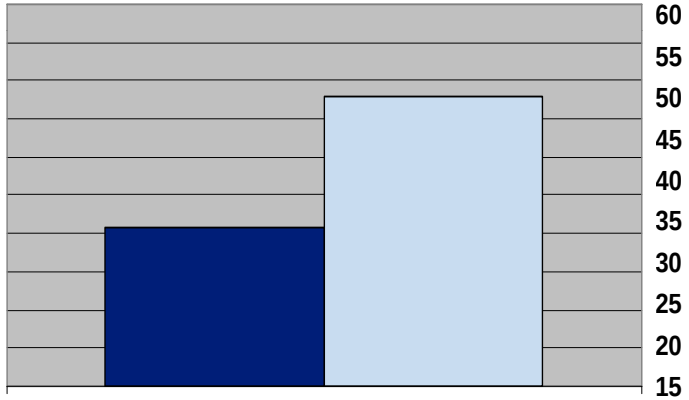
Hybrid Technology Changes Historical Models





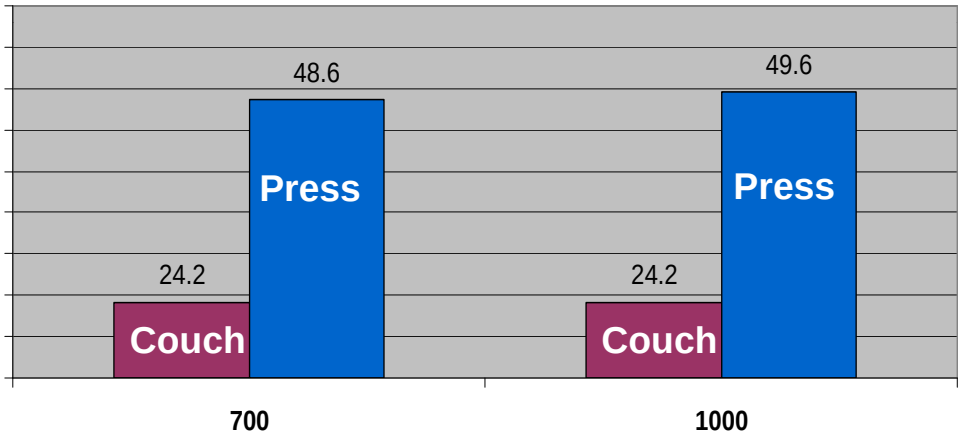
Hybrid Technology Changes Historical Models

% Z Direction Flow Resistance to MD&CD Flow Resistance



8 MPa Used Sample

Hybrid allowed for 1st Press loading Increase without sheet crushing



30lb/1000, White Top, 1640 fpm

Press Optimization - Case Study 1
DBL Felted 1st Press

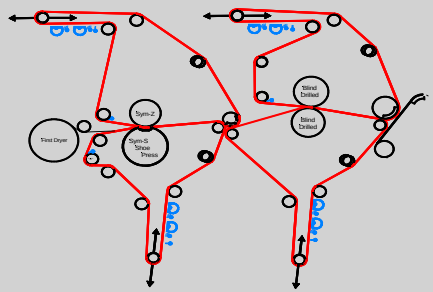
Machine Data

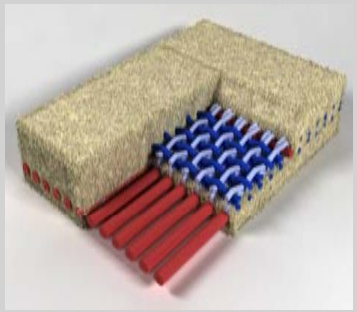
Grade	Liner 35-46lb/1000
Furnish	100% OCC
Press	Doubled Felted 1st to Shoe
Speed	2100 fpm (637min)
Width	378” (9.5 m)

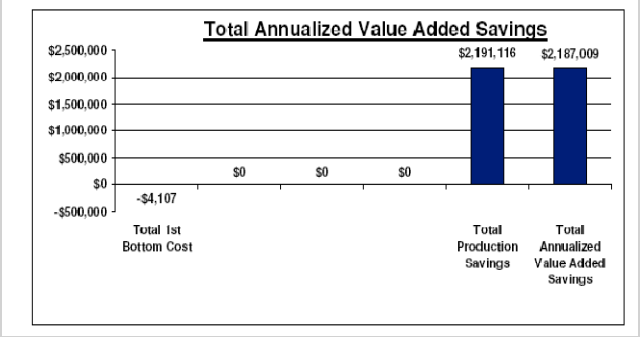
Speed Increase = $ 2,100,000

Results / Benefits

- Eliminated transfer issue out of 1st press on all grades reducing breaks, increasing speed and production
- Some grades increased in speed over 200 fpm, average speed increase across all grades = 50 fpm
- Replaced immediate need for capital investment to deal with “licking” / transfer issue







Press Optimization - Case Study 2
DBL Felted 1st Press

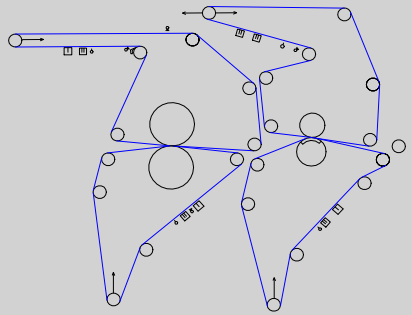
Machine Data

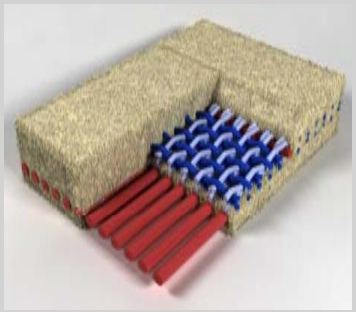
Grade	Coated Board
Press	DBL Felted 1st & 2nd
Speed	1300 fpm (394 m/min)
Width	248” (5.9 m)

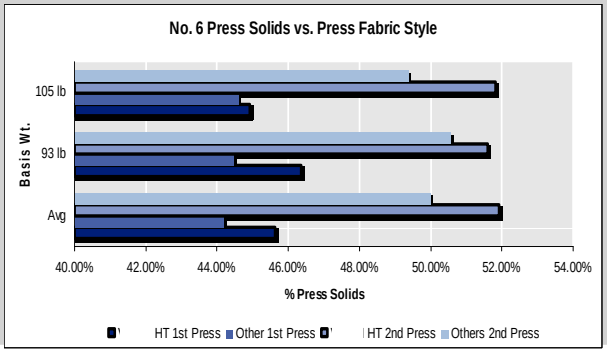
Results / Benefits

- Increased press exit solids 1.5 - 2%
- 2% TPH increase on average
- Improved speeds all grades
- Lower uhle box vacuums over life

Production Increase = $ 2,100,000

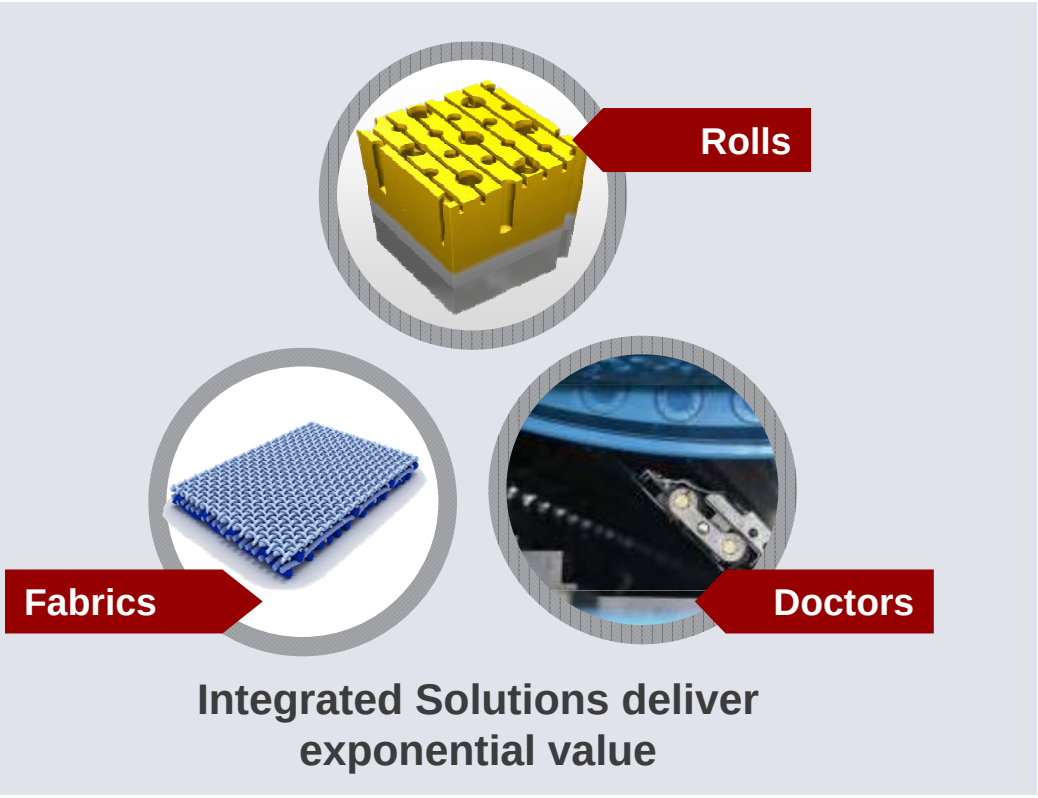




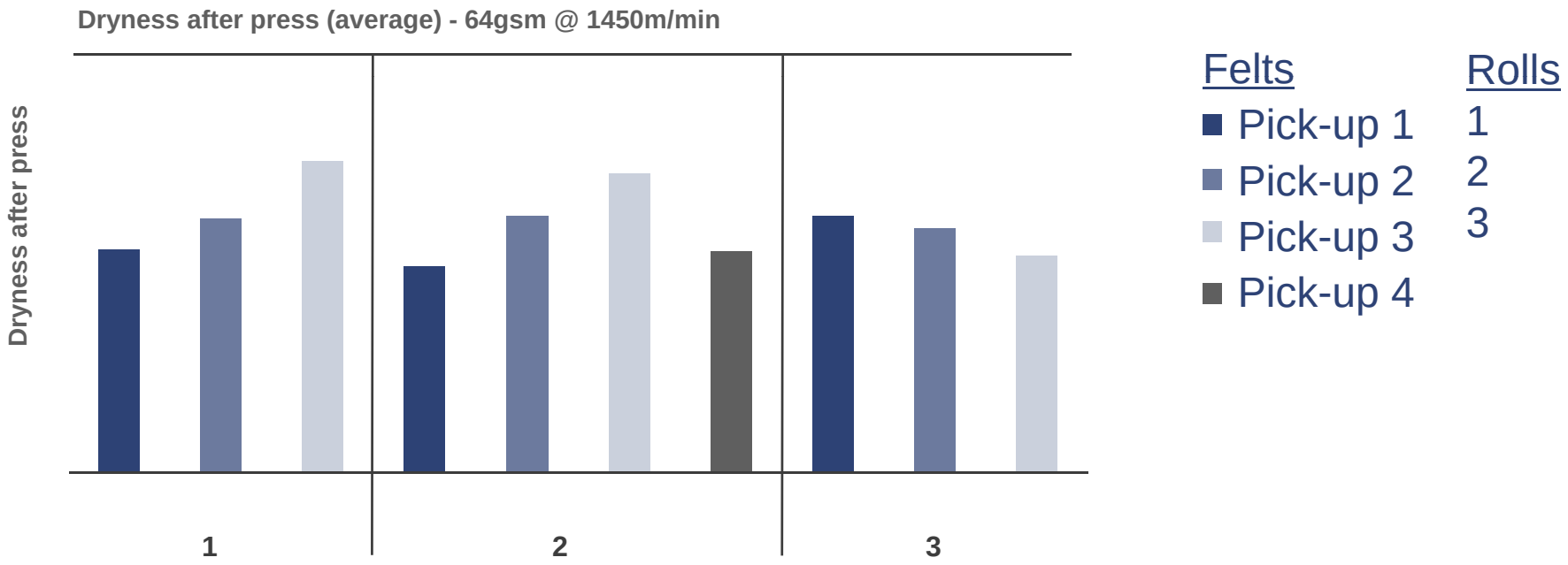


Clothing Management Strategies to Optimize Paper Machine Performance

System Solutions



Research results - 64gsm @ 1450m/min
Dryness after press



How to Manage Clothing to Optimize Machine Performance

Optimize performance of existing fabric and equipment

Evaluate new fabric technology