



Building Leadership Excellence



Paper Machine Clothing Trends in Today's American Market

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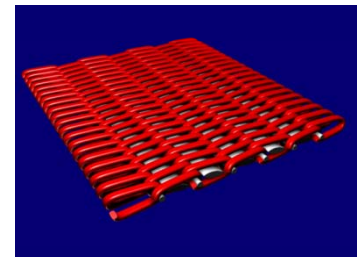
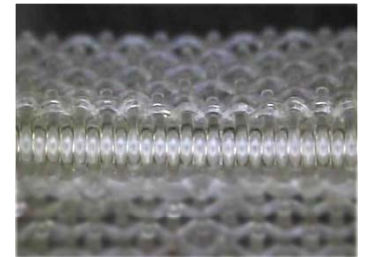
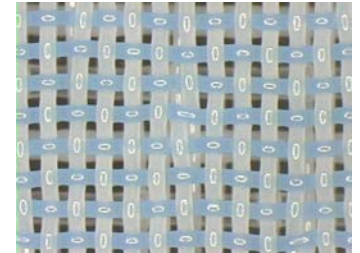
Albany International Corp.

May 1-4
PaperCon 2011
Northern Kentucky Convention Center

RETHINK PAPER:
Lean and Green

Trends 2010 - A Review

- **Forming – Triple layer progression continues**
- **Pressing - moving seams into final segments of the industry, extending the move to non-woven components and structures**
- **Drying - Spiral fabrics appearing in all applications**



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2011 – A Year of Recovery and Stability

- **Many manufacturing companies had to reshape themselves following the financial crash that bottomed in early 2009**
 - Assets were rationalized, product offerings streamlined, supply chains “leaned out”, business practices optimized
 - Many traditional suppliers to the paper machine clothing industry also “leaned out” their businesses
 - Clothing companies will push toward manufacturing flexibility to deliver new products quickly and to adjust to the changing material supply base



Three Manufacturing Platforms

- **Fabrics woven with wide looms**
- **Fabrics woven with narrow looms**
- **Fabrics that require no looms**



Fabrics woven with wide looms

Front of loom

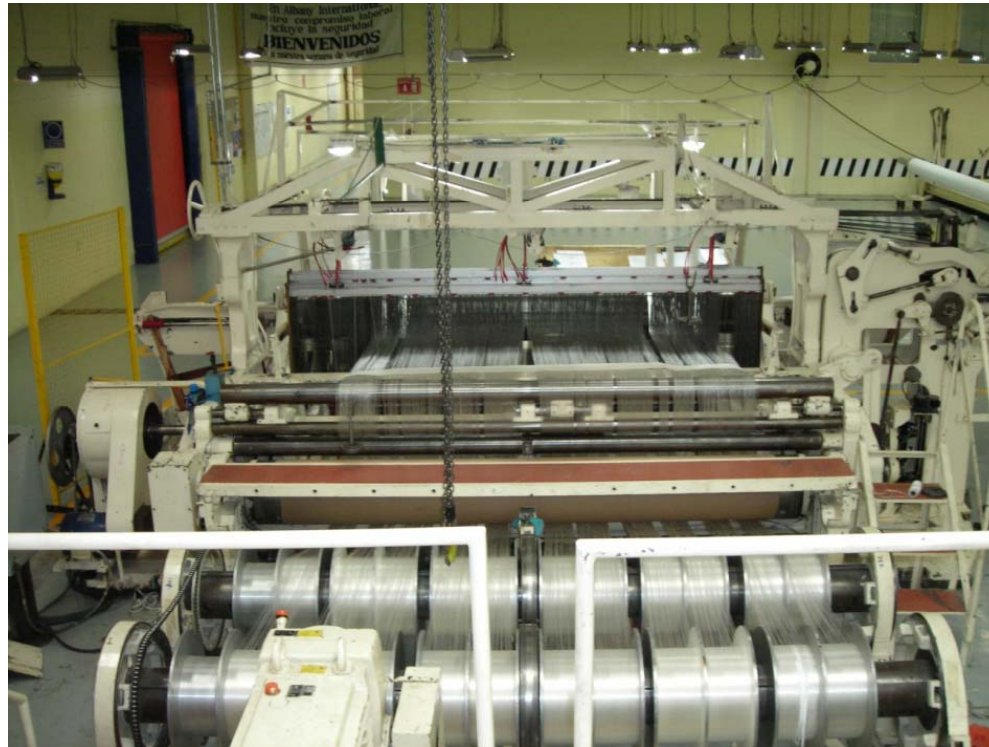


Back of loom



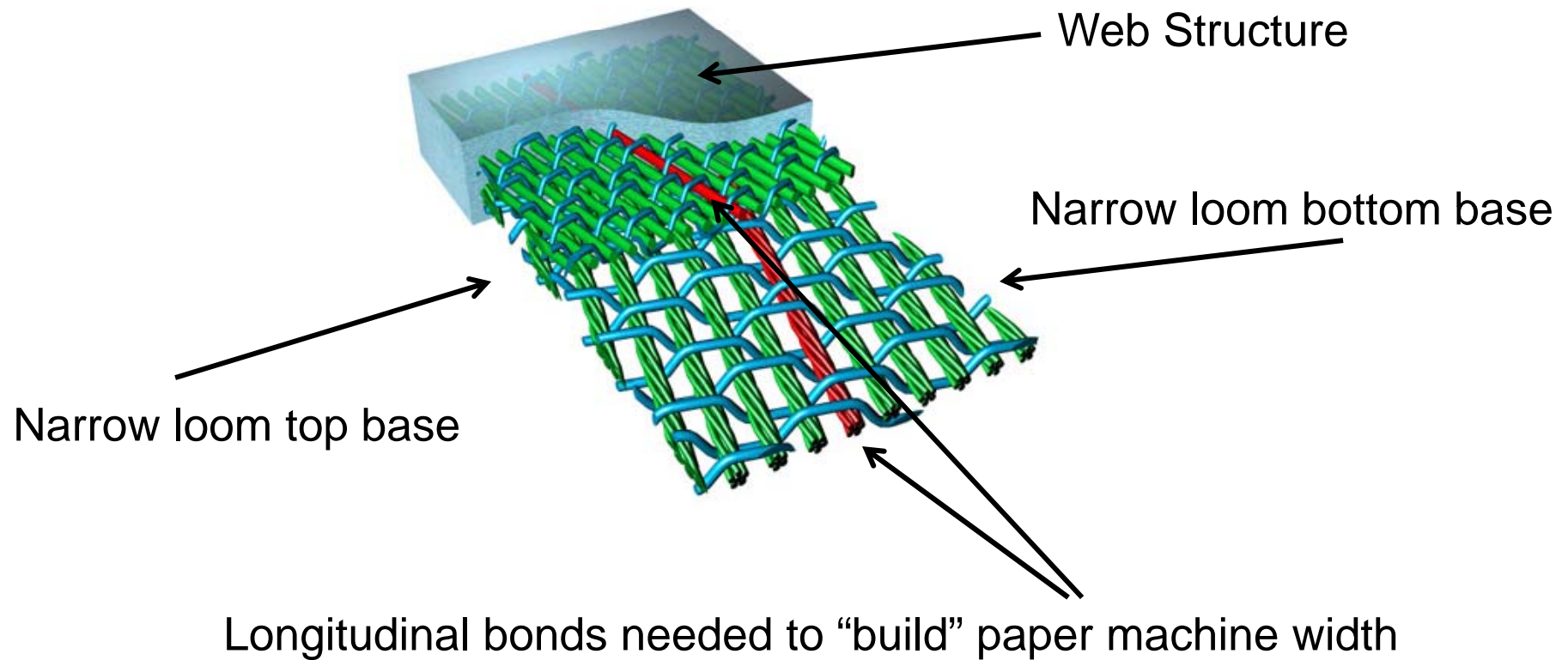
- Slow to weave, long changeovers – major impact on delivery time
- Lots of material behind looms – difficult to switch to new product options
- Order set at the first pick - inventory is inflexible, pegged to a specific position
- Looms have to be as wide as paper machines (flat woven) or half as long as paper machine positions (endless woven) and range from 8 to 30 meters wide

Fabrics made with Narrow Looms



- Fast weaving – 3 to 10 times faster than wide weaving
- Less material behind looms – product cycles out in weeks, not months
- Inventory is flexible – customer ordered size does not fix where output goes
- Must bond material longitudinally to achieve paper machine width

Fabric made with narrow weaving looms

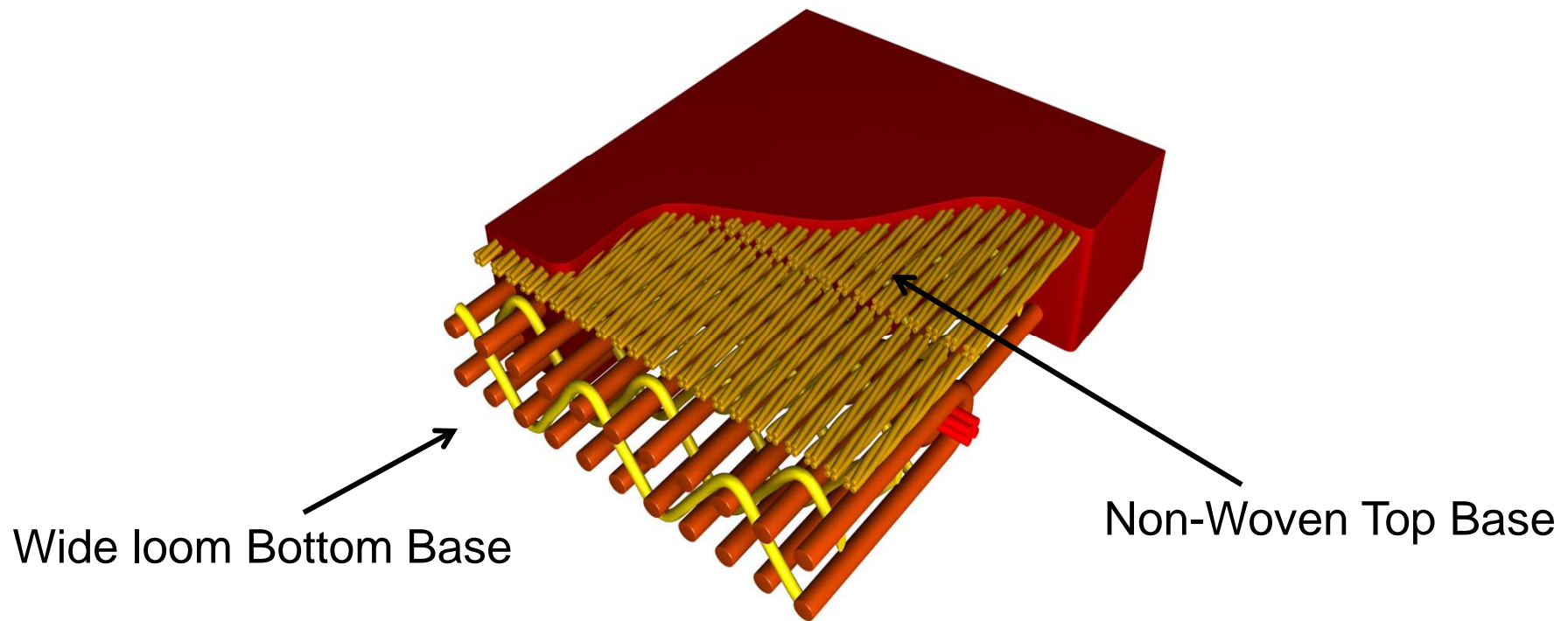


Fabrics made with no looms

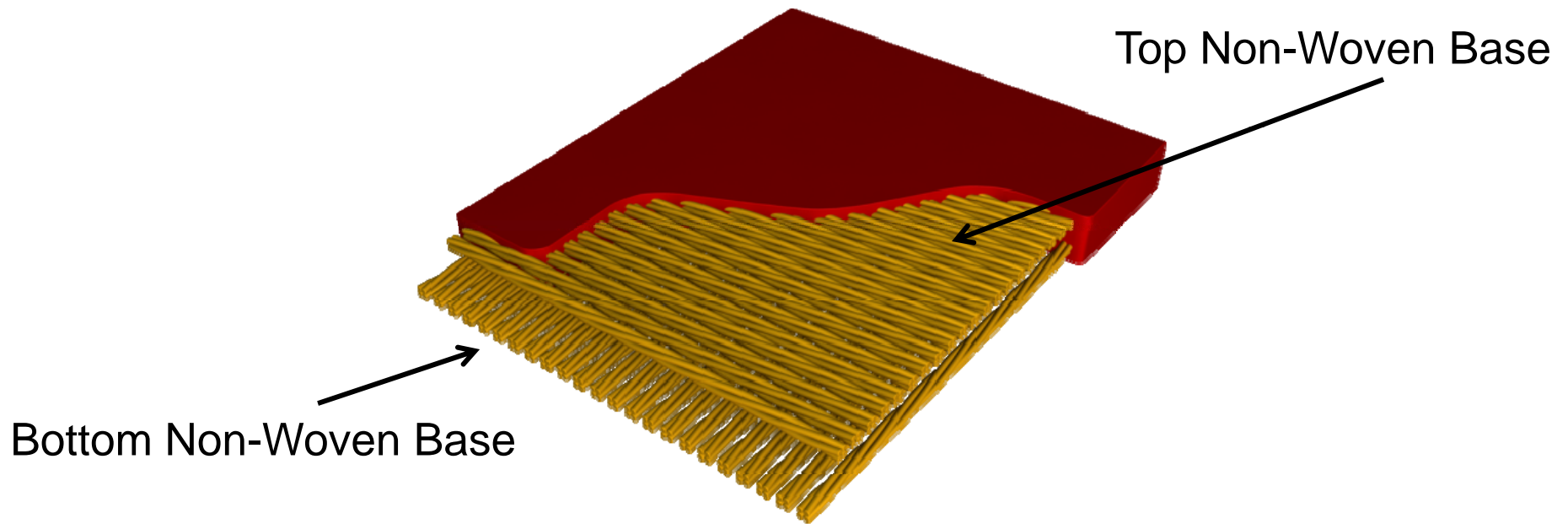


- No Weaving – A major unit operation bypassed
- Stock rolls either internally manufactured or purchased
- Inventory is flexible – ordered size does not limit where material goes
- Must bond material longitudinally to achieve paper machine width

Fabric made with a Wide Loom Base and a Non-Woven Base

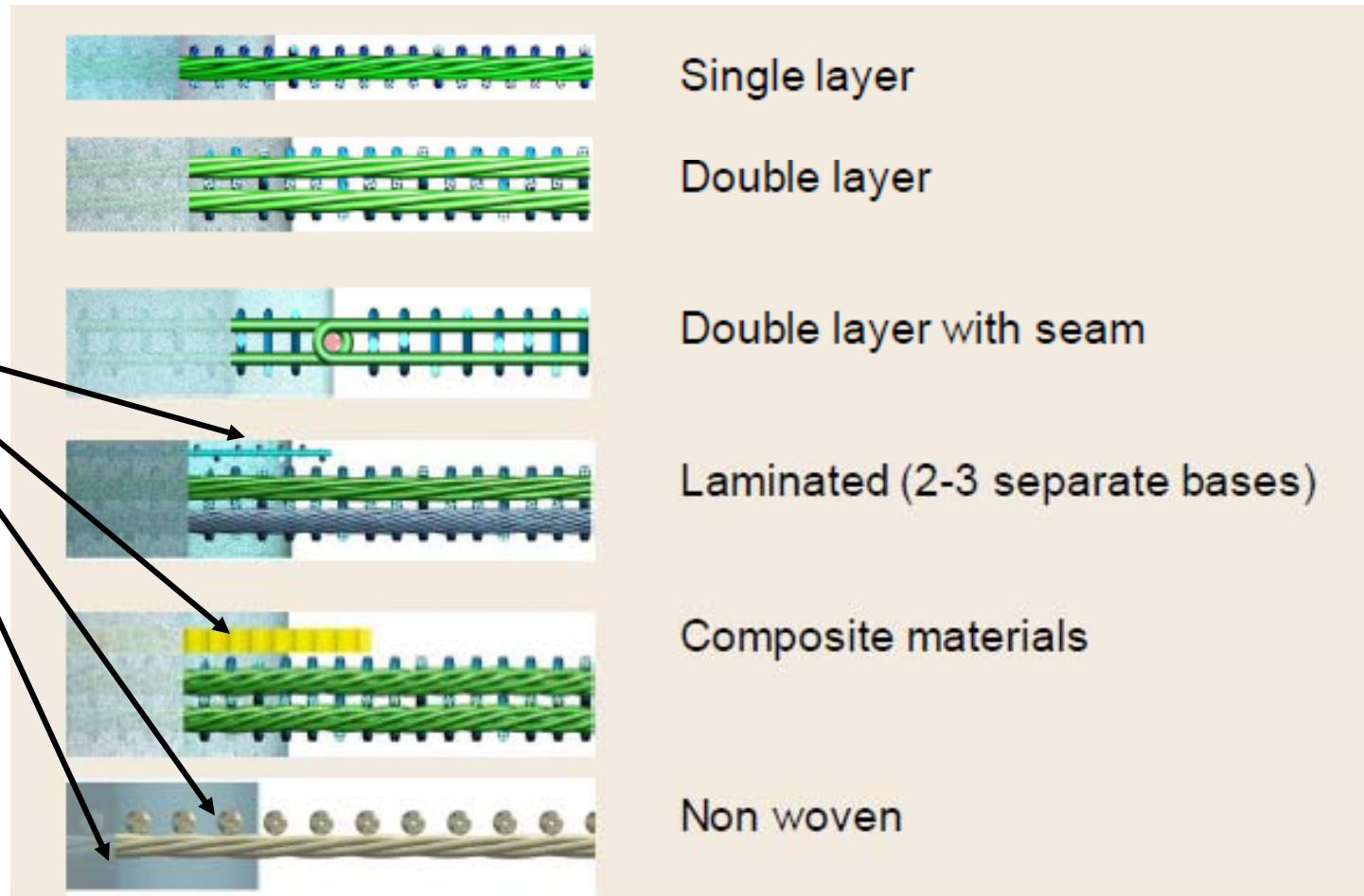


Fabric made with No Weave Looms – All Non-Woven Bases



Many Options – Not All Woven

Non-woven
components



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Wide to Narrow to No Loom

- Will be determined by MD bond quality
- Will also be determined by seam quality
- Both will determine the manufacturing “flexibility” of the supplier



Wide to Narrow to No Loom

- **Forming – No commercial offerings in the narrow loom or non-woven class. Sheet quality and fabric stability requirements are too select to allow anything but wide woven fabrics.**
- **Pressing – Narrow loom fabrics and hybrid woven – non-woven combo fabrics are well established, pure non-woven emerging in many markets. Needling helps to mask bonding impact.**
- **Drying – Spiral fabrics (non-woven) do not require MD bonding and seam quality limitations are few.**



Spiral Dryer Fabrics – No Looms



- **Smaller machines allow for flexible manufacture**
- **Changing from one material to another takes minutes not days**
- **Need only to replace a single spool of mono – a wide loom involves up to 100,000 monofilament strands**
- **The last coil is the seam**
- **No bonding requirement**

Toward “Flexible” Manufacturing

- Pressing and Drying have multiple product offerings, Forming not commercialized
- Paper Machine Clothing material supply chain rationalized and tightened, the need for flexible manufacture more critical since financial events of 2008-09
- Flexible manufacture leads to
 - Easier and Faster New Product Introduction
 - Better Standard Delivery
 - Faster Emergency or Trial Delivery

