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FabricLink's

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A Product Development Discussion:

Where Should Your Textile Tech \$\$\$ Be Going?



Sunday
January 28, 2007
7:30 to 9 a.m.
Salon D
Downtown Marriott
Salt Lake City, UT
*(across the street from the
entrance to the show)*
Outdoor Retailer
Winter Market 2007

P A N E L

- **Bonding/Welding: Steve Howard, CEO & President of Bemis Associates Inc.**

Steve Howard joined the family-owned business in 1982 as the 4th generation to lead Bemis since 1910. A graduate of Ithaca College, Steve had a major influence on the sales and marketing efforts at Bemis for the past 24 years, and initiated the introduction of Sewfree® technology to the apparel industry. Steve is keenly aware of both the opportunities and obstacles facing the brands and manufacturers in a global marketplace. When not working, Steve spends time with his four kids, and enjoys many outdoor activities, including tennis and gardening in the summer, and skiing and skating in the winter. He resides in both New England and Asia.

- **Digital Printing: Willetta DeYoung, Founder & President of EDP Textiles**

Willetta has over 20 years experience in fashion design, textile research and development, marketing and graphic design. Her creativity, ambition, education allowed her the opportunity to open EDP Textiles (exclusive digital printed textiles), Minneapolis, MN. In 2004, EDP Textiles was one of the nation's first on-demand, digital textile print houses. The company specializes in printed textiles products for fashion, decorating and mass-customization. Prior to EDP Textiles, Willetta was the textile specialist for Target Corporation, where she contributed to the development of Target's textile performance standards. Willetta holds MS degree in Textiles, Design and Retail Marketing from UW-Stout and certifications in technical courses from College of Textiles, NC State University.

- **Sustainability: Kevin Hagen, Corporate Social Responsibility Program Manager for REI**

Kevin directs company-wide efforts to implement sustainable business practices. With more than 20 years in business leadership positions, Kevin has lead business development, marketing and product development groups in aerospace, renewable energy and consumer products industries in Europe, Asia and the US. Prior to REI, Kevin was the founder and principal of a sustainable business consulting firm specializing in renewable energy procurement strategy. He holds a degree in Interdisciplinary Engineering and Management from Clarkson University, Potsdam NY and an MBA in Sustainable Business from the Bainbridge Graduate Institute.

- **Product Development: Mark Lazarus, President of Laztech Consultants, Inc.**

Mark Lazarus consultants to the fiber, textile and apparel industries, and brings 30 years of experience to the Industry Panel. During his 17 years at Liberty Fabrics, Mark implemented sales and marketing strategy, R&D and production planning, while developing strategic alliances, joint ventures and acquisitions. Mark has engineered performance fabrics for the Olympics, NFL and NCAA football, NHL hockey, and Major League baseball and soccer, as well as critical medical applications. He also pioneered compression testing at the Department of Sports Medicine at Penn State University, and served as the Chairman of the SGMA Fiber & Fabric Committee. Mark is a graduate of the Philadelphia College of Textiles & Science, and holds a US patent.

- **Product Development: Joe Walkuski, President of TEXbase, Inc.**

For thirteen years, Joe was the Director of Textile Research & Development at Patagonia. In 1997 he was a founding member of Patagonia's Advanced Concept Development Center in Bozeman, Montana. In 2002, Joe left Patagonia to form TEXbase which provides on-demand software and services to the technical textile industry. Joe is a graduate of the Fashion Institute of Technology, holds a US patent and has won numerous awards for his contribution to the industry. Joe is an avid outdoorsman taking full advantage of the beautiful surroundings in Southwest Montana where he lives with his wife, Cam and their two children.

- **Moderator: Kathryn Swantko, President, FabricLink/The Technical Center**

Kathy Swantko, a recognized expert in textiles and apparel care, is a tireless, pro-active advocate for the apparel and textile industries. She has over 30 years of experience in the textile industry involving areas of promotion, sales training, education, market research, and editorial writing. In 1995, she launched the award-winning FabricLink.com and companion TheTechnicalCenter.com web sites as both an educational resource for consumers and retailers and a B-to-B forum for the textile/apparel industry. She serves on the textile/fashion advisory boards at California State University Los Angeles (CSULA), California Polytechnic University Pomona, and Long Beach City College, and is an instructor in CSULA's Textile Production and Management Certificate Program through extended education.

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E V E N T T R A N S C R I P T

The Industry Panel discussion was very successful. . . . except for the fact that the technology used to record the discussion failed! So, instead being able to provide a full transcript, we have done a follow-up Q & A with the panelists. Panelist providing input for the following Q & A include Kevin Hagen, Steve Howard, Mark Lazarus, and Joe Walkuski.

At the actual event, a swatch of fabric was provided to each person attending the event, which showed an example of the three technologies being discussed by the panel. A great deal of thought and effort went into the development of the swatch. Therefore, a special "Thank You" goes to DuPont for providing the DuPont™ Sorona® fabric, which is sourced from renewable resources; EDP Textiles for digitally printing the photograph on the fabric; and Bemis for using its Sewfree® bonding/welding process on the fabric swatches.

INTERVIEW WITH KEVIN HAGEN

SWANTKO: *What are the main points that you'd like to make regarding where sustainability is a short-term trend or if it's a permanent change of direction?*

HAGEN: I believe that sustainability is in fact a change of direction for business. I think that there's ample evidence now to suggest that business for too long was taking the attitude that the environment was sort of a no-win proposition. The challenge of business was to meet people-compliance expectations and wait for regulations to change, or lobby against legislation to change, rather than to deal with environmental issues through a compliance perspective. The current trend in environment social responsibility for business has been to recognize that business has the absolute opportunity to be a significant change agent in the world. And, that business can use the marketplace and its power in our nation's finance and responsiveness to the benefit of environmental social issues. This is a very significant and a very important shift in the way business is done. It reminds me, in a lot of ways, of the older perspective of quality. When I broke into manufacturing, my first manufacturing manager said "you can have it on time, you can have it cheap, or you can have it to spec----pick two!" And, that was the way that folks looked at these things----they looked at things as mutually exclusive, and that you had to figure out a balance between quality and cost. And, you did that by adjusting the number of inspectors on the line, and various other techniques. Very soon after that, Toyota taught us all that total quality management, and the notion of how to manage manufacturing was entirely different. And, that there was a prospect to make things on time, and at low cost, and high quality----all at the same time. And in fact, businesses that embraced those thoughts, Toyota for example, have put their competitors pretty much out of business. And most of those factories and managers, who didn't adjust to that shift and didn't get the new paradigm went out of business. As we approach the conversation of sustainable business, we may first think that it's an oxymoron to have things with a high environmental and socially responsible matrix, combined with price, quality, and all the other things we're used to having, is impossible because we think that those are opposing forces. Generally, we believe that we have to make a choice or have a balance. But, I see that truly clever businesses are proving all over the world that these things actually can be achieved at the same time, and to the benefit of both. As a result, it's changing business for good.

SWANTKO: *What about the challenges of combining sustainability into a performance product that provides not only sustainability, but also comfort and performance?*

HAGEN: There was a time when we thought that breathable and waterproof couldn't be done. There was a time when we thought that lightweight and performance couldn't be done. But, the customer spoke, and the marketplace said "these are desirable attributes, and we want it all----And, by the way, we want it at an affordable price! And, now we want it in great colors and great styles!" Early in the history of outdoor gear, we kind of said that all that can't be done. But in fact, businesses have been successful in achieving much of that. And, some would argue all of that, and then some. I think innovation in the business has been able to deliver that. I think that raising the expectations---saying that producing our products in an environmentally and in social responsible manners, and by using materials which have lower----and hopefully no environmental or social impacts---those matrix are becoming an important key to the equation for the consumers and manufacturers and suppliers alike. And, I look forward to seeing what innovation brings as we place these new expectations on the supply chain.

SWANTKO: *Speaking of the supply chain, what kind of changes do you anticipate will be necessary to achieve sustainability within the supply chain?*

HAGEN: I think the number one issue is information flow. The supply chain has been built to deliver product very efficiently and effectively. But, I don't think that we are supplying as much information as we might need

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up and down the supply chain. I think the biggest challenge before us is to land on some matrix of what sustainable products might actually mean. Measuring the "green" attributes of products is really hard. And, as we start to look at tools like life cycle assessments, you quickly get spun into these deep cycles of----excuse the expression----but sort of "geek" details. It's really hard to work on taking a full assessment, life-cycle view of the product, and really starting to understand what all the effects are. In fact, we've designed systems, and designed information flow to avoid that. So for example, if you want to approach the chemical constituents of products, very frequently you find that that level of detail is actually not only not available, but it's also considered proprietary in many circles for a variety of performance reasons. All of that may have been okay in the previous perspective. But as we go forward, having transparency to understand the real chemical constituents of products, or at least being able to certify in a really reliable way that there are no persistent, synthetic chemical molecules in a product is important. In other words, the key thing to understand is that there are no perspective carcinogens, or there are no future threats in the actual materials of the product, or in the materials of the process used to make the product. These all affect everything from the environmental performance, the environmental conditions around the places where the material originated, or was manufactured. It affects the employees in the manufacturing process. It affects customers. And finally, it affects the quality of the location where these materials eventually find a resting place, if that means a landfill or some other approach. All these details of the design, manufacture at the chemical level of the product are things that the current supply chain is not used to managing well. I think new things, such as the European Reach Expectations, are going to start to change that. I think that here in the U.S. market, we are going to need to keep up with those expectations, if we really want to attack issues of sustainability in the supply chain.

SWANTKO: *Speaking of certifications, what types of certifications would a company be responsible for providing to a garment manufacture/retailer/consumer regarding the sustainability of a performance product?*

HAGEN: I think, first and foremost, we have to look at both the environmental and socially responsible elements of the whole supply chain. The top thing that I would suggest looking at is the whole issue of factory labor compliance. Certification around factory labor compliance is one of the places over the last decade that the supply chain has demonstrated that we can make a difference on, and we can make a change on. That customer demands can be arrived at through super national expectations, regardless of where a product is manufactured, or what the local legislative conditions are. Regardless of the local enforcement conditions, we still have expectations of social compliance, and meeting labor expectations in factory safety, and labor compliance in factories. As a result, I think this example shows that we can implement change. And although that problem is not totally solved, there is work going on. There is a process around it. I think we're all headed for the next generation for beyond compliance perspective on the social side. So, I think standards such SA8000 (Social Accountability Standard developed by Social Accountability International), or other international standards and certifications that go along with those is one place where factories have demonstrated a lot of opportunity. Now, moving into the environmental side, I think we have a need for some consideration there. Different manufacturing techniques and different manufacturing issues lend themselves to different challenges. But, there is some great work being done. I would point out the work being done by the Leather Working Group, as an example of a vertical stakeholder engagement supply chain process that has developed really terrific manufacturers' standards and expectations, and a metric system around the appropriate production of leather products. The Leather Working Group was based in North America with suppliers or brands like Nike and Timberland, and many others. But, it's an international connection. In fact, it affects primarily tannery operations in Asia, and in other countries. So, I think that's a wonderful example of an industry working group that's developed a vertical perspective of the supply chain with participants from outside the industry, inside the industry, advocacy groups, and technical experts. These groups work together to tackle real hard questions. What does it mean to have an environmentally preferred process for tanning? Those are tough challenges. And, by creating expectations from the brands, and then being able to communicate that to customers, I think that this is an excellent example of supply chain working towards creating real solutions.

SWANTKO: *How do you see sustainability impacting the performance market going forward?*

HAGEN: I think that we can expect that customers will be asking us to deliver products that meet all of their expectations. I think that environmental and social dimensions are simply becoming part of the definition of quality, and that we need to expand faster than the market expectation, if we expect to be successful. I think the other dimension is that we need to develop ways in which we can talk to customers---talk to the market---in a technically accurate, but approachable way that helps customers understand the differences, and understand the attributes that are important. This will provide opportunities for the customer use their purchasing power to help the industry innovate for improvement.

SWANTKO: *Generally, what was your reaction to the Panel? Did you receive any comments after the presentation from people you talked to about the value of it? What's your general impression of how it went?*

HAGEN: I think it went very well. I think my fellow panelists made wonderful points, and were obviously expert in their fields. And, I think there was an interesting overlap of the different technologies that were

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described and discussed. I received a lot of comments afterwards, especially from audience members who were really interested in the sustainability element, because they just hadn't really thought through what the environmental and social responsibility was some kind of a moral challenge----although maybe it is. But, it wasn't in the vain of the theoretical. It really was a practical supply chain challenge that there are answers for---that we can rise to the expectation. And, I think conceiving of the idea that we can harness the supply chain innovation to challenge ourselves to fix these issues was I think a breath of fresh air for a lot of people. Generally, I think that a lot of people feel like the world's challenge on confronting social and environmental problems are insurmountable. But, I would submit that if we can figure out how to do waterproof/breathable, we can certainly figure out how to do environmentally sustainable products.

INTERVIEW WITH STEVE HOWARD

SWANTKO: *Describe the product development process, including the issues with educating the manufacturer and retailer.*

Howard: The design is brought to Bemis. Most often it is a cut and sew design that needs to be converted and considered for bonding. The actual fabric, the objective and the environment are considered. Sometimes we have brands specify the equipment they'll be using. The first step is to select the proper adhesive. We select an adhesive based on all these factors and then create a bonded sample and test for bond strength. Some manufacturers may specify that they require Dry clean resistance, some require hydrostatic testing, some require a target shear strength. It is very application driven. Once we select the adhesive and bond the sample, we run the tests required. This information is sent to the Brand as well as the contractor. Suggested processing parameters are included. Time, pressure, temperature are the three processing parameters we set. If fabric changes or machinery changes these initial conditions may have to be adjusted. We offer in-line quality testing to ensure that the processing conditions are correct.

SWANTKO: *Talk about the steps and challenges in integrating your technology into the production process.*

HOWARD: The challenges are hoping that fabrics and machinery didn't change since initial testing and that the contractor doesn't take liberties in the processing to gain efficiency. You can give the example of the fabric swatch we originally tested for this give-away. We tested the fabric before it was pre-treated for digital printing. After it was pre-treated, the characteristics of the fabric changed. We now had a sample that was more supple, softer hand than the original. This affected the SRT selection. The tape we had originally chose was now too stiff, it didn't match the hand of the pre-treated fabric. This is an important lesson.

SWANTKO: *What is the investment/requirements in terms of equipment, training, maintenance, time & money? Or, the difficulty in finding qualified suppliers.*

HOWARD: Based on experience, designer's and brands love the innovation and want to employ it, but taking it to the next level is where the glitches arrive. What form should be used, tapes or die cut wide width films, volume you'll need to order, finding contractors who can perform these operations or won't charge you through the nose for the bonded portions of production. Even initial parameters such as seam strength figures or adhesive selection are a bit daunting to the new entrant. That's where we (Bemis) comes into play. We have a lot at stake as well.

SWANTKO: *Sustainability appears to be on its way to being a permanent requirement for outdoorwear. What about the challenges in combining sustainability, comfort and performance?*

HOWARD: Only comment we have to add is that most of our adhesives are made with No VOCs (volatile organic compounds). Our 2 and 2.5 tapes are made with no VOCs. We are an environmentally-friendly manufacturer. We re-use our scrap and realize the importance of preserving the environment for generations that come after us.

SWANTKO: *Does the bonding/welding process change with printed fabrics, like digitally printed fabrics? If so, how might the Sewfree® technology and usage change?*

HOWARD: Digital printing can be used with our films. Already there are many printing technologies that can be used with our films. Our tapes and films have been printed on for logo identification or for pattern matching. Digital printing is ideal because this technology allows more customization on a smaller scale. We'll probably be utilizing this technology in the future. Currently we use flexographic and ribbon(stamping) processes for production,. However, digital printing has been utilized on our films. We have been used on an IRIS ink jet printer for our aliphatic films.

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SWANTKO: *Besides the outdoor market, what other specialty markets utilize welding/bonding? Do you expect there may be any crossover from these applications into outdoor wear?*

HOWARD: (NO BRAINER QUESTION FOR BEMIS)

We initially introduced Sewfree® to the intimates industry over six years ago. We felt that was the industry that would really benefit from the features Sewfree® has to offer. In fact, due to a resurgence in interest from this market, we are exhibiting at an intimate show in Paris only a few days from now. We fully expect many crossovers into other market segments as technical outerwear brands expand their product offering and as the number of bonded garments in retail continue to increase. We've seen the cross-pollination of ideas from apparel to non-apparel markets. For example, we have some customers that have used us for apparel, now using us in non-apparel (gear) applications. We serve the non-apparel industry with films, so crossover and designer innovation is a part of our success story.

SWANTKO: *Does the value-added to the finished product offset any additional production cost?*

HOWARD: Improved or guaranteed water resistance, lighter weight garment, less abrasion, cool aesthetics/new designs can be easily achieved.

I believe these attributes are worth additional costs, however Bemis isn't the expert on whether or not these attributes offset the additional production costs. We have many large customers who feel this technology is part of their innovation strategy, and they feel it is warranted, and that their customer base expects and appreciates the technology. Many designers, brands and contractors have "seen the light". Obviously, they believe it is worth the extra effort/additional cost.

SWANTKO: *How do you view the supply chain's interest and ability to move in new directions and adapt new technologies? Are there differences in attitudes in the US versus in Europe, China, South America, etc?*

HOWARD: The supply chain was reluctant to move in this direction. The designers really had to push. I believe there are attitude differences between certain cultures and/or regions. For example ...China is more contractor based and wanting to produce things at low cost, so this technology goes against the risk and cost associated with innovation. Sewfree® requires an investment (on capital equipment as well as commitment in educating the manufacturing force)..... However, we see this changing now. Now many contractors who were quick to dismiss this technology 4 years ago, are now eager to become more than proficient in it. Especially in China, where they are now facing increased competition. Lower cost is no longer "king", but the ability to differentiate themselves from other contractors is becoming important. Now, they are clamoring to learn as much as they can about Sewfree®.

SWANTKO: *Are there currently any limitations in the availability of qualified suppliers, with the necessary equipment and expertise for each technology?*

HOWARD: Yes, there are a limited number of contractors that are able to manufacture bonded garments in QUALITY, high volume production. Experience and in-line quality testing are important in to ensure the Designer's (Brand's) criteria are met. Originally, machine manufacturers were slow to modify equipment and provide equipment for this technology. Now, we're finally seeing this change. Machinery is becoming much better and the competition is bringing the pricing to where it should be.

(This is a bit of a sales slant but true).....As for other TPU (thermoplastic polyurethane) providers, they simply don't have the track record in apparel and technical assistance that we have. While bonding instead of sewing sounds easy, there are pitfalls and considerations that need to be made. TPU or "glue" isn't a commodity item. Testing and in-line quality assurance is crucial to the success of this technology being implemented in designs. Other TPU suppliers are just catching up with Bemis.

SWANTKO: *What are the challenges and the promotional platforms for educating the consumer?*

HOWARD: The technology is still considered new, so there's a lot of education (support) that we must provide. Bonded seams are not easily noticed by the end-consumer and even brands require some education on exactly how certain applications can be welded. These are some of the challenges. As for the promotional platforms, we currently don't target the end consumer. However our exhibition at trade shows and assistance to brands on describing Sewfree® technology hopefully reaches the end-consumer. For the retailers to witness the actual construction of a bonded garment helps them fully understand the benefits and hopefully makes a very strong impression on them. We hope that they can articulate these features as benefits to the end-user. As for the brands, they all bring their own "flavor" to creating bonded apparel and the methods in which they convey the "bonded" applications within their garments differ. Some prefer to talk about their technology to the end-consumer via online sources, some prefer hang tags and some prefer in-depth retailer training. We leave it up to the brands as to how they want to inform the end-consumer about the features & benefits of

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Sewfree®. Often times, Sewfree® is used in conjunction with other enhancements to achieve a certain goal (example- reduce weight.). So we leave it up the brand.

SWANTKO: *What's your vision on the future use of your technology in the outdoor wear market?*

HOWARD: We hope that Sewing machines go away and everyone glues every seam in the world. (laughter) Seriously, we see this technology being used in many more sectors than just technical outerwear. We actually introduced our technology to the intimates sector first. Technical outerwear was second. However, as the brands continue to broaden their product offering, we can see Sewfree® technology being used in performance wear/active wear, footwear, accessories, children's wear, medical apparel..etc...The same benefits that are enjoyed by technical outerwear can be sought after by other niche markets.

SWANTKO: *What are the main points you want to make regarding:*

- *Is bonding/welding is a short-term trend or a permanent change in direction?*
- *What are the challenges in combining sustainability, comfort, and performance?*
- *What changes are required within the supply chain?*
- *Were there any questions or topics brought up during the Panel that you want to comment on?*
- *How do you see sustainability impacting the performance market in the future?*

PARLEE, Marketing Director for Bemis: I've enclosed "my" answers to the pre-forum questions and I will address the questions below as best I can. I didn't take notes while Steve was speaking, so this is a mix bag of what I remember and the message Bemis always tries to convey:

PARLEE: MAIN POINTS:

- 1) Bonding garments is a proven & viable technology to use for making apparel. Right now, it is still in the early stages, but you can expect to see more and more bonded apparel in the future as contractor & machinery capabilities evolve.
- 2) There are definite advantages to utilizing Sewfree® adhesive films from Bemis. For the aesthetics, the improved water resistance and the reduction in weight for outerwear garments. A bonded seam is better than a sewn seam in almost all cases.
- 3) Bemis offers unsurpassed technical assistance in this revolutionary technology.

POINTS TO QUESTIONS:

- 1) Sustainability and our role: We manufacture thermoplastic adhesives, these are 100% solids and don't contain any VOCs (volatile organic compounds). Often times, people think of glue as something "nasty" for the environment, that's not the case with our adhesives. We have a few formulas that can be recycled and are working to develop more. We use manufacturing processes that involve reduction and re-use of waste material, and we are actively involved improving our community and reducing the negative effects of pollution (and our impact) on the environment.
- 2) Product Development process: Bringing this technology to fruition has been challenging and there has been a lot of effort, on our part, to assist in the product development process. We've worked closely with the contractors, brands and equipment companies to refine the technology and make the transition from cut and sew to bonding easier. We are in the factories and understand the challenges for all involved. That's why our commitment in the area of technical assistance is crucial to both the brand and contractor.

Impressions of the Panel:

- 1) Sustainability is a buzz word we've heard from our customers and in the press. It was good to learn how far (up and down the supply chain) a company can make an impact. Because of this, we are currently looking into additional ways that we can reduce our impact on the environment and, as I mentioned above, keep sustainability in our product development efforts.
- 2) The fabric sample give-away was instrumental in showcasing the technologies. I'm glad we could work together to get something like that accomplished. Even this small sample demonstrated the challenges in using bonded technology, and the importance of product development. The situation where the pre-treatment of the sample caused us to have to switch to an alternative process and glue, rather than what was originally planned, speaks volumes to the importance of product development. I believe this was just touched on in your introduction, but I hope that the audience did catch your mention and saw this sample as instrumental.

INTERVIEW WITH JOE WALKUSKI

SWANTKO - *As a moderator, how do you feel the Panel did in addressing the three technologies, and what value did their comments have for the performance market?*

WALKUSKI - Overall, each of the three panelists did a very good job of representing their technologies. They are all clearly experts in their areas. As far as value is concerned, I think the seamless technology probably displayed, in my mind, the greatest tangible value to the audience. I think with digital printing, it was a little

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harder to perhaps make the leap to what value that might bring. And, I think on the sustainability level, even though the panelist was fantastic, that's always a very difficult topic to equate to value---when you define value as dollar signs. But, I think from a broader, more cerebral educational value, I thought that all three were fantastic.

SWANTKO - *What, if any key points, did you take away from the discussion?*

WALKUSKI - Nothing is easy, and they all have specific hurdles to overcome before you are able to realize any value out of this. You need to be committed to eliminating sewing thread seams from your garment to allow you to have the gumption and support to go down the route of engineering seams with adhesives. You have to understand clearly what digital printing is able to bring to your operation, before you're truly able to maximize its value, because it is certainly limited somewhat in its capabilities right now. If you go into it with unrealistic expectations, you'll be disappointed at the end of the day. I think, foremost, from a sustainability level---because it is so far removed from "value"----you've really got to be committed to that process---top-down organization, in order to extract any benefit from the effort that any organization might put forth. Overall, I think that the most important things that the Panel talked about was their individual niche areas, and the way that those technologies or theories, in the case of sustainability, can be applied.

SWANTKO: *From a product development standpoint, or perspective, what do you feel are the challenges facing the supply chain in utilizing each of these technologies?*

WALKUSKI: From a sustainability standpoint, I can answer primarily from a textile and raw materials perspective. The gentleman from REI spoke of the bigger picture in sustainability---power, building maintenance, etc. But, from a raw materials standpoint, the biggest challenge we have in product development in the supply chain is realizing efficiency of scale in all of these various "green" technologies. They're all new. They're all low volume. And consequently, they're all high priced. In order for those technologies themselves to be sustainable---meaning on-going, viable raw material offerings----they need to be commercialized to the point where they are economically feasible to produce. And, that relies heavily on sufficient volume to justify those efficiently to scale. From a digital printing standpoint, the biggest challenge there is scaling the technology. If you remember, one of my questions to all three experts centered around scaling.

SWANTKO: *(FYI, Scalability of a company/process refers to the fact that the business has the capacity for potential economic growth within the company. The main reason to plan for scalability is to reduce cost and effort. Underestimating the amount of scalability that will be needed, and over-preparing for expansion, are both problems that can present themselves during the development of a new technology. The key to avoiding these problems is to have a thorough understanding of the business goals over both the short term and the long term, and using that to drive the scalability needs.)*

WALKUSKI: So, from a sustainability standpoint again it's volume---how do you get the volume to scale the technology to make them economically feasible. The same is true for digital printing, how is that technology going to be able to evolve, such that the cost per linear yard of output is reduced to the point where it can be more widely applied. And then from a seamless standpoint, the same holds true as well. Pretty much each combination of substrate needs to be engineered with respect to adhesive and delivery mechanism and heat source, and all kinds of different variables. And, you compare that to selling fleece on a five-thread over-lock, which is pretty straight forward. And, so having to engineer each specific solution affects your ability to scale effectively, and utilize one solution across multiple end-use applications. I think each of the three technologies have scalability challenges that they face.

SWANTKO - *How did you view the value of the Panel? Did you receive any comments? Do you think there is a need for more of these types of interactive discussions?*

WALKUSKI - Without a doubt, they are extremely valuable! All of the comments I heard back were very positive. I absolutely support doing more of the same in the future!

INTERVIEW WITH MARK LAZARUS

SWANTKO: *As a moderator, how do you feel the Panel did in addressing the three technologies----ie. sustainability, which is more of a theology rather than a technology, digital printing, and bonding/welding----and addressing the value they have for the performance market?*

LAZARUS: First of all, the sustainability issue is a big enough issue to have its own day, and we only scratched the surface. It's not just about sustainability, as was pointed out by Kevin, it's also about social responsibility. And, it's not just about the product itself. But, it's about the product being derived from a renewable resource, or is from recycled materials. And, it's not just about the energy consumed to produce the product, but what is the environmental impact of the entire chain for the product's entire life cycle, from the beginning of making

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the fiber to the home laundering and disposal of the garment. That's what has got to be looked at, and it was just something that we just didn't have enough time to adequately cover. But, obviously it sparked some emotions in the crowd. Although the technologies, didn't necessarily go together, but you did a great job of putting the three technologies together into one sample, which was great for the attendees to see. And, the discussions about all three technologies had obvious impact on the performance sportswear market. One of the questions that we asked was the benefits in cost versus benefit. With digital printing, it's still not at a point where it's economically feasible to do on a large production basis. It's best suited for small specialty businesses. So, at this point, it's interesting technology, but, it's not practical yet. However, I'm sure over time, they will get it to that point. The Bemis bonding & welding is fascinating in that it is a step change in the industry---going from sewing to bonding. And, it obviously has its place in a number of areas., for intimate apparel through active wear. Again, we haven't really seen the total impact of this, because they're still really developing the technology. But, when you figure out that seams can be uncomfortable to most people, depending on the sewing thread and the type of seams that are used. In terms of being aerodynamic, or having a higher coefficient of frictions for a swimmer in a swimming pool, it you can eliminate seams, it's going to lower the friction level and be more aerodynamic. So, that has a lot of potential.

SWANTKO: *What were some of the points that were either brought up at the Panel, or key points that you took away from the Panel?*

LAZARUS: In regards to the sustainability issue, you really have to look at it from beginning to end of the product life cycle, not just in how you form the fiber. And, we talked about educating the consumer, and educating the retailer on the benefits of these technologies. And, one of the questions that I had asked is: Are we in danger of this word "sustainability" or "green" becoming just a marketing buzz word, or how do we prevent that from happening? Again, that was a topic that could have been tossed about, back-and-forth quite a bit. I just saw an article in one of my Internet newsletters that I get. And, this point was raised in an article from the U.K.: What is the energy cost of transporting garments, now that the U.S market is manufacturing so many garments in Asia----What's the environmental impact of air shipping garments? This is all part of the equation that just haven't been measured. The article talked about an interesting term "clothing miles". In the food business they talk about "food miles", and how food transported over many miles takes away from the ability for it to be really fresh, creates the need for preservatives, and chemicals, etc. to be put on---say fruit coming from South America into the U.S. Well, clothing miles----What's the real energy cost of shipping a so-called organic cotton from Asia to the U.S.? It may use more energy, and the impact on the environment may be greater than using regular cotton grown here. So, it's an interesting topic, and has a lot of room for debate. Also, we talked about having industry standards. Or, what is "green"? And, it's a difficult thing to develop. But, since there are no standards, how is the consumer going to know what is real and what's not real, particularly if you use a hangtag to say it's "green" if it has 10% organic cotton in it. But, in commenting on the Panel as a whole, I have to say this. When I sat in the audience for all of FabricLink's previous Industry Panels, it takes awhile to gather your thoughts and really come up with a good question. And, inevitably it would haunt me for the rest of the day----Oh, I should have asked this, or I wish I had a chance to ask that. But, with this Panel, Joe and I had a chance to review all of this prior to the event. You came up with a great list of questions that we fed off of. But, having the opportunity to know what was going to be talked about, we could formulate the questions in our minds, and maybe ask things that people would think of later on. And, I thought the format of having Joe and I ask the questions from a product development standpoint really worked well! As you said, you can take it up to a point. But, Joe and I think in terms of actually developing these products and marketing these products. So, maybe we can get a little deeper with some of the questions.

Back to the Panel---I think digital printing has great potential, if they can get the costs in line, which is all about speeding up the process, and becoming more productive. There's been another buzz phrase that's gone around the industry for years called "mass customization". And, this is the kind of technology that would be perfect for that kind of thing, because you can personalize a garment, but have it be in the middle of a long production run of thousands of personalized garments.

SWANTKO: *What are the challenges to product development and the supply chain in utilizing these technologies? You touched a little on digital printing. What about the other two?*

LAZARUS: In terms of the bonding technology, there are factories all over the world with millions of sewing machines, and all of that would have to be replaced to be able to do that. So, you've got to find people and invest in equipment, and revamp your whole process. Bemis doesn't manufacture. So, you'd have to retrain all of your people. So, there's quite a bit involved here. In talking to some of the apparel people, they're saying they don't have access to the technology, because their contractors don't own those machines. I don't know the size of the investment in terms of buying the equipment, but there's also the retraining of the operators, and things like that. Any kind of a revolution is going to take time and investment, and that's what the bonding technology is----it's a revolution in garment construction. Again, the challenge of the sustainability thing is to understand the full impact of the life cycle of the product.

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SWANTKO: *How do you view the value of these Panels, and is there a need for more of this type of interactive discussions?*

LAZARUS: Yes, I believe so. I think it's great because people come to these events and get exposed to technologies in depth that maybe they wouldn't have either had the time, or even known that they exist. OR has grown to be so large that it's very tough for an apparel designer to cover all of the technologies that are available with all of the fabric companies and fiber companies, it's very tough even in the four days to cover everything you need to do! So, if you can go to one place for an hour and a half, and have three technologies covered by experts in the industry, I think it really does help to focus people on some of what's out there. So, I think it's extremely valuable, and you can see by the attendance. There was another seminar going on next door with a very popular figure outdoor sports enthusiast---I think a mountain climber. And, the Industry Panel still filled the room against that draw. So, I think it's extremely valuable. I didn't want it to end, because I think we had a lot more to discuss, if we'd have had the time.

(Follow-up Q & A's: This is the part of the Industry Panel event that was recorded. So, this is a transcript of some of the actual discussion questions from either Joe or Mark, the product development panelists, or questions from the audience.)

Unknown Question from either Joe or Mark: (Actual question not recorded, but obviously a question for Kevin Hagen on sustainability and the supply chain.)

HAGEN: I think that historically it's been "Oh, and you want it "green"? And, "Oh, you want low impact materials?" I think that at one time that was looked at as additional constraint, and you could make sacrifices to achieve it. I think that the challenge of the industry going back to the supply chain is that we don't want it to be a sacrifice anymore. We don't want that to be a choice. We want that to be an end, and an additional feature of what's going on. From a durability perspective, I don't think that we have a choice. I think that design will include, if it doesn't already, constraints around environmental performance for fabrics, for the process, and for the ultimate material for the ultimate garment. And, I don't think that we have a choice about that.

LAZARUS: Willetta, just one more point on durability---Does your technology have the proper fastness, in terms of light fastness, wash fastness for products in the outdoor market---for swimwear products, for example?

DEYOUNG: It just so happens that I have brought some swimwear products with me. And yes, it does have the durability properties that you need for that kind of thing. Typically, the process is a two-step process----I print on the fabric, and then I set it through a heat-set or steam-set finishing piece of equipment, and process it at the appropriate time and temperature to achieve that durability.

LAZARUS: Again for Willetta, historically we have been aware of the term pfd (prepared for dye) or pfp (prepared for print). And, that's been sort of a generic process, but I heard you mention what might be termed pffd (prepared for digital dye).

DEYOUNG: We call it pfd---prepared for dye. Really, the prepared for dye on the natural fabric isn't anything different than what is already done for any normal fabric. You get a bleached wash, and I prefer to have an optic brightener put on it because that allows me to have more control over the accuracy of my colors. For the synthetic fibers, like the DuPont™ Serona® swatch you received in your goodie bag, it does have to have an additional pre-coat applied to it. And, that is simply because synthetic fibers typically do not absorb water. On synthetics, if you take little droplets of textile dye, which are liquid, and put them on the fabric, and they will spread and look really bad. And although a lot of people don't like the idea that you have to pay an additional cost to get your fabric pre-treated, you really don't want to go with untreated fabric. So, there are some considerations to keep in mind. Basically, the pre-coat on the synthetics is basically a binder to keep your dyes in place, and keep your images as crisp as possible through the process.

LAZARUS: So, do you have some specific pre-treatment processes that you'd prefer to have on the raw materials that you're printing?

DEYOUNG: Yes. Right now, that does kind of limit where I get my fabrics from. I choose to work with textile vendors that already do that process for me. In the future, I hope to expand and to be able to do more textile research and development of my own, because that's the direction that I'd like to head, and be able to handle that preparing and treatment process in-house. Now, I have to go to suppliers that already do that service for me.

HOWARD: Let me just add, in considering Sewfree®, it's important to understand also how the textiles have been treated, and what they're treated with. In most cases we're able to get the bond strength that we want. But, depending on how it was treated, and what it's been treated with may change the choice of adhesive, and

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the optimum conditions. So, this is another caution and reason to be doing the testing up-front to make sure that we're shortening that learning curve, and short circuiting any potential quality issues.

LAZARUS: Steve, you stole my follow-up question. (Laughter) I guess we have time for one more question before we open it up for the group. Steve, what is your vision for the future of your technology, particularly in this industry?

HOWARD: Well, I can tell you, we're having a blast with it! It's a lot of fun! That's for sure. So, we're going to keep working at it. We will continue to reinvest. Being a private company is great, because we reinvest, and put the majority of the proceeds back into the business in product development. So, we're constantly working on coming up with better products for these applications. We're big in the intimates industry, so there is some cross-over there. With intimates, we are working with much softer, lower modulus, higher elasticity of our adhesives. So, those will be crossing over into this marketplace. We will also be reinvesting in and studying our production equipment. And, most importantly, we'll be reinvesting in our technical services to help all of us to better understand what the challenges are, what the new applications need to be, and what it's going to take to succeed both at the brand level and the factory level. But, the momentum is great! The successes have been great! And, it's a real bright future for bonding and the use of Sewfree® versus stitching.

SWANTKO: Well, I think we'll stop here. And, I know that some of you have to ready your booths for the opening of the show. So, for those who need to do that, feel free to leave at this time. And, we'll open it up for questions from the audience. I want to get your questions on tape as well. So, please wait until you get the remote mic, and give your name and company name, and then follow it up with your question. So, who wants to be first---any questions?

(Attendee) My name is Doug Hoschak, and I'm with (company name inaudible). And, the question is for the two suppliers, who are with bonding and digital printing. You buy outstanding products and new technologies. I've heard over and over again the processing of special finishes. Forty years of working with technologies in fibers and fabrics, I know there's a huge amount of energy consumed in the processes that you do. And, there are ways to create patterns without printing. There's the stitching issue versus the non-stitching issue---taking jobs away from people who are working for low wages, trying to put their kids through school. The social responsibility could take me in a thousand directions. But, I've narrowed it down to one question. Why, when I hear the words sustainability, are we talking about huge amounts of energy for bonding and printing? Nobody has addressed the source of the energy. Is it alternative energy, like wind power? Has anybody got any factories that are doing anything to address the issue of energy consumption and greenhouse gases?

HOWARD: I would suggest that that will come for sure. For the time being, I can tell you that generally speaking, the heat seal machine is not going to be using a whole lot more energy than the sewing machine. But, I understand. I hear your point. And, again back to the scalability, and once this gains more momentum, that certainly will be an issue that needs to be addressed, and I'm sure we'll be able to take care of that.

DEYOUNG: As far as the emissions, or the toxicity of the air from printing of textiles using my technology----I don't have that issue. You don't even have to wear a mask. There are no regulatory restrictions on the digital printing process. They dyes are water-soluble. As far as energy use, right now, I'm based in Minneapolis. My energy comes from Xcel Energy. I can't answer directly to the root of where my energy is coming from today, but I do know that my printer only uses energy when I'm actually producing. I don't keep it running continuously. So, there's that efficiency. And, there's also the sustainability compared to traditional textile printing. In traditional printing, for each color you make a screen, and that is a very labor intense, and resource intense process, especially in the use of water.