

Environmental sustainability is not just about farming methods or the use of organic cotton. It covers all aspects of production as well as the life cycle of the products themselves. In recent years Nike has been developing a policy of environmental sustainability and its impact on the sports activewear chain is set to increase. In this article Rick MacDonald illustrates how this policy is working in practice and what Nike's "three Re's" (reduce, recycle, reuse) approach means for the supply chain.

The stand-off cooling top: high performance meets environmental sustainability



Designing and developing the Stand-off textile and running top has given Nike Industrial/Apparel Designer Eddy Harber and myself a unique opportunity to combine two qualities that are both critically important but rarely seen in the same product: top performance for top athletes and consideration for the environment.

Eddy and I work as a team in a research-based apparel innovation group known internally as RPM (Research, Product, and Materials). Our first project as a team involved finding apparel solutions to various problems that track and field athletes encounter that might hinder their performance.

We knew that Nike was committed to supplying the national federations that we sponsor with a warm weather long distance running top to be used primarily in the Marathon event at the 2000 Olympic Games in Sydney. While touring the Outdoor Retailer Show in 1998, we were reminded of how many products were out there that could keep an athlete warm, and how few (if any) that could truly help endurance athletes stay cooler during their event. On a lunch break at the Show, Eddy was reminded of a study that he was involved in while working with the British military, that showed that moving air over perspiring skin was the most effective way to cool personnel in hot conditions. He suggested that if we could maximise air movement over a sweating runner's skin by raising the fabric away from their body using small nodes, and opening up holes in the surface of the material, we could use the powers of convection and evaporation together via a very simple (or so we thought) cooling fabric. The classic napkin sketch followed, and Stand-off was born. [See design board illustration.]

We naturally, and somewhat successfully, initiated development of the Stand-off fabric as a knit. The material that we came up with was functional in terms of cooling, but heavier than our current running singlet fabric and more expensive. We decided to explore some alternatives.

With Nike Apparel's Advanced Materials Research (AMR) group, we began to think that somehow moulding or forming the fabric was going to be the way to get to what we had put down on

Close-up of the Miratec fabric used for the Stand-off top.



paper. Concurrent with this way of thinking was a trip that an RPM team made to a textiles show in Italy. It was there that they came across Miratec, an advanced non-wovens division of PGI. The potential three dimensional aspects of the Miratec process impressed our team enough to begin what was to become a very fruitful relationship between our two companies.

Also around the same time, Nike's Environmental Action Team (NEAT, of course) held a two-day offsite conference to introduce product teams in the Apparel division to thinking environmentally with regards to product. NEAT also introduced an upcoming corporate initiative that would involve individuals in environmental sustainability projects in all areas of Nike and in all of our global regions.

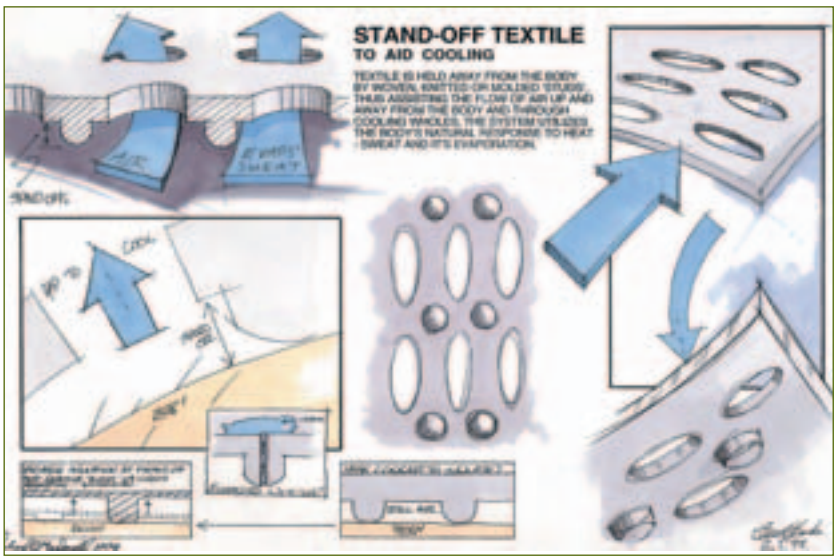
During an exercise at the meeting where each group would come up with a 'fantasy' sustainable product, it dawned on our team that a non-woven version of the Stand-off top could fit very well into a 'green' scenario, and still maintain the high performance standards that we would be held to at the Olympic level. From that point on, Stand-off was a green development and the project became part of Nike's global Sustainability Initiative.

The planets were lining up pretty well for us at this point, as we also became aware that the Sydney Games were being sub-billed as the 'Green Games'. The Olympic organising committee (SOCOG) had made a commitment to maximise use of environmentally sound building materials, land use and development, as well as encouraging sponsoring companies to take the environment into account in their products. Honouring the spirit of the Green Games with the Stand-off top for marathoners was the right thing to do. Along with our Re-use A Shoe (used footwear recycling), 3% organic cotton tee shirt, and PVC reduction projects, Nike could demonstrate its commitment to the Green Games and the environment with products for athletes, which is what we do best.

We were able to follow a sustainable course on the fabric with Miratec for several reasons [see fabric close-up illustration]. The first was the general efficiency and cleanliness of its fabric formation process. Using CAD/CAM design and quick, narrow-goods prototyping, we were able to quickly progress in the fabric's development without tying up large energy-consuming knitting machines.

In prototyping and production, the fabrics are formed very precisely using laser-guided water jets to place fibres right where they are needed. Significantly less energy is used in the Miratec process compared with conventional means due to this efficiency, and the water coming out the back end is pristine. (I know, because I have been drinking this water in presentations as a demonstration of the cleanliness of the process.)

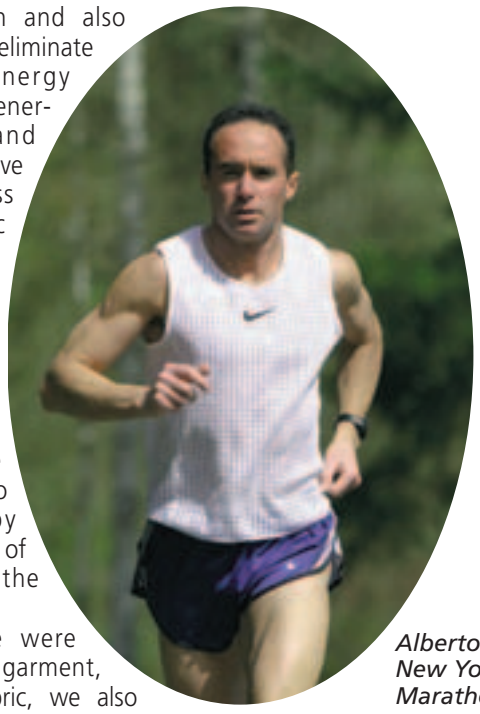
Another very obvious green aspect of using a non-woven material is that the entire energy consuming process of spinning yarn is eliminated. We're moving directly from fibre to fabric in one very efficient process. Also eliminated is the transportation involved in delivering the spun yarn to the knitting or weaving facility.



Design board illustration.

One of the "three Re's" of environmental sustainability is "recycle". Upon working with Miratec, we asked them to incorporate recycled fibre into the mix for Stand-off as we were seeking to take the environmental aspects of our fabric as far as we could. We ended up with a blend of 75% Wellman Eco-Spun polyester fibre and 25% virgin polyester. In future versions of Stand-off, we hope to move to 100% recycled fibre but we were not able to achieve the necessary performance qualities with 100% recycled at this time. Our calculations show that it takes about one-and-a-half, two-litre PET bottles to make one Stand-off top.

One of the performance aspects of the Stand-off top was that it needed to be a light colour to reflect radiant heat from the sun. Fortunately, the Eco-Spun fibre was available in a 'natural' white colour, which maximises solar heat reflection and also allows us to eliminate the highly energy consuming, generally toxic, and clean-up intensive dyeing process from our fabric formation. Again, as with the spinning process, the transportation involved in sending the fabric to the dye house is also eliminated by using the colour of the fibre as the fabric colour.



Alberto Salazar - former New York and Boston Marathon winner.

Because we were developing a garment, not just a fabric, we also

explored alternative methods of assembling our product. We decided to pursue ultrasonic welding as a means of eliminating sewing thread as a material from the garment, as well as keeping the materials in the top to one polymer. By eliminating the sewing thread, we not only reduce the total materials used in the garment, we eliminate the need for the energy intensive thread manufacturing process as well as the transportation of the thread to the garment assembly facility. Efficiency is sustainable ("Reduce" is the first of the "3 Re's).

By keeping the garment content to one polymer, we increase the likelihood that it can be recycled more easily. Unfortunately, this aspect of the product helps us highlight one of the 'unclosed loops' in our business. We have a 100% polyester garment that will ultimately end up in a landfill thus leaving "Re-use" as the unfulfilled "Re" for Stand-off. It's unlikely that competitive athletes will be donating their racing tops to second-hand clothing stores.

While it is true that there is a thriving used clothing industry which is sustainable to a large degree, most of the apparel products that our industry makes will ultimately be thrown away by someone, somewhere. In the United States, there is not currently a way to even recycle 100% polyester apparel products like Stand-off back into raw polymer after their usefulness as clothing or rags is over. A process called methanolysis can be used to achieve pure polyester from post-consumer or manufacturing products but this is not currently being performed in the USA. Nike is exploring the formation of a coalition of companies from various industries to find enough landfill-bound polyester to make reopening methanolysis plants a profitable endeavour.

In order for us to truly consider Nike a "sustainable company", loops like the above will need to be closed both within our own internal processes as well as within the processes of the hundreds of partners that we work with. From product 'ideation' teams and raw materials through to the product manufacturers, retailers, and end consumers, a massive education process is taking place (using The Natural Step principles developed by Karl-Henrick Robert in Sweden), but we have a long way to go, and Stand-off is an exception right now, rather than the rule.

We are approaching this current global Sustainability Initiative as the first steps of a marathon, but a marathon that we know we need to run in order to continue to be a leader in the sports and fitness industry into this new millennium. The product leaders of the future will be those that follow environmentally sound practices, because these practices will lead to efficiencies throughout their business, and thus, higher profits: doing well by doing the right thing.

In the midst of our pursuit of a green product, we haven't lost sight of our first objective with Stand-off though, a cooler running top for endurance track and field athletes. I am happy to report that wear testing has shown the fabric to be noticeably cooler and lighter than conventional knits. This May, we are in our final refitting process for the garment and are about to begin production. The first big competitive test of Stand-off will be on Nike sponsored athletes at the USA Olympic Track & Field Trials in hot Sacramento, California, in July. In the following two months, athletes in the Nike-sponsored national federations will have Stand-off running tops available to them to use in the Sydney Olympics. I almost forgot another environmental plus - those country names (and the Swoosh, of course) will be printed on the tops using water-based inks, eliminating the PVC binders that conventional screen printing inks contain.

Rick MacDonald,
RPM Apparel Innovation Director, Nike Inc.

For those interested in Sustainability for Business, the following books are suggested as recommended reading:

- Natural Capitalism *by Amory Lovins, Hunter Lovins and Paul Hawken*
- The Fifth Discipline *by Peter Senge*
- Biomimicry *by Janine Benyus*
- Green Marketing *by Jacquelyn Ottman*
- The Natural Step for Business *by Brian Nattrass and Mary Altomare*