"That stuff doesn't change much"

Recently I was asked to update current tent materials as well as report on design advances for Spring 2001. I mentioned this during a conversation with a climbing buddy of mine. "That should be easy," he said, "that stuff doesn't change much. Some minor changes in the details, a colour change here, maybe an extra vestibule there." Hearing this I wondered if he had a point. "Surely there have been significant design advances in the past few years, and there are huge differences between manufacturers," I said. "Don't get me wrong," he said, "I might be over simplifying it a bit, but really how many big changes can you count over the last couple of years."

Hey! there were clip-locs, single walls, UVX windows, different door shapes, etc. - there were plenty of things I could think of. What was disconcerting, however, was the realisation that my friend was a real outdoor enthusiast, a good climber, an avid hiker, as well as someone who had worked in outdoor retail. Had all the hype and propaganda of new designs and features been lost on him or had he just become jaded by a million hang tags and product claims that turn out to be marginal improvements at best, assuming he had noticed them at all?

Make no mistake, he was grossly over simplifying, but it started me questioning just how much consumers, or even those in the industry, knew about tent features. Selling tents at retail I can often recall features and benefits falling on deaf ears as the customers would say "I'll take this one: if it rains and I get stuck in it for a few days it would be more comfy to play cards in." There have definitely been significant advances in tent designs. However, there do seem to be many advances in the details, important details, but ones that are not always easily noticed by the untrained eye: non-wicking grommet tabs, silicone dipped guy out loops, photocromatic windows, or maybe even changing a pole angle by a few degrees for better structural integrity, for examples. These are important features, but not always appreciated by the average consumer.

There are definitely good reasons why one tent is as much as a hundred dollars more than another and it is not just for the logo on the rain fly. Keeping this scenario in mind I began to contact the predominant tent designers in the trade to research design and textile advances that have been made in the past few years. In a short time I realised that to cover every advance and do justice to the contributions of every company, not to mention sorting out who should really get credit for which design feature, this article would have to be two hundred pages long. There are also many kinds of tents from huge multi-room family tents to single wall, single person tents that weigh less than four pounds (1.814 kg) - but this article is confined to the high end, 3 & 4 season, double wall tents from US Manufacturers. In the first half of the article, the most common materials used are considered; the second half addresses some of the new design and textile innovations being introduced for Spring 2001. (When describing current fabrics there are many manufacturers using various deniers, construction, and coatings but the focus is on the most commonly used.)

Tent floors

Most often used in floors is a 70 denier nylon taffeta with a polyester urethane (PU) coating. This coating will vary in thickness depending on the manufacturer specifications. It can range from 1,200mm to as high as 10,000mm. The thicker the PU coating the more durable it will be, but, as you increase its durability (waterproofness), you also increase its weight, as well as decrease its tear strength, so it is up to the manufacturer to find the magic balance depending on the tent's final usage: a thicker coating for a three person 4-season tent and thinner for a light weight solo tent. Fire retardant treatments (FR), mildew resistant treatments (MR) and ultraviolet retardant (UV) are also often contained in the PU coating.

Aside from varying the thickness of PU coating, there is also the variation of using polyethers urethane (PE) as opposed to PU. One advantage to this is that a PE is hydrophobic (water hating) as opposed to a PU which is hydrophilic (water loving). It has been found that over time the PU coatings begin to degrade or hydrolyse, the chemical process in which the PU starts to break down into its various base components. A by product of this is that sterict acid is released which gives off a foul stench much like dirty socks left for a weekend in your high school gym locker. Using polyethers instead of PU coatings avoids this effect. Another added bonus of its hydrophobic nature is that it is more resistant to growing mould. The draw back to the PE coating is that it is more expensive so it is only used by a few manufacturers in specific models.

Tents side walls

The tent sidewalls are the vertical area from the floor seams to where roof angles change and tent changes colour, between six and ten inches up the

sides of the tent. Like the floor, this area takes quite a beating, so it is generally made of the same 70 denier PU or PE coated fabric that the floor is made of.

The canopy

The rest of the fabric that makes up the top of the tent body is the canopy fabric. This is generally a 40 or 70 denier calendered nylon ripstop fabric, which has good air permeability and good tear strength for holding seams tight.

Tent fly

The tent fly, or rain fly, is where one can really get into some interesting fabrics and finishes. I found companies using both polyester and nylon for the rain fly, but the majority opt for nylon. Nevertheless, while talking to designers, there seems to be a debate over which is a better fabric for a tent fly.

Further digging on the issue revealed some interesting opinions. I am a strong believer that when you are developing a product, you really need to stay focused on its true end use, as well as the fact that it is difficult to develop a product that does everything really well. It is all give and take. With this said, there are so many factors in construction, coatings, and finishes that affected everything from tear strength to UV resistance, that it is impossible to make a blanket statement that one fabric is always better in every application then the other. Let's look at some pros and cons that exist between the fabrics.

(As I said above yarn denier, tenacity, construction, coatings etc. affect the fabric performance dramatically, so for argument's sake theoretically assume the exact same fabric construction in nylon and polyester.)

In laboratory tests, polyester often has a good tear strength, but in field testing nylon tends to be more resistant to tearing due to its inherent ability to stretch.

Nylon absorbs water causing it to swell and sag, becoming loose on the tent and forcing the user to go out and tighten it down.

Polyester's relative lack of stretch and low moisture absorption help keep it more taut, reducing flapping of the tent.

Nylon tends to be more abrasion resistant, not needing as many reinforcements as a polyester fly.

Polyester does seem to be more resistant to UV degradation in higher deniers, however, in lower denier fabrics (40-75D) there does not seem to be any appreciable advantage in UV resistance between polyester and nylon.

Colour also contributes to UV resistance - darker colours tend to have better resistance than lighter colours, fluorescent colours have the worst (sounds backwards but it is true).

A high quality fabric is better than a cheap one no matter what it is made of.

What I hope you are noticing is a pattern of contradictions - the give and take required.

From this brief look one could summarise that the unique characteristics of both nylon and polyester could have design advantages depending on the specific end use of the tent. For example, since a non free standing tent relies heavily on the taut staking of its rain fly to keep the integrity of its structure, it would benefit greatly from the low stretch and moisture absorption characteristics of a polyester rain fly.

Tent poles

The category of tents considered here generally use aluminium poles, except for the occasional lightweight model which incorporates carbon/aluminium hybrid poles. In researching I found that there was an area of debate as to which company produced the better poles: Easton, a long time US manufacture, or DAC, a Korean manufacturer which makes Featherlite poles. There was plenty of information on the subject, enough for another feature. Before anyone believes that I am going to attack this issue let me say: when all is said and done, again I found it nonsensical to say that one brand is always better in every application than the other.

It is hard to make direct simple comparisons between them because, like fabrics, there are many variables such as alloy, temper, wall thickness and diameter which all contribute to the final performance of the pole. Again the designer has to find the right balance of strength, weight, ease of repair, and cost when choosing the right pole for the job. One manufacturer that is using both styles of poles actually expressed concern that the industry might polarise into camps and not make fair comparisons between the two types, such as making a claim that one is stronger than the other based on alloy strength alone and not considering all the other characteristics that contribute to a pole's performance. A caution to the reader: anyone who calls an excessive amount of attention to the poles, might not have much else to talk about.

With the major components covered, let us turn attention to the details, because it is often the fine details that go unnoticed. Although the major components can make big differences in tent performance the small details also greatly affect performance, longevity and the overall comfort of the tent. An excellent example of the importance of details came from Damien Huang, director of equipment at The North Face. He mentioned that one of the biggest eye openers that had occurred during its first C130 wind test was that one of the major components contributing to the failure of the tents in testing, was the ladder lock buckles! Buckles? "Yes, the 20 cent ladder locks, that allow you to synch down your tent fly to the stake out points, would slip, starting a chain of events leading to the tent's premature failure." This is a small example of how a seemingly insignificant detail like buckles can be so important. It is also an example of the kind of major improvement that consumers see as marginal improvement at best, if noticed at all. Sound familiar? Details can be worth their weight in gold.

Some of the new tent designs, features and materials for the Spring 2001 season.

Mountain Hardwear

For Spring 2001 Mountain Hardwear introduces three new tents which fall into its new Superlight tent category, the Tri-light, Approach and the Mountain Yurt. "We really worked hard to lighten up these tents," says Martin Zemitis of MHW design team, "but we found merely lightening up any single item will not make a substantially lighter product. Instead, we worked on the big picture and took weight out of every component - tent poles, fabrics, construction, seam taping etc. - only by working on all issues have we managed to lighten up the total tent weight by as much as 20%." This category of tents also brings three new fabrics with it. The first is a fly fabric which is a 30 denier nylon 6.6 ripstop with a 3000mm PU coating on the back that can be seam taped, with excellent UV and FR retardancy as well as a new silicone coating on the outside of the fabric. This fabric with its light weight, high durability and low stretch is an excellent balance of weight and performance claims Zemitis. The second is its new light weight 2000mm PE coated floor fabric. The third fabric is a 40D HT calendered, nylon, ripstop canopy fabric with a good balance of weight to strength ratio.



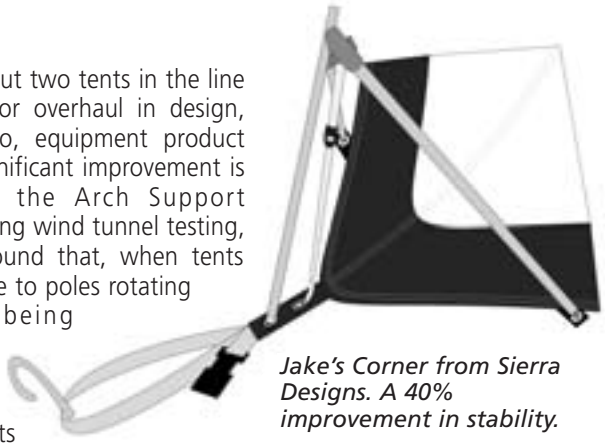
Tent by Mountain Hardwear

Kelty

Kelty USA is introducing its new TITANTEX fly fabric made with Titanium Dioxide for super ultra violet resistance. According to Carl Boni, product manager for tents, another two introductions are structural features which will work together as a system to increase the stability of the tent. The first is the FlyBoy which is a patch permanently affixed to the fly and a plastic clip that clamps the body, poles, and the fly together into a single, self reinforcing structure. Webforce is the second new feature which consists of two parts. The first is the 'trusses' at each pole sleeve intersection. These guide the poles through the intersection, easing set up and eliminating any independent movement of the poles, strengthening the structure. The second part is the Webforce 'tendons' on the fly, which lock stakeout points to the FlyBoys, preventing any stretch or movement under even the strongest winds.

Sierra Designs

At Sierra Designs all but two tents in the line have undergone a major overhaul in design, according to Ted Giano, equipment product manager. The most significant improvement is the introduction of the Arch Support Technologies (AST). During wind tunnel testing, the SD design team found that, when tents failed, it was usually due to poles rotating on their tips and being deflected to the ground. To combat this they designed the AST system which exists in two forms. First, on all four season tents, they have incorporated 'Jake's Corner'.This is a support system consisting of 2x14 inch poles and 2x12 inch poles which combine in the corners of the tent preventing twisting of the main poles, giving the tent a 40% greater wind resistance. The second part of the AST concept takes place on two of SD's 3-season tents, the Orion and Orion 3, where they have redesigned the existing frame geometry to simulate the same support benefits of 'Jake's Corner'. Another feature introduced is the new Stash door that gets out of the way (from being stepped on and trashed) in as little as two seconds with the addition of a stash pocket.



Jake's Corner from Sierra Designs. A 40% improvement in stability.

The North Face

Damien Huang, Director of Equipment, at TNF provided a brief on a new tent called the 'Rainier'. This offering is in its ultralight series of tents and the unique feature is that it has four different pitching options. 1. Pitch the fly first if it is raining allowing you to set up the tent under a dry shelter. 2. Set up the fly and tent simultaneously. 3. Pitch the tent by itself if the weather is good. 4. Pitch the fly only for shelter. Another point added by Damien was that, as a whole, the company was re-examining its designs with comfort in mind which unfortunately is difficult to translate on to a spec. sheet.

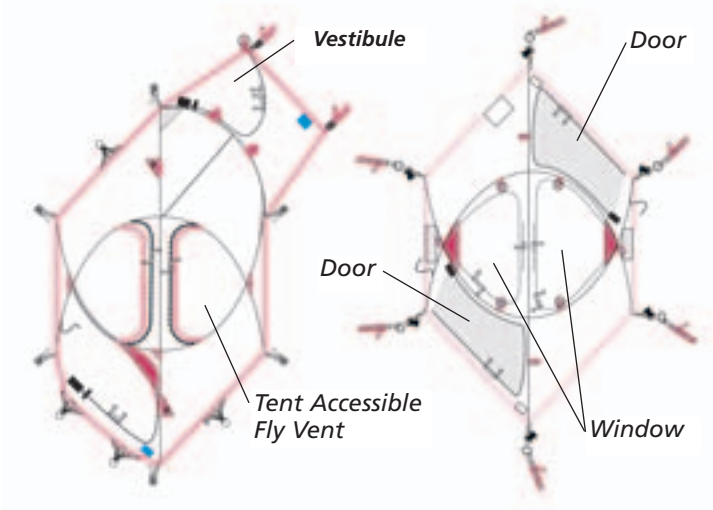


TNF's Rainier

Marmot

For Spring 2001 Marmot is introducing its 'Integral Pole Vestibule', a system whereby the poles of the tent actually form the structure giving a functioning vestibule without having to stake it out. Another Spring '01 improvement is the expansion on the Exoskeleton system that was introduced last season in its Mach 2, Mach 3, and Area 51 tents. This is a system with two different pitching options for the tent: pitch the tent fly and tent simultaneously, or second, pitch the fly by itself as a shelter.

Detail plan of Odyssey tent by Moss Tents, Edgeworks, Inc.



Edgeworks

Edgeworks announces that, in its Moss line of tents for Spring 2001, it is making some changes to its Summit series of tents. The Summit series will now include gear lofts, internal guys, and new detachable stake loops. The Summit series will also be switching over to fully taped all polyester rain flys. Moss will also be introducing two new tent designs: the Odyssey, a 4 season 2+ person tent featuring two large doors, two large windows and a vent in the rain fly that is accessible from the tent and the Assault, a tent which will feature light weight fabrics and components for a bare bones, two person summit bid style tent.

Andy Coutant

With grateful thanks to all who helped me gather the information for this article.

Before joining Concept III Textiles, with special responsibility for Rentex Performance Fabrics and as director, technical product development, the author spent some eight years in outdoor retailing and management, including Jersey Paddler, and has also taught classes in kayaking and other outdoor skills.