» leap of FAITH

BY CLYDE SOLES

As snowsport helmets become sleeker and more fashionable, many are found to be meeting the barest minimum of safety standards.

» Embracing the fickle nuances of fashion as much as the logical needs of safety, the ski and snowboard world has rushed toward acceptance of helmets as the norm rather than the exception—much like the bike world wisely did a decade ago. While wearing a helmet of any kind seems to make intuitive sense when flying down a snow slope at 25 miles per hour—a typical speed on blue runs—a helmet that does not meet stringent, though voluntary, testing standards offers little more protection than a cardboard box.

While GearTrends® believes firmly that increased usage of helmets in biking, climbing, snowboarding and skiing is absolutely a good thing, our in-depth research for this article reveals a disconnect between what consumers are told and what the reality is regarding the level of protection a helmet provides.

Certainly, designs have become lighter, sleeker and more ventilated, making helmets a more comfortable and fashionable choice to the bowling ball helmets commonly seen in the mid-90s. However, as a result, many helmets are meeting only the barest minimum of safety standards. And when it comes to head protection, minimum just doesn't cut it.

Be warned that helmet advocates are often no better than the anti-helmet zealots when it comes to putting out misleading information. For example, one oft-cited study that supposedly shows how effective helmets are at preventing injuries is based on data compiled when bike helmets were beefier than today. And the higher risk of neck injuries the "anti" crowd warned about hasn't materialized.

THE GOOD

The good news is snowsports are pretty darn safe overall—more people are killed by lightning each year than ski accidents. The odds of serious injury or death while skiing or snowboarding are less than one in a million. And of all reported injuries at resorts, only 2.6 percent involve serious head trauma. However, considering the consequences, even that is too high.

The percentage of skiers and snowboarders wearing brain buckets continues to increase in the United Sates. Last season, according to the National Ski Areas Association, about 28 percent of all lift riders wear helmets and another 32 percent are planning to start in the near future.

As skiers become more proficient, they are more likely to wear a helmet, increasing from 14 percent of beginners to 23 percent of intermediate skiers, and 37 percent of advanced/expert skiers. It is apparent that parents are also enforcing helmet usage since 63 percent of children under 10 years old wear them.

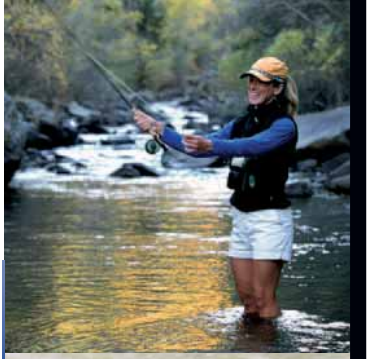
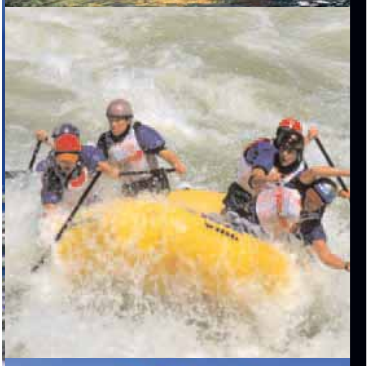
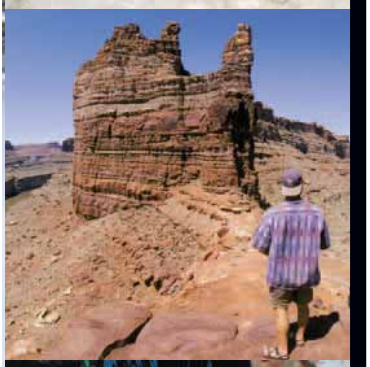
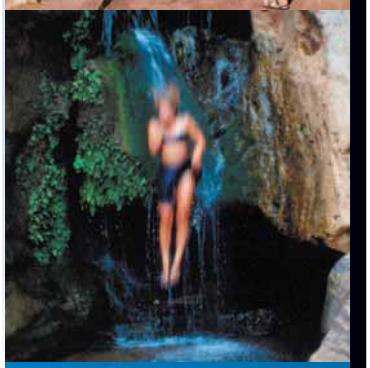
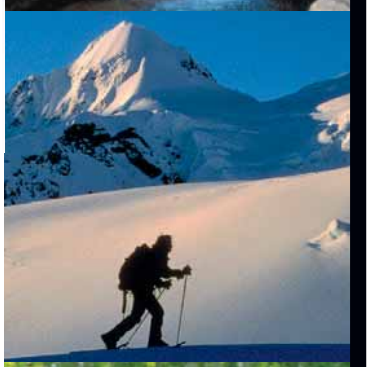
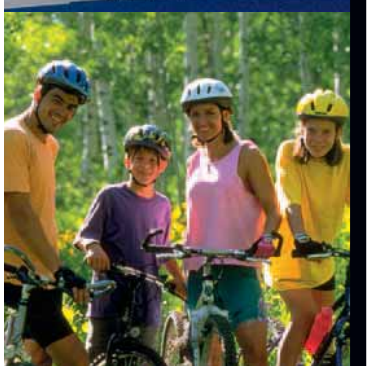
This trend contrasts sharply with Europe, where helmets on adult skiers are rare. After a week of skiing in Italy last spring, GearTrends® could probably count the number of helmeted skiers on one hand. A recent survey in Switzerland showed that just 3 percent of women and 6 percent of men over age 25 wear helmets while skiing; the rates are a bit higher for snowboarders, 12 percent and 14 percent, respectively.

After several years of strong growth, SIA reported that helmet sales fell last season for the first time in a decade. It estimated that 680,896 helmets sold compared to 880,510 the year before and 653,959 in the 01/02 season. Still, compared to total sales of just 66,000 helmets in the 95/96 season, helmets remain a strong category for some ski shops.

The clear industry leader is Giro, which has an estimated 38 percent market share, a good portion of which belongs to its Nine.9 helmet. Other strong contenders include Boeri, Leedom, K2 and, particularly in snowboard shops, RED helmets.

Despite the decrease reported by SIA, several helmet manufacturers contacted for this article reported their sales were up last season and they expect to be up again. It may be that sales of cheaper helmets have leveled, while sales of higher-end helmets are moving as the

BOB ALLEN PHOTOGRAPHY

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core group of helmet wearers upgrade for improved features such as superior ventilation, built-in speakers (Giro Fuse and RED Audio Hi-Fi), and integrated goggles (K2 Black Hawk One). Next season expect to see more integration of helmets with audio and goggles, as well as models specifically for women.

THE BAD

Reviewers routinely gush about the latest helmet features and, as an afterthought, toss in a recommendation that consumers should look for an ASTM, CEN or Snell label to ensure the helmet is "safe." Similarly, many of the websites we visited (including www.skihelmets.com, which is merely an e-tail site) and ad copy we reviewed communicate helmet-buying and helmet-use messages that are about style and comfort with barely a mention of meeting standards (e.g., K2 and Uvex don't even state how their helmets are tested).

Even when a manufacturer touts it has met a certain standard, what gets glossed over is that the CEN standard (CE 1077) is dangerously outdated, the ASTM standard (F2040) has serious weak points, and the entire industry has abandoned the rigorous Snell standard (RS 98).

According to Eric Richter at Giro: "Helmets like the Nine.9 or the Fuse were created for recreational skiing and snowboarding, so we designed them with ASTM F2040 in mind because it addresses the most common concerns for recreational skiing and snowboarding and it is based on the most recent data and observations about usage and injuries. Since the CE 1078 bike helmet requirements are similar to aspects of ASTM F2040, we made sure that the Fuse and Nine.9 would meet CE 1078 for sale to the EU market.

"By comparison," he continued, "the CE 1077 standard was created for the specific demands of alpine skiing and racing in Europe. It has some requirements that don't apply directly to snowboarding or current injury data, and it is based on older research and ideas too. Based on these factors, we feel it isn't completely applicable to the Nine.9 or the Fuse. This is a perfect example of how and why standards evolve, and why we always have to be open-minded about how to make the best product for every type of rider."

Unlike bike helmets, which have a federal mandate for testing requirements, and climbing helmets, which are certified by an independent body, ski helmets sold in the United States have voluntary standards and no requirement for outside verification. Aside from last winter's tests by Consumer Reports magazine, which were shallow and of little value, there have been no published comparisons of ski helmets' most important function—safety. For the most part, even the various consumer ski magazines just churn out reviews that read almost like advertorials with little or no mention of safety. By all appearances, helmets are in danger of becoming more about fashion than safety.

MEETING A STANDARD

Most recreational ski helmets sold in the United States now meet the ASTM F2040 standard, which has nearly (96.1 percent) the force of the Snell standard for hitting a flat surface. The helmets sold in Europe only have to meet CE 1077, which tests with 69.2 percent of the Snell flat anvil impact force, albeit with a slightly lower permitted level of acceleration.

The Central European Norm (CE 1077) is the most basic of all the standards—requiring only a drop onto a flat surface from the lowest height of any available testing standard. What this means is that helmets with a CE 1077 certification have passed the most minimum of standards, developed for ski racers in the 1980s, to allow them to be sold in Europe.

However, hitting a flat surface is less of a concern for recreational skiers than hitting trees and rocks, the primary targets of serious head injuries, according to a report by a Colorado trauma center. Since these impacts concentrate the forces, the most important helmet tests are with a round sphere and a wedge-shaped anvil.

The ASTM F2040 standard requires three drop tests that include a flat anvil, a rounded anvil and an edged anvil, making it a much more desirable standard when evaluating the overall safety of a helmet. Snell RS-98 takes the ASTM testing protocol one step further by placing a metal head into a helmet and then dropping that onto flat, round and edged anvils at specific impact velocities. Snell drops generate the most velocity, followed by ASTM, and then CE a very distant and almost worthless third.

Basically, all of this means that a helmet meeting the ASTM or Snell standard protects a skier traveling 14 miles per hour from a direct impact with a flat surface and gives protection against trees. The CEN helmets are only tested to the equivalent of hitting something flat at 11.6 mph (for size medium. Higher forces are used in larger helmets). Beyond those relatively slow velocities, most helmets do very little to protect the head in a straight-on collision since they essentially disintegrate on impact.

If the Snell certification is best, as it appears to be, then why aren't more manufacturers turning to it? According to Hong Zhang at the Snell Memorial Foundation, "The problem with the availability of Snell-certified helmets for skiers is that European-style ski helmets with little protection capability are very popular in the

WHO'S WHO IN STANDARDS AND CERTIFICATION

We waded (too deeply at times) through the confusing morass of standards information—sometimes even the standards organization had trouble explaining their own information—to come up with what we hope is a concise explanation for your edification:

» **ASTM:** ASTM International, originally known as the American Society for Testing and Materials (ASTM), is one of the largest voluntary standards development systems in the world. Compliance with standards is voluntary. Any company claiming it has passed ASTM standards must self-test for compliance or have its product tested at an independent lab using ASTM standards protocol. The ASTM does not, itself, enforce or perform certification. Visit ASTM at www.astm.org.

» **Snell:** This is a private, widely respected non-profit foundation which develops performance standards for head protection equipment. Visit the Snell site on the web at www.smf.org. Any helmet bearing a Snell certificate label has passed some of the most rigorous, and some manufacturers claim, restrictive and unreasonable, testing available at Snell's labs.

» **CEN:** Established in 1961, the European Committee For Standardization (www.cenorm.be/cenorm) is a non-profit association producing European standards designed to eliminate internal European trade barriers. Products which have CEN certification carry a CE marking which does not indicate a conformity to a standard, but rather conformity to the legal requirements of EU (European Union) directives. The mark is not a certification of quality either, but indicates to authorities responsible for enforcement of EU directives that the manufacturer claims compliance with the directives that apply to the product.

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marketplace and are cheaper to make. Manufacturers have little incentive to shoot for a tougher and higher standard set by Snell. We only hope that consumer demands for more protective ski helmets will one day drive the manufacturers to develop newer and better headgear."

Other issues of concern are that none of the ski helmet standards test for side impacts or glancing blows. Consumers have no way of knowing how a helmet performs in these relatively common situations.

Structurally, the side of the skull is weaker than the front and top (depends on specific location), and the edges of many helmets will flex considerably. Thus, a helmeted skier taking a tumbling fall through rocks may still be vulnerable to a relatively mild blow to the temples, even if this area is covered.

While a glancing blow has less force than a direct impact, it actually can be more harmful. This is due to rotational forces that tend to shear and tear brain tissue, often without external signs of damage. Helmets with big vents may be more likely to snag on branches and rocks, possibly increasing the risk of injury.

Ironically, although the ASTM standard is much better than the CEN standard in terms of testing for impacts, only the latter includes a penetration test from a sharp object (such as a ski pole or tree branch). Snell also has a penetration test but since nobody uses its certification, it means that most ski helmets sold in the United States are not tested for penetration resistance.

ANY HELMET JUST WON'T DO

It is often said that any helmet is better than no helmet when a skier crashes. This sounds logical but isn't necessarily true. A poorly fitting helmet won't do its job in a tumbling fall.

A study conducted with a radar gun on blue runs at three ski resorts found that skiers and snowboarders go a lot faster than they realize. Out of 650 people, 84 percent were going faster than 19.7 mph, 50 percent were faster than 26.7 mph, and 16 percent were faster than 33.7 mph. On average, skiers were traveling 3.5 mph faster than snowboarders, and men are 4.0 mph faster than women.

With experience, comes speed: intermediate skiers average 6.8 mph faster than beginners, and advanced skiers rip along 5.1 mph faster than intermediates. One skier clocked in at 52.0 mph!

Better gear and improved grooming makes a difference too, since average speeds are 4.9 mph higher than in the late 1970s. Thanks to the ascendance of high-speed chair lifts, the slopes are more crowded than ever with faster-moving skiers—more on-slope collisions are inevitable, with greater consequences.

Significantly, those wearing helmets were 3.0 mph faster than those without. This doesn't necessarily mean that helmets encourage skiers to go faster, but it may well be that those with a lust for speed realize a helmet may be a good idea. But a skier with a helmet may also be more likely to take other risks, such as skiing along the edge of a slope instead of down the middle.

Recall that the ASTM standard only tests helmets to the equivalent of 14 mph. A skier or snowboarder traveling at the average speed of 26.7 mph has 3.6 times more kinetic energy than the helmet is designed to dissipate. The fastest 16 percent of skiers have over 5.8 times the capability of their helmets—these people are organ donors if they hit a hard object head first.

When a moving head stops suddenly, that 3-pound ball of soft tissue inside (a.k.a. the brain) continues briefly until it bangs against the skull then rebounds injuring the opposite side too. If that ball gets some spin from a glancing blow, there may be even more tissue damage.

Unfortunately, the current helmet standards allow higher acceleration (300 times the force of gravity) than the brain can handle. According to a report on cadavers, minor brain damage can occur with an acceleration of 148 g and serious damage can result from 268 g.

Ski helmets indeed seem like a great idea…until you realize that manufacturers currently engineer helmets to meet standards of their own choosing, often inadequate. Worse, if the consumer is sold a helmet that fits poorly to begin with, even the possibility of minimal protection is greatly reduced. At least they are warm, comfortable and stylish.

HEAD SMARTS

There is no such thing as one helmet for all snowsports. As with other sales, it is important for stores to qualify customers to determine their needs. Stores also need to do a better job of fitting helmets instead of just taking the customers cash and sending them out the door.

Racers need full helmets, often with chin guards for bashing gates. But these tend to be hot, heavy and restrict hearing.

The denizens of snow-parks and half-pipes are probably better off with true skateboard helmets that are tested for multiple side and rear impacts. These do a better job of reducing frequent small hits because they use squishier foam than used in single-impact ski and bike helmets. But they are generally less capable of handling the big hit and should not be used for free skiing. However, although there are ASTM (F1492) and Snell (NX2002) standards for these multi-impact helmets, there is no requirement to use them, so many "skateboard" helmets just meet the weaker one-whack-throw-it-away standards.

Since Snell-certified helmets are not an option currently, recreational skiers should only purchase helmets that meet the ASTM standard. Shops should think twice about selling ski helmets that only meet CE 1077, because these products offer so little protection. While these may be fine for racers, they merely offer a false sense of security for recreational skiers.

At present, consumers are left largely to trust the goodwill and good name of the helmet brands. Responsible manufacturers, those same ones paying so much attention to style and comfort, need to step up and begin designing and manufacturing their helmets to meet the most stringent of testing standards suitable for today's skiing environments.

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