Every time an avalanche fatality hits the newswire, the skiing community tries to make some sense out of what happened. Some people want to know precisely what mistakes the victims made so they can avoid the same fate. Others want to know how anyone in their right mind could even conceive of backcountry skiing in Considerable conditions. As someone who often skis pretty big lines under a Considerable forecast, I find myself attempting to explain the process my partners and I employ when making decisions in avalanche terrain. It’s not easy using words to express a constellation of cognitive skills as complex and integrative as the ones I have learned. But I try to add my perspective to the discussion because I have been doing just that for nearly 40 years. I wrote something like the following in an online discussion on telemarktips.com in the aftermath of the recent Stevens Pass avalanche that claimed the lives of three well-known and very experienced backcountry skiers.

See “Skiing in Considerable Hazard” continued on page 20

The probability of losing a single round of Russian Roulette is “only” 1/6. To last very long in the backcountry, the probability of an avalanche needs to be far lower.

—Jonathan Shefftz, Avalanche Lesson, pg 34
what’s our vision and what’s our strategy?

While these might seem like peculiar questions for the president to ask of the membership, the questions are honest and sensible. I hope you’ll help us answer these questions.

The avalanche profession continues to be an evolving order and so too should be our association. Formally, we are a member-driven association because members can elect or remove members of the board. Also, in member-driven organizations members express their wants and needs and their push is to the board. However, for 25 years we have operated more as a member-supported organization where the board drives the organization and the members support the board. This approach worked because we were small and relied a high degree on volunteers (on whom we will still rely on in the future). As our numbers grew we have employed executive directors. Currently Mark Mueller resolutely and ably directs our day-to-day operations.

Our association is ready to mature, especially as society – commercial, governmental and recreational – is now starting to recognize our profession and the importance of avalanche professionals. As a result (at least right now) our membership is growing and growing fast.

It is time to evaluate our progress and look forward. We need a vision to the future. To look to the future we have to decide what we want AAA to become and what changes we will make to get there. This is a big topic for quite some time. Will Gaedd’s brutally honest look at risk spawned some further introspection from other mountaineers; Phil Powers and Margaret Wheeler expand on that look with personal and professional perspectives. Charlie Ziskin’s insight into skiing during a Considerable danger is showcased on the cover for his ability to turn complicated decision-making into lucid prose; thanks Charlie and welcome back to the avalanche community. And speaking of lucid prose, I was able to pilfer Karl Klassen’s essay about the complexity of snowpack at the tipping point from the new CAC forecaster’s blog. Pop over there and have a look at the range of writing where these thoughts expand from the space/time limitations of daily forecasts.

I also thought that, since everyone else was doing it, TAR should have an article about airbags. But I wanted a focus on risk tolerance as the theme for the April TAR, especially on the differences between personal and professional risk tolerance. In the pages to come, you will find a wide variety of contributors weighing in on their views of risk. For perspective, I have drawn from the climbing and mountaineering community in addition to the avalanche community, as they have each been thinking hard about this topic for quite some time. Will Gaedd’s brutally honest look at risk spawned some further introspection from other mountaineers; Phil Powers and Margaret Wheeler expand on that look with personal and professional perspectives. Charlie Ziskin’s insight into skiing during a Considerable danger is showcased on the cover for his ability to turn complicated decision-making into lucid prose; thanks Charlie and welcome back to the avalanche community. And speaking of lucid prose, I was able to pilfer Karl Klassen’s essay about the complexity of snowpack at the tipping point from the new CAC forecaster’s blog. Pop over there and have a look at the range of writing where these thoughts expand from the space/time limitations of daily forecasts.

I also thought that, since everyone else was doing it, TAR should have an article about airbags. But I wanted a focus on risk tolerance as the theme for the April TAR, especially on the differences between personal and professional risk tolerance. In the pages to come, you will find a wide variety of contributors weighing in on their views of risk. For perspective, I have drawn from the climbing and mountaineering community in addition to the avalanche community, as they have each been thinking hard about this topic for quite some time. Will Gaedd’s brutally honest look at risk spawned some further introspection from other mountaineers; Phil Powers and Margaret Wheeler expand on that look with personal and professional perspectives. Charlie Ziskin’s insight into skiing during a Considerable danger is showcased on the cover for his ability to turn complicated decision-making into lucid prose; thanks Charlie and welcome back to the avalanche community. And speaking of lucid prose, I was able to pilfer Karl Klassen’s essay about the complexity of snowpack at the tipping point from the new CAC forecaster’s blog. Pop over there and have a look at the range of writing where these thoughts expand from the space/time limitations of daily forecasts.

What’s YOUR Level of Risk Tolerance, Personally & Professionally?

This final issue of volume 30 of TAR is another fat one. There is finally time to collect stories and case studies from this winter, see how the weather history played out into avalanche stories. For this year, early drought led to a pervasive deep-slab problem. Patience and risk tolerance became the operative topics. I chose to focus on risk tolerance as the theme for the April TAR, especially on the differences between personal and professional risk tolerance. In the pages to come, you will find a wide variety of contributors weighing in on their views of risk. For perspective, I have drawn from the climbing and mountaineering community in addition to the avalanche community, as they have each been thinking hard about this topic for quite some time. Will Gaedd’s brutally honest look at risk spawned some further introspection from other mountaineers; Phil Powers and Margaret Wheeler expand on that look with personal and professional perspectives. Charlie Ziskin’s insight into skiing during a Considerable danger is showcased on the cover for his ability to turn complicated decision-making into lucid prose; thanks Charlie and welcome back to the avalanche community. And speaking of lucid prose, I was able to pilfer Karl Klassen’s essay about the complexity of snowpack at the tipping point from the new CAC forecaster’s blog. Pop over there and have a look at the range of writing where these thoughts expand from the space/time limitations of daily forecasts.

I also thought that, since everyone else was doing it, TAR should have an article about airbags. But I wanted the TAR perspective to take a longer-term view, utilizing critical thinking and real statistics, so I enlisted Jonathan Shefftz to do his trademark thorough job, which, sure enough, he did. See Enhanced Avalanche Survival from Airbag Packs on page 8.

You will also find a photo/essay montage from a late January avalanche cycle in the Tetons starting on page 14. Since I live in the Tetons I have ready access to great photos, and there is never a lack of drama here. A close personal brush with a big avalanche led to a set of reflections and some thoughts for the avalanche community at large. For balance please send me photos, stories, and reflections from your avalanche cycles as well – why should I claim the TAR bully pulp it all to myself? As always, letters to the editor are also welcome.

A few case studies, chosen for their relevance or important questions, some impressive photos and vignettes from a variety of venues, then a fiction piece from John Stembers (with a wicked funny illustration courtesy of Matchstick Productions), round out this final TAR. In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.

In his “From the President” column (above), Dale Atkins talks about updating the AAA mission statement. I’d like to underscore his words to you.
AAA thanks the following members for contributing an additional donation in 2011 to further our efforts. Donations totaled $14,043 and amounted to 24% of our total income in our fiscal year 2010/11.

**BENEFACTOR ($1000+)**
- C-I-L Explosives
- Nathan Kerr
- Halsted Morris

**PATRON ($500-999)**
- Theo Menes

**SUSTAINER ($250-499)**
- Jack Zimmerman
- John Stimberis
- Jamie Wolter
- Bryan Mears
- Margo Krisjansons
- Dale Mihuta
- Jack Zimmerman
- Doug Richmond
- Don Sharaf
- Denny Hogan
- Craig Sterbenz
- Chris Wilbur
- Chris Gibson
- Bob Bailey
- Jan Kellam
- Ian McCammon
- Ed Friedman
- Dr. Roger Zimmerman
- Doug Richmond
- Jon Ross
- Janet Kellam
- Halsted Morris
- Jack Zimmerman
- Donna Sharaf
- Denny Hogan
- Craig Sterbenz
- Chris Wilbur
- Chris Gibson

**SPONSOR ($50-249)**
- Jack Zimmerman
- John Stimberis
- Jamie Wolter
- Janet Kellam
- Ian McCammon
- Ed Friedman
- Dr. Roger Zimmerman
- Doug Richmond
- Jon Ross
- Donna Sharaf
- Denny Hogan
- Craig Sterbenz
- Chris Wilbur
- Chris Gibson

**FRIENDS ($5-49)**
- John Fitzgerald
- Sava Malachowski
- Lel Tone
- Dallas Glass
- Steve Brigham
- Troy Marino
- Sarah Heck
- Jim A. Kennedy
- Sarah Heck
- Irene Henninger
- Nicole Greene
- Brad Acker

**ISSW steering Committee Report**

Dates have been set for two future International Snow Science Workshops.

**ISSW 2013**, the second European ISSW, will be held in Grenoble, France, October 7-11, 2013. Currently plans include a one-day excursion to Chamonix.

**ISSW 2014** will be held in Banff, Canada, September 28 - October 3, 2014. ISSW was previously held in Banff in 1996, and the first meeting in a format similar to ISSW was held there in 1976.

The ISSW steering committee has been consolidating information about past and future ISSWs at a single Web site. All things ISSW should be accessible at or linked from www.issw.net. Thanks to Dan Judd for donating the issw.net domain.

Currently, www.issw.net has general information on ISSW and a summary of each of the meetings. In addition, abstracts and/or paper titles and authors are available from 1996 onward through their archived Web sites. However, at the moment there are only full papers from ISSWs 1996, 2008, and 2009.

The ISSW steering committee is currently engaged in making all of the Workshop Proceedings, including full papers, available – dating back to the early Canadian meetings in the 1970s. A searchable online database is being produced by Montana State University (MSU) in cooperation with the ISSW steering committee. Direct funding for this project is provided by CAA and AAA with substantial contributions of time and expertise by MSU. The proceedings should be available online by the end of March. Visit www.issw.net for the latest updates.

—Rich Marriott, ISSW steering committee secretary

**Avalanche Divas Event Set for September 17 at ISSW**

The Avalanche Divas will again honor women in the avalanche field at the 2012 International Snow Science Workshop, which will be held September 17-21 at the Dena’ina Center in Anchorage, Alaska. Diva nominations can be emailed to Aleph Johnston-Bloom at snowaleph@gmail.com. Ladies, save Monday night, September 17, to celebrate with the Divas in Anchorage!

---

**ISSW 2012**

**September 17-21**

**Anchorage, AK**

**issw2012.com**

---

**LIVING PROOF**

**THAT SIMPLICITY SAVES LIVES**

I was a 16-year-old kid who knew very little about the backcountry. Two years ago a BCA Tracker saved my life. I was buried for eight minutes and I was dug up by friends whom I consider family today. My goal is to become a guide so that I will have the ability to protect people like my former self. Thanks to BCA for saving my life and giving me inspiration.

— Randall Stacey, Ipswich, MA
Mammut recently announced problems with some of the air cartridges sold with their airbag systems. The oldest models have a long-term safety problem and are being recalled to replace the pressure valve. Some of the newer RAS cartridges have displayed a glitch during refilling, which is not a safety issue but can be remedied by sending cartridges back to Mammut or simply repairing them at home.

**SNOWPULSE INFLATION-SYSTEM 1.0 AIR CARTRIDGE RECALL**

Mammut has just issued a recall for older Snowpulse “Inflation-System 1.0” air cartridges. The Snowpulse cartridges (also called cylinders) are equipped with a pressure gauge, also known as a manometer. Over time, some of these pressure gauges have developed a leak that leads to a drop in air pressure and sometimes to all the air escaping. This means that the airbag will inflate insufficiently or not at all. To completely rule out the possibility of this risk, Mammut Sports Group AG has decided to replace all first-generation (Inflation System 1.0) Snowpulse cartridges. Since the full cartridge in these older models could potentially leak at any time, this is a safety issue that needs to be resolved immediately.

This recall only affects older Snowpulse cartridges; it does not affect any of the RAS cartridges manufactured either by Snowpulse or by Mammut.

**Which cartridges are affected by the recall?**

All first-generation Snowpulse cartridges that are compatible with Inflation System 1.0 are being recalled.

**How can I tell if my cartridge is part of the recall?**

All cartridges with a valve like the ones pictured at right need a replacement pressure gauge. The new Snowpulse cartridges for Inflation System 2.0 as well as cartridges from the Mammut Ride Airbag RAS are not affected by the recall.

**What exactly is the problem with the old cartridge?**

The cartridges are under enormous pressure, at 300 or 207 bar, which is measured with a pressure gauge on the cartridge neck. Some cartridges develop a leak over time, which leads to a drop in the air pressure and sometimes to all the air escaping from the cartridge. Even unused, stored cartridges can be affected by this loss in pressure. The cartridges can lose pressure at any arbitrary time.

According to investigations initiated by Snowpulse at the pressure gauge manufacturer, this has been traced back to a faulty testing procedure; during quality control, the pressure gauge was damaged by excessive pressure.

**Why are the new cartridges not affected?**

During the production of cartridges for Inflation System 2.0, the manufacturer of the faulty pressure gauges modified the test procedure so that this problem cannot arise in the future.

**Is there any charge for replacing the cartridge?**

No. Mammut will replace the pressure gauge on a defective cartridge 1.0 at no charge. In addition, mailing costs for returning it will be reimbursed.

**How do I return my cartridge?**

1) Return only the empty cartridge (without the backpack).
2) If the cartridge is full, carry out a test deployment of the airbag in order to completely empty the cartridge. First, make sure that the burst zipper for the airbag pocket is completely closed before you pull the release handle. Afterward, follow the steps outlined in the User Manual to again stow the airbag correctly. If you can’t find the manual, the instructions can be reviewed at www.snowpulse.com.
3) Remove the cartridge from the backpack. In doing so, don’t forget to re-attach the valve pin (see illustration) that remains on the end of the cable after deploying the airbag. The pin is necessary so that the cartridge can be properly refilled. You might need a pair of pliers to reattach it.
4) When sending in the cartridge, use the original packaging if it is available. If you no longer have the original packaging, pack the cartridge in a well-padded cardboard box so that it is protected from blows and impacts.
5) Include the recall form in the package so that the pressure gauge on the cartridge can be replaced. Visit www.snowpulse.com to download the required form.

**Where can cartridges be replaced in the US?**

If you live in the US, affected cartridges should be sent directly to the Mammut service center in Vermont. Contact the office to get a UPS calltag before you
Ortovox to Offer ABS Backpack in 2013

ORTOVOX, manufacturers of snow safety products, has entered a licensing partnership for the use of the ABS-Inside System for backpacks. Beginning in 2013, ORTOVOX will be adding avalanche backpacks to their arsenal of avalanche emergency equipment. Since 1980, ORTOVOX has been constantly evolving its product line and snow safety system to include avalanche transceivers, shovels, probes, backpacks, and now backpacks with avalanche-specific safety technology.

ORTOVOX backpacks have been an industry leader in the winter sports scene for 27 years, and the company has built a reputation for quality, functional design and focus on safety. The new licensing agreement enables ORTOVOX to integrate the ABS system into their own backpacks, further developing safety concepts with an eye on comfort and fit.

In the event of an avalanche, the ABS system helps improve active avalanche safety through the activation of the deployment handle installed on the backpack carrier system. A pressurized cartridge is pierced and gas escapes, inflating two integrated airbags in a matter of seconds. Although the airbags cannot prevent victims from being swept along by the avalanche, they help keep them on top of the snow and preventing death by suffocation, the main cause of death in avalanche accidents.

GNFAC Human Factor Seminar Online

Videos from the Gallatin National Forest Avalanche Center Continuing Education Seminar on Human Factor on March 7, 2012, are now available on YouTube at www.youtube.com/playlist?list=PLEFAE2148A0027DF6&feature=view_all or search YouTube for AvalancheGuys.
That’s right. “Alta is for Skiers” is no longer the area’s only calling card… and if you ask long-time Alta avalanche forecaster Daniel Howlett, better known as “Howie,” the area has been defined by more than just skiing for quite some time. In fact, one could surmise that snow science has been as integral to the community as bubbles are to beer since 1885, when a catastrophic avalanche nearly destroyed the entire mining township of Alta, Utah. Since the early days of Alf Engen, who founded Alta Ski Area in 1935, many a powderhound-turned-snow-scientist has gained his avalanche bearings within the steep recesses of Little Cottonwood Canyon. The list includes Edward LaChapelle, Ed Adams, and Ethan Greene, just to name a few.

Today, although avalanche-mitigation efforts in the canyon plod forward with one howitzer round after another, the underlying science behind the earth-snowpack-atmosphere system seems to have come to a bit of a plateau. At least until recently when an atmospheric scientist at the University of Utah began to, of all things, start taking pictures of snowflakes.

With such a close proximity to the University of Utah and an annual mean snowfall accumulation of 500”, Tim Garrett, professor of atmospheric science at the University of Utah, has made Alta his preferred location for studying various atmospheric phenomena related to boundary layer snowfall and mixed-phase clouds. Still in its infancy, Garrett is leading the Wasatch Hydrometeor Aggregation and Riming Experiment (WASHARX), an experiment funded by the National Science Foundation. As part of this experiment Garrett and his research team have deployed several unique instruments around Alta Ski Area, including a one-of-a-kind camera designed to capture images of individual snowflakes, still in free fall, by means of stereographic photography.

Multi-Angle Snowflake Camera

The camera, termed the Multi-Angle Snowflake Camera (MASC), actually consists of three cameras offset from one another by 36 degrees. This multi-angle approach allows for a stereographic view of the snowflake as it passes through an infrared sensor, simultaneously triggering the shutter and flash mechanisms for the three high-speed cameras mounted to the frame of the instrument. Invented by Garrett and former University of Utah graduate in mechanical engineering, Cale Fallgatter, the intent behind the MASC was to develop a better empirical understanding of cold-cloud microphysical processes as well as improve upon existing cold weather forecasting models. According to Garrett, “All cold weather forecasting models rely on having accurate observationally based parameterizations for the relationships between snowflake mass, diameter, and fall speed. Also, these models need to be able to faithfully describe the complex and rapid processes of snowflake aggregation and droplet riming.” Working in cooperation with Alta Ski Area and Howlett’s environmental monitoring and technology company, NoHow Inc., alternative interests in the MASC have quickly spread to the avalanche forecasting community.

Applications to Snow Science

It is fairly well known that fundamental characteristics such as the size, shape, and extent of riming or aggregation of falling snowflakes can have a direct effect on the density and distribution of weak layers within a snowpack. But often, these variables cannot be identified until the storm board gets swept off or a snowpit excavated. Even then, because a snowflake’s metamorphism begins as soon as it hits the ground, not to mention the inherent human bias in the identification and measurement of crystal types, it can be difficult to acquire such basic characteristics with any kind...
suggests that this rime percentage affects snowpack. Through Bair’s previous work, which fraction can be determined, which could then be used 5um), it is thought that a rime-to-snowflake mass-
can relate to snow stability?”
such as volume, amount of rime, or fall speed that we they fall?” and “Are there quantitative measurements, crystals that cause in-storm avalanches be identified as avalanche-related questions. Particularly, “Can snow
where criticality will be attained and how layers are complex mixes of different grain types, the tipping point arrives slowly,
the snowpack becomes unstable, we often say we have reached “criticality” or the “tipping point.” When a warm, windy storm rapidly dumps large amounts of new snow, the tipping point generally comes quickly – sometimes in a matter of hours. This scenario is usually obvious and relatively easy to forecast. When weak layers are incrementally loaded (small, cool, calm storms drop minor snowfalls) and the weak layers are complex mixes of different grain types, the tipping point arrives slowly, and it’s much harder to predict when and where criticality will be attained and how the avalanches associated with the tipping point will look.
The latter scenario I describe above should sound familiar; it’s what we are experiencing now. The recent dry spell left a complex sandwich of weak layers on the surface. I will not go into detail – read the recent and current forecasts for your region and other posts in this blog, and you’ll get an idea of what I mean. In the last week or so, these upper layers have been incrementally loaded by small snowfalls of low-density snow with little wind and cool temperatures. This new snow is now settling fairly rapidly and is very susceptible to transport by wind. Looking at field data with a critical eye Friday, I could see a very gradual increase in avalanche activity – mostly human-triggered, mostly pretty small. In my opinion, as of Friday afternoon, the snowpack in most areas was in a state of
of accuracy or precision. With the advent of the MASC, there now exists both a systematic and automated method for deriving these most fundamental snowflake properties, all within their natural environment. Thus far, the first to purchase a MASC unit specifically for avalanche-related research from the Garrett and Fallgatter spin-off company, Fallgatter Technologies, has been the US Army Corps of Engineers Cold Regions Research & Engineering Laboratory. Led by post-doctoral research scientist and former Mammoth Mountain pro patroller Ned Bair, currently of the Earth Research Institute in Santa Barbara, California, Bair is hoping to give a much more robust answer to some long-standing avalanche-related questions. Particularly, “Can snow crystals that cause in-storm avalanches be identified as they fall?” and “Are there quantitative measurements, such as volume, amount of rime, or fall speed that we can relate to snow stability?”
Using the MASC’s 20um resolution (soon to be 5um), it is thought that a rime-to-snowflake mass-fraction can be determined, which could then be used to identify potentially weak crystals and layers within the snowpack. Through Bair’s previous work, which suggests that this rime percentage affects snowpack stability, Bair is hoping that the MASC data – coupled with snow accumulation, nearby avalanche occurrence records – and stability tests will help unlock some of the science behind both storm-snow avalanche cycles and weak-layer distributions within the snowpack.

Resources
To learn more about the MASC as well as the recent and anticipated research of Tim Garrett, Ned Bair, or Daniel “Howie” Howlett, visit:
• www.insc.uta.edu/~tgarrett/Snowflakes/
• www.snow.ucsb.edu/cues/
• www.nohowinc.com

A former avalanche professional, Kevin Hammonds is currently working on a graduate degree in the Department of Atmospheric Science at the University of Utah. Although his research focuses more on the micro-physics of snow in the atmosphere than snow on the ground, he can’t help but keep one eye turned in that direction.

The Tipping Point
Story by Karl Klassen

This article first appeared in the Canadian Avalanche Centre (CAC) Forecaster’s Blog at www.avalanche.ca/cac/bulletins/forecaster-blog on February 19, 2012. Reprinted by permission of the author.

After extended periods of no snow in winter, weak layers almost always develop on the surface of the snowpack. The extent and characteristics of these weak layers depend on the nature of the dry spell: temperatures, winds, humidity, etc., and the nature of the pre-existing snowpack before the dry spell started. Sometimes the weak layers are non-persistent (they react when loaded by new snow then settle and bond relatively quickly). Sometimes the weak layers become persistent and react not only when initially buried, but for weeks and sometimes months after.

Regardless of the weak layer characteristics, the how and when of avalanche activity on them is a not a matter of “if” but “when.” When activity will begin depends on a variety of factors. How weak is the weak layer? What is it sitting on top of? How much new snow accumulates, and how rapidly does it accumulate? How dense is the new snow when it falls, and how rapidly does it settle? How much wind and from what direction? What are the temperatures during and after the loading cycle, and does the sun come out after or not? You get the picture – it’s not always simple, and each weak layer/ loading cycle and subsequent avalanche cycle is unique.

Critical Factors
When we are approaching the point where a significant change in stability from good to poor is expected, you will hear forecasters talking about “critical” factors such as load (how much weight has been added / is being added) and slab property (how stiff the layer of snow over the weak layer is). When the snowpack becomes unstable, we often say we have reached “criticality” or the “tipping point.” When a warm, windy storm rapidly dumps large amounts of new snow, the tipping point generally comes quickly – sometimes in a matter of hours. This scenario is usually obvious and relatively easy to forecast. When weak layers are incrementally loaded (small, cool, calm storms drop minor snowfalls) and the weak layers are complex mixes of different grain types, the tipping point arrives slowly, and it’s much harder to predict when and where criticality will be attained and how the avalanches associated with the tipping point will look.

The latter scenario I describe above should sound familiar; it’s what we are experiencing now. The recent dry spell left a complex sandwich of weak layers on the surface. I will not go into detail – read the recent and current forecasts for your region and other posts in this blog, and you’ll get an idea of what I mean. In the last week or so, these upper layers have been incrementally loaded by small snowfalls of low-density snow with little wind and cool temperatures. This new snow is now settling fairly rapidly and is very susceptible to transport by wind.

Looking at field data with a critical eye Friday, I could see a very gradual increase in avalanche activity – mostly human-triggered, mostly pretty small. In my opinion, as of Friday afternoon, the snowpack in most areas was in a state of

Continued on page 11 ➤
Enhanced Avalanche Survival from Airbag Packs: Why Can We Learn from the Data?

Story by Jonathan S. Shefftz

EXHIBIT 1: ABS Statistics

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data set</td>
<td>Full Only</td>
<td>All ABS Incidents</td>
<td>Partial or None</td>
<td>Non-ABS Partners of ABS Users</td>
<td>Atkins Analysis</td>
<td>Colorado</td>
<td>Swiss 1980-99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(1)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Caught skiers/riders</td>
<td>262</td>
<td>295</td>
<td>33</td>
<td>35</td>
<td>1224</td>
<td>2301</td>
<td>1469</td>
</tr>
<tr>
<td>(3) Fatalities</td>
<td>7</td>
<td>17</td>
<td>10</td>
<td>17</td>
<td>109</td>
<td>523</td>
<td></td>
</tr>
<tr>
<td>(4) Survival rate</td>
<td>97.3%</td>
<td>94.2%</td>
<td>69.7%</td>
<td>74.6%</td>
<td>91.1%</td>
<td>77.3%</td>
<td>87.0%</td>
</tr>
<tr>
<td>(5) Avoided fatalities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) w/ABS out of 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

So when are you going to get an airbag pack? The question from my touring partner last season was not very surprising, and not only because he runs a company that makes such packs. Yet just a few short years ago, that question – especially in the US – would have been puzzling; only ABS made such airbag packs, and outside of a brief partnership with Dynafit, distribution in the US was somewhat obscure. But now for the current 2011/12 season and the upcoming 2012/13 season, airbag packs are available from four companies: ABS (with partners ARVA, Dynastar, EVOC, Millet, Ortovox, Rock Snake, Rossignol, Salewa, and The North Face), Snoworks; Mammut, Backcountry Access, and WARY (with partner Mystery Ranch).

Airbag pack saves of avalanche victims, once relegated mainly to detailed data presentations on ABS’s Web site, are now publicized on major television network shows. The evidence is compelling that airbag packs work, whether via controlled tests with dummies, the underlying phenomenon on inverse segregation/grading, or the dramatic video footage.

Cost Versus Benefit

If that is good enough for you, then you can stop reading this article right here. But the economist in me is always comparing costs and benefits. In this context, the cost of an airbag pack is not its monetary price (which although significant is nevertheless not out of place given the financial value of all the other gear we take along on any ski tour), but instead the sizable (and also because the authors attempt to estimate the likely limited representativeness of such a small data set. (And other studies have already verified the statistical significance of the ABS survival rate advantage, although their data sets typically reversed the ratios, i.e., focusing on the survival rate for a small number of ABS users within a much larger population of caught skiers/riders.)

To address the non-ABS survival rate with additional data, turning to column (e), Dale Atkins (the president of the American Avalanche Association, among other qualifications too numerous to list here) has compiled his own analysis of Colorado avalanches over a time span comparable to the ABS data set, but with over four times as many caught as in the ABS data set. Out of 1224 caught skiers/riders (with most likely only a trivial percentage using ABS), Dale calculates a 91.1% survival rate.

Columns (f) and (g) provide the data for a study of Swiss avalanche victims between 1980 and 1999. This study is notable both because of the 2301-person sample size, and also because the authors attempt to estimate data on ABS pack deployments. The most recent compilation is through August 2010, and the next update will be presented at the upcoming September 2012 ISW in Anchorage.

The ABS dataset is almost entirely European: out of 249 total avalanches in the database, only 10 occurred in the United States and four in Canada. Since more avalanche incidents probably occur truly above treeline in the Alps than they do in the United States – where much of our backcountry skiing and hence avalanche are really at* treeline and hence present the hazards for more trauma deaths – the ABS advantage might be mitigated by a higher trauma incidence. And ABS claims numerous survival advantages over its competitors. Therefore, the ABS track record in Europe might not be entirely applicable to the United States, or to its competitors’ designs. And both the past 2010/11 season and the current 2011/12 season have seen successful ABS saves as well as ABS fatalities, but augmenting the data set without the kind of complete picture provided by a comprehensive SLF update is probably inaccurate. So keep all those caveats in mind throughout the numbers that follow.

Examining the Statistics

Exhibit 1 provides a summary of the ABS data set in column (a) through (d). Row (1) provides a description of the data set, row (2) lists the number of caught skiers/riders (however “caught” may be defined), and row (3) lists the number of fatalities. (Rows (4) and (5) will be explained in due course, as will the other data sets.)

As shown in column (a), row (4), and as stated on the ABS Web site – yet without much emphasis – the 97% survival rate is only a trivial percentage using ABS), Dale calculates an 88.8% successful deployment rate (as opposed to survival rate), i.e., 262 divided by 295. Of the 33 attempted deployments that resulted in either partial or no inflation of the airbags, four were users who did not properly prepare their packs beforehand, 18 were users who were unable to deploy during the avalanche, two were users who intentionally did not deploy the airbags, seven were technical malfunctions, and two were damaged by the avalanche.

Including the unsuccessful deployments, the actual survival rate is 94.2%, not 97.3% (which is rounded down to 97% on the ABS Web site). That certainly sounds very good – although still not perfect, as almost 6% of ABS users have died when caught in an avalanche. But how much better is it than skiers/riders without airbag packs?

Column (c) addresses that question using the “natural experiment” (as we social scientists like to call it) of ABS users whose airbags failed to inflate fully. Their survival rate was only 69.7%. Another natural experiment is the survival rate of non-ABS users accompanying ABS users who were caught in an avalanche: their survival rate was 74.6%.

These sample sizes though are very small: just 33 and 67 (respectively). Tests can be performed for statistical significance to determine the probability that the survival rate differentials are attributable to random chance, but that still would not address the likely limited representativeness of such a small data set. (And other studies have already verified the statistical significance of the ABS survival rate advantage, although their data sets typically reversed the ratios, i.e., focusing on the survival rate for a small number of ABS users within a much larger population of caught skiers/riders.)
the survival rate across all avalanches – both reported and unreported – based on the premise that many avalanches with caught yet uninjured skiers/riders are never reported. As shown in row (4), skiers/riders caught and survived the avalanche incidents is 77.3%, but the authors estimate that the true survival rate is a much higher 97.0%. Note that this latter figure is roughly comparable to Dale Atkins’ 91.1% figure.

Column (b) is from a study of Swiss and Austrian avalanches over a similar time frame, with a higher survival rate than for the exclusively Swiss study, although still lower than the benchmark estimate at all avalanches (i.e., both reported and unreported).

The Bottom Line
A skier or rider referred to for the bottom line, in the form of rows (5) and (6). But first for an excerpt from a Powder Magazine interview with Dale Atkins, which has been widely quoted as well as misquoted.

I posed the following question at the National Avalanche School: Say we had a group of 100 people killed in avalanches. If we assigned responsibility for each one with an airbag, how many of those lives would airbags save? The majority of people thought 30 to 50 plus lives would have been saved with airbags. This is a dangerous perception because airbags only give a slight edge to survive, but that is good enough for many. In fact, I have owned and used airbags since the mid-1990s.

When you’re able to deploy an airbag it’s usually too late to decide how well they do in preventing burials and reducing mortality, but there’s still a significant number of people who get killed with airbags. The fact that airbags are really only going to save three additional people out of 100 that’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal.

The question posed at the National Avalanche School (NAS) is answered in row (6), although the 3-out-of-100 figure is actually the answer to the question posed in row (5). In other words, for row (5), imagine a region in which 100 people have been caught in avalanches. Had they all been equipped with ABS packs (with their mainly European track record through August 2010), how many of those caught yet uninjured skiers/riders would get to live? According to Dale’s data set, that is the 3-out-of-100 figure that he cites. It’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal!

Risk Homeostasis & Other Factors
Now for some additional caveats (as if all the preceding caveats weren’t enough). Avalanche beacon concerns have become both more prevalent and more real. (And yes, with available data and analyses do attribute a noticeable survival advantage to avalanche beacons, despite the occasional “corporate locater” derisive appellation.) Even more recently, shoveling strategies have also become better refined and publicized. All of that would be expected to increase the non-ABS survival rate – as compared to the historical survival record reflected in the analyzed data sets – thereby narrowing the survival differential going into the future between non-ABS users (whose survival outside of trauma depends largely on self-extraction) versus ABS users (whose advantage derives from not being buried in the first place, and hence whose survival would not be significantly improved by better beacon searching and shoveling).

Yet what about risk homeostasis? What about that? Perhaps in the past when ABS bags were more rare, our purchase was a conscious conscious. But in the future, as they become more commonplace, their use could encourage more risky behavior. All of this is obviously entirely speculative, but still, as I write this right now, on one airbag company’s Web site, large letters proclaim, “GO BIG AND GO HOME.”

What Can Cars Teach Us?
Proponents of the risk homeostasis thesis often advance an analogy with automobile safety: automobiles have become safer over time, but we negate that advantage by driving faster. That’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal!

The question posed at the National Avalanche School (NAS) is answered in row (6), although the 3-out-of-100 figure is actually the answer to the question posed in row (5). In other words, for row (5), imagine a region in which 100 people have been caught in avalanches. Had they all been equipped with ABS packs (with their mainly European track record through August 2010), how many of those caught yet uninjured skiers/riders would get to live? According to Dale’s data set, that is the 3-out-of-100 figure that he cites. It’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal!

The question posed at the National Avalanche School (NAS) is answered in row (6), although the 3-out-of-100 figure is actually the answer to the question posed in row (5). In other words, for row (5), imagine a region in which 100 people have been caught in avalanches. Had they all been equipped with ABS packs (with their mainly European track record through August 2010), how many of those caught yet uninjured skiers/riders would get to live? According to Dale’s data set, that is the 3-out-of-100 figure that he cites. It’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal!

The question posed at the National Avalanche School (NAS) is answered in row (6), although the 3-out-of-100 figure is actually the answer to the question posed in row (5). In other words, for row (5), imagine a region in which 100 people have been caught in avalanches. Had they all been equipped with ABS packs (with their mainly European track record through August 2010), how many of those caught yet uninjured skiers/riders would get to live? According to Dale’s data set, that is the 3-out-of-100 figure that he cites. It’s not really exciting news unless you’re one of those three people. Then it’s a really big and important deal!
Surface hoar: what it is, and how does it form?

Simply put, surface hoar is the winter equivalent of dew. Water vapor condenses on the Earth’s surface – typically grass in the summer (dew) and on the snow surface in the winter (surface hoar or frost). The dew point is the temperature at which air becomes saturated. The temperature must go below the dew point for condensation to occur. The ideal conditions for surface hoar to form are clear, calm (really very light winds such as a few mph), and cool nights. There must be moisture available such as an open body of water or water vapor (high humidity). The winter process of dew is deposition, where water vapor skips the liquid stage and goes right into a solid due to cold surface temperatures.

The photos on this page were taken in the southern Kootenay Mountains of British Columbia on February 7, 2011, near Wildhorse Pass. The elevation is about 5000’, in a flat area that receives low-intensity sunlight for a few hours during the day. It hadn’t snowed for a week, and each night was perfect for sh formation. We had beautiful sunny days with high temps at the freezing point, then clear, calm, cold nights (lows of -10ºC) with barely a cloud in the sky.

Everywhere you looked there was sh of 5-15mm, and 30-50mm was also very common. This event was widespread to the Wildhorse Pass area and the Kootenay region. The surface hoar could be found on open slopes to the tightest of trees, regardless of elevation and aspect. The extremely large sh of up to 110mm was found in a flat, sheltered area that receives very little direct sunlight, both in intensity and duration for this time of year. There was a creek about 20m away that was open in a few spots, supplying moisture. You can really see the growth on the A, B, and C axis and multiple events on the crystal.

How will this surface hoar behave? Following 10 days of high pressure where the sh formed, we did receive 1mm of rain followed immediately by freezing rain, followed by 5cm of new snow the next day. The surface hoar was well preserved except for extreme solar aspects, and I fear that the freezing rain crust will only preserve it even more. There was no to very little wind during this time, definitely not enough to destroy any of the sh. Though it was only 5cm of new snow, steep slopes were sluffing fast and running long distances for such a small amount of new snow. Like anything, time and a keen eye will tell.

Chris Shelly worked as the snow safety director at Moonlight Basin for a number of years as well as the patrol and snow safety director at Ohau, NZ. He currently works as a mechanized ski guide and as the forecaster for H2O Guides in Valdez.
THE TIPPING POINT
continued from page 7

precarious balance – the weak layers were holding on by a fingernail as accumulations of new snow gradually piled up on top of them.

Yesterday’s data indicated this trend was continuing; a few more slides, a little bigger, still mostly human triggered. Preliminary reports are trickling in, this morning, and it looks like some regions got significantly more snow than forecast in the last 24 hours. On the west side of the Monashees east of Vernon, for example, there’s a report of 60cm of new snow – far more than was forecast. Places that got more snow and/or wind than was discussed in yesterday’s forecasts are likely now over the tipping point, and local danger ratings in those areas are almost certainly higher than what was forecast yesterday in areas where this occurred.

Human Factors

I think there’s also a human tipping point. After a long drought, people get frustrated and fed up with the poor conditions often resulting in riding conditions and eagerly await the arrival of new snow that will improve their backcountry experience. However, the arrival of new snow and the improvement in riding conditions in these situations is almost always associated with the arrival of the tipping point. The slower the tipping point comes, the more people get lulled into a false sense of security and the more they underestimate the potential consequences that result when the tipping point is reached.

For example, the current situation: complex weak layers + 10 cm new snow = great fun. + another 10 cm = great fun and a few small avalanches that get ignored. + another 10 cm = surprise! avalanche incidents/accidents occur but everyone’s too embarrassed to say anything, so others don’t hear about it, and they get caught in larger avalanches until eventually there’s a serious wreck.

This is what we are seeing in some areas now; notably the South Coast Mountains and the North Shore: people got surprised and caught, some lost gear, and were partially buried, and they all sunk away embarrassed and didn’t tell anyone. This is probably also occurring or about to occur in the west-central Monashees and any other areas that went over forecast for snow, temperatures, or winds yesterday – we’re just not hearing about it.

Areas that have not gone over the tipping point yet will probably be there in the next few days when a bit more snow, wind, and/or warmer temperatures arrive. PLEASE: check with knowledgeable locals about what’s happening, look at the avalanche forecasts for your region every day, critically examine the weather factors that are driving the danger ratings and avalanche problems, then constantly observe what’s happening around you as you go into the mountains. If the avalanche forecasters rate danger Moderate in the Alpine – and that’s based on a weather forecast of 10cm new snow, -5.0, and light SE winds while you are seeing 40cm of new, +1.0, and a SW wind – you have to adjust your trip plans and terrain choices, or you will get caught by surprise. If your personal tipping point isn’t under control when the snowpack stability/avalanche activity tipping point arrives, you are just asking for trouble.

Karl Klassen’s bio includes 35 seasons in the avalanche biz including: ski area avalanche control; consulting; heli/cat ski guiding; ski tour guiding; reciprocal avalanche course curriculum development and instruction; public avalanche forecasting; and mountain guiding in Canada, New Zealand, USA, Europe. He is currently all of these. Public Avalanche Warning Service manager at CAC; chief guide at Monashee Powder Snowcats, CAA Professional member, ACMG Active Professional member, IFMGA member, ACMG/IFMGA mountain guide, CAA Level 3, founding director and past technical director of AIARE, past president of ACMG, past executive director of ACMG. His wife Mary Clayton is the CAC communications director; his son Alido is 10. Karl laments that they are both better skiers than he is.

Avalanche Summary

The recent cycle of widespread natural avalanches running on the Feb 08 surface hoar is probably over. Explosive control and human triggering continue to produce avalanches on this persistent weak layer (PWL). The light new snow that is falling on Friday may be enough to cause some more natural activity on the PWL in areas that did not recently slide and have enough wind to develop a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load. The new snow and wind may develop a soft surface slab that does not cause a heavy windslab load.

Also see “The Tipping Point,” at right.

FEEL SAFE. BE SAFE. A COMPACT BACKCOUNTRY SLED DESIGNED TO SAVE YOU PRECIOUS TIME AND ENERGY IN A MOUNTAIN RESCUE SITUATION.

www.rescuebubble.com
Close Call on Petes North

Turnagain Pass, AK
February 11, 2012

Chugach National Forest
Avalanche Center Report
by Wendy Wagner

This remotely triggered avalanche caught, carried, and buried two skiers ascending an up-track on the westerly aspects of Petes North ridge near treeline. One partially buried (uninjured) and one fully buried (concussion).

Avalanche details: HS-ASr-R2-D2-I

Type: Wind slab. This was a 1-finger wind slab sitting on a thin layer (2” and less) of 4-finger low density powder over harder (pencil hardness) wind slab that acted as the bed surface.

Size estimate: 150’ wide x 5-700’ x 12-18” deep

Trigger: Remote from ~20-30’ left from corner of the right flank and stauchwall.

Weak Layer: Broken precipitation particles/decomposing fragments

Aspect: WNW

Angle: 37-43 degrees

Elevation: 2500’

Debris: ~3-5’ deep (fanned out to varying degrees)

Weather: Storm day.
Friday, February 10, the day before the avalanche, 8-12” of medium-density snow fell with 30mph east winds, gusting to 85mph. Temperatures near 30ºF.
Saturday, February 11, the day of the avalanche, 3-5” of similar density snow fell with east winds averaging 40mph and gusting to 95mph. Temperatures near 30ºF.

Avalanche danger rating: Considerable with pockets of High.

Events
Two parties of two skiers and one party of three were all skiing the low-angle sparse trees just below treeline under the western shoulder of the Petes North ridge. They were using caution, staying on low-angle slopes and aware of the avalanche danger. Right at treeline the slope steepens and looms ~500’ above the low-angle trees. The skiers were on the looker’s-left side of the shoulder and were descending from a safe flat area on the shoulder, right at treeline. The steeper slope above was looker’s right from where they were descending. They suspected the slope was wind loaded, however it was also assumed that if it slid, the debris would be funneled into a small gully off to looker’s right and avoid the sparse trees where the skiers were recreating.

As five of the seven skiers had convened at the top of the treeline, the point they descended from earlier on their first run, two skiers (among the party of three) were out of view, still on their way up the skin track. At this point, one of the five walked away from the group when he felt a large collapse. Immediately the five skiers saw the slope above and to the side of them begin to fracture, and they began to yell, “Avalanche.” The skier whose two partners were still on the up-track, out of sight, began to run downhill after the debris. The other four skiers followed.

The debris stopped and a person buried to his waist struggled to remove himself. They quickly turned all beacons to receive and began a beacon search when someone noticed a hand near some small trees where the beacons were leading. They were able to dig out the back of the person and clear the airway quickly. Burial time was estimated at three, but possibly more, minutes from the time of the burial to clearing the airway. The skier partially buried was able to dig most of himself out and help with the rescue of his partner. Both buried skiers were able to ski out on their own power.

Note
The debris from this avalanche nicked one small 50’ section in the zig-zag of the “relatively” safe up-track (where skiers were caught). A small section of the up-track was also covered with a very small amount (~1’ or less) of debris near the toe.

This was a close call that we all can take something away from. Some lessons learned:

• Extra caution is required when multiple groups are recreating on the same slope!
• Never underestimate where and what terrain features an avalanche can overrun.
• When visibility does not lend itself to seeing the whole picture clearly, placing a skin track even more conservatively than you may think necessary could save someone’s life – and possibly the life of a person from a different party.
• Keep your rescue skills honed. KUDOS to these skiers for their excellent quick response!
• Always keep your beacon batteries fresh.

Wendy Wagner is a CNFAC forecaster.

Petes North photo above and on next page and Turnagain Pass map courtesy of Chugach National Forest Avalanche Center

Petes North: the micro-ridge wasn’t enough of a terrain feature to channel avalanche debris away from the treed apron. Another case of “know who is above/ below you.”

This was a close call that we all can take something away from. Some lessons learned:

• Extra caution is required when multiple groups are recreating on the same slope!
• Never underestimate where and what terrain features an avalanche can overrun.
• When visibility does not lend itself to seeing the whole picture clearly, placing a skin track even more conservatively than you may think necessary could save someone’s life – and possibly the life of a person from a different party.
• Keep your rescue skills honed. KUDOS to these skiers for their excellent quick response!
• Always keep your beacon batteries fresh.

Wendy Wagner is a CNFAC forecaster. ©
I think that is a good and accurate write-up.

After allowing some time to pass and talking to the other guys, I'll give you a narrative of what happened in my mind:

We left the parking lot at Johnson Pass on the heels of a group of two folks (let's call them A and B) who were also involved in the incident. We caught up to them where the up-track broke off from the powerline and went up through the forest. They were following an existing track that was mostly filled in from the previous 12 hours snow, so basically breaking trail. I took over breaking trail at that point and followed the existing route through the forest until we broke out in the glades, where the old trail was non-existent. I chose to put the track where I did to take advantage of the lower angles and to keep the exposure to dangerous slopes above us at a minimum. A few hundred feet below the highpoint I stepped aside and one of the members of the group that we had passed earlier finished the track up to our high point. We had been in mostly still air, but as we ascended on to the flat part we were caught by moderate wind gusts out of the north.

We took one run basically fall line from our high point and slightly north of the skin track. While we were transitioning back to skins, A and B came up the skin track. I jumped in behind them and started up while C and D were still transitioning. I stopped a few times to decrease the distance between C and D and me, but I wanted to ask A some questions, and if you get too far behind those guys, you ain't gonna catch up. So I kind of drifted back and forth between C&D and A&B after we ran into you (Wendy) on the up-track. I was having a conversation in between C&D and A&B after we ran into you (Wendy) on the up-track.

I thought seconds passed between the time that we hit the high point and the avalanche was triggered; we all were cued in to it and looked up to see the size of the avalanche from the waist down and completely caked with snow. It was D, and there was gear downslope of him. I approached him from uphill and recognized him and asked him where C was. He said he didn't know, and I asked him to put his beacon on search. He either said he was trying or he already had, I don't remember.

At that point I continued gliding downslope and while gliding removed the Tracker from my right pants pocket and felt the stretch from the lanyard that attached it to my zipper pull. I usually don't put it in my pocket – actually feel pretty strongly that it belongs in its harness on my torso. (For more thoughts on this point, see page 36.)

I turned the beacon to search mode and immediately had a signal 40 meters away. I started following the Tracker, but it was taking me toward the toe of the avalanche, and my distance to signal was increasing. I stopped moving about the same time the beacon decided to recalculate, and the refreshed signal it acquired started curving me to my left and back up toward D. I had dropped my poles and was able to move easily across the debris, too fast in fact for my beacon as I had to force myself to slow down, because it kept dropping and reacquiring the signal. Once I adjusted my pace the curve I was tracking turned into more of a straight line and the distance was in the single digits and rapidly decreasing.

I remember passing by D who was still partially buried, and I started seeing other rescuers come into my peripheral vision as I was approaching pinpoint search range. My beacon started making that noise it makes when it is time to probe, and I just dropped my beacon and my pack and started assembling my shovel while calling for a probe from B who was rapidly assembling his probe.

I remember hearing someone yell they saw a hand while the shovel and probe assembling was happening. B went right to the hand and found his head by removing snow with his hands and called that he had a clear airway. At that point I heard C groan. A approached below me and told me to get my skis and pack out of the way so we could dig from downhill. C was buried left side down with his chest and head pressed into the uphill side of the tree. I think A immediately realized that we had to get at him from uphill to get the pressure off of his chest, which in hindsight I may have increased by removing snow with my shovel from the downhill side of him. I briefly pulled downhill on the tree to try to help alleviate the pressure on his chest.

At that point I moved into a position to palpate his spine and was able to successfully palpate it cervical to lumbar. With C's lowered level of consciousness I realize a full neuro assessment couldn't be completed, but I was just going on what training I had – a WFR in 2005 with no recurrent training since the initial. I think at that point, B diverted his attention toward confirming that there wasn't another buried victim, and he was focusing on his beacon which was picking up several signals. One was mine which had reverted to transmit mode either unintentionally or automatically, and the other was C's which was harnessed to his torso. I turned mine (which was still dangling its lanyard attached to my pants where I dropped it) off and located C's and turned his off.

At that point, C stood up on his own, and I put my parka on him, then sat him down on a pack and did a
Some background
When you last heard from me, TAR readers, on January 23 I had just penned an editorial labeling myself as one of those people about whom I warn my classes, a human factor crucible, impatient for fresh powder. December drought had left the Tetons high and dry; two powerful storms stressed the weak snowpack and heightened powder fever. We submitted the February TAR, 30-3, to the printer the next morning, and I went skiing with two friends, also avalanche professionals who were intimately familiar with the intricacies and problems of the current Teton snowpack.

The day
After 3.76” of SWE from January 19-22 caused a huge avalanche cycle (see photos these pages), we were pondering where to ski on January 24. Mid-elevation trees were rejected out of hand; one friend vividly recounted the pockets of sturdy 3-4mm surface hoar perched on a melt-freeze crust that were well-preserved down in those same trees. A late-December hearty inversion had perhaps helped to cook the surface hoar and some of the widespread depth hoar with warm temps up high. And those were just the indirect problems to consider. Overnight temperatures had dropped to 4ºF with clearing skies; the first sunny day on a loaded snowpack. We opted to stick to the lower angle (33-34 degrees), skier’s left side of the south face of Taylor Mountain, stay in the shade and scoot out of there as the January sun rolled around south.

All the way up the southeast ridge we bantered back and forth, discussing and debating the merits of our arguments: snowpack, weather, terrain were all dissected for data and desire. I also asked my compatriots for input on the theme for TAR 30-4; we emphatically declared that today’s ski was just within our risk tolerance personally, but there were way too many unknowns to venture there professionally, on an avalanche course or with even the best ski clients. Charlie Ziskin’s essay on decision-making (see cover story) articulates the process we were trying to use.

As we stripped skins on the southeast shoulder, we noted a party above and to the northwest of us, skiing further out into the south face; we all remarked how that part of the bowl was beyond our risk tolerance. We were on good behavior as we inched beyond the shoulder, one at a time, to a safe spot tucked in thick trees. The skiing was fabulous, but there was an undertone of “can’t make any mistakes, this is serious terrain and conditions.”

The second pitch brought us lower onto the face, but a slice back to the ridge eased the slope angle and exposure. One of our party and an add-on friend departed; my good friend and long-time backcountry partner Fitz and I continued up for another lap, noting that the sun was beginning to make its mark, conditions changing, so we agreed that our next run would be even closer to the ridgeline, in the step/bench terrain.

The avalanche
We skied that second lap with no consequences, but noted that the previously light surface was starting to settle and moisten, acting more like a slab. We then descended glade to glade, garlanding back toward the up-track on the southeast ridge. We had stopped to look at a moose when we heard a loud “crack,” like a rifle shot. I thought it might be a huge collapse; Fitz thinks it might have been air blast...
noise, coupled with trees breaking. Shortly afterward, we saw waves of rolling powder cloud billow down the confined track, boiling up, sounding like a full-speed freight train. From our safe zone well out of the path our thoughts went to the other ski party who had been above us on the second lap; our shorter trip up the skin track put us ahead of them in the circuit.

As the cloud dissipated we sped to the valley bottom in time to see a drainage packed with snow; a final wave of slow-moving wet debris oozing toward us. We immediately began a signal search, our initial fears alleviated by the sight of one of the members of the upper team who told us none of them was involved, although he had indeed triggered the huge face by jumping on a rollover near a rock band. Attempting to release the recent wind slab, it went much bigger than he expected, down to the depth hoar/dry snow surface from December.

My partner and I went into “dealing” mode, thankful for years of training that helped us know what to do and how to stay cool in this situation. Worries were amplified by the fact that debris from the south face was boiling up, sounding like a full-speed cloud billow down the confined track, combining a high-risk, high-penalty alpine experience along with high use, and it’s important to adjust traditional backcountry thinking and activities to these unique dynamics. Here are some thoughts on frontcountry protocol with regard to active testing techniques on Teton Pass.

While active testing is definitely the sexiest of tests, consider all other resources at your disposal before cutting a slope, including:

- Study the Bridger Teton National Forest avalanche report.
- Take the extra 20 minutes to dig your own pit and get intimately familiar with the layers within the snowpack.
- Pay attention to results from any recent GAZex events.

Additionally, stay alert to the environment you are skiing in, including such factors as:

- Changes in the weather and acute temperature swings
- How quickly tracks are filling in
- A ski pole test to feel for layers
- How much snow is on and around trees
- Affects of wind events on the terrain

Don’t outsmart the instability

The first free lesson reminds me not to underestimate the deep slab problem; underneath it really is a human factor problem, a patience issue that doesn’t heal overnight or after one storm. We even stress in our courses not to outsmart the instability. Did we do that? Perhaps. But I believe that our terrain management (staying in the planar lower-angle part of the bowl), not our intimate snowpack knowledge, kept our tracks in place as the steeper and windloaded portion of the slope failure triggered another avalanche of discussion on proper snow and slope safety etiquette. At the heart of the conversation is the use of some active slope tests – ski/slope cutting or cornice chopping – sometimes considered appropriate protocol for testing a slope’s stability in the backcountry.

Frontcountry Safety Protocol

Story by Jay Pistono

The January 24 avalanche on Taylor Mountain’s east face into the Coal Creek drainage triggered another avalanche of discussion on proper snow and slope safety etiquette. At the heart of the conversation is the use of some active slope tests – ski/slope cutting or cornice chopping – sometimes considered appropriate protocol for testing a slope’s stability in the backcountry. This discussion has exposed that several areas in and around Jackson – and Teton Pass specifically – are now considered frontcountry by the Forest Service.

Frontcountry is a wild backcountry area that sees heavy use because of its proximity to populated areas and easy access. Frontcountry combines a high-risk, high-penalty alpine experience along with high use, and it’s important to adjust traditional backcountry thinking and activities to these unique dynamics. Here are some thoughts on frontcountry protocol with regard to active testing techniques on Teton Pass.

While active testing is definitely the sexiest of tests, consider all other resources at your disposal before cutting a slope, including:

- Study the Bridger Teton National Forest avalanche report.
- Take the extra 20 minutes to dig your own pit and get intimately familiar with the layers within the snowpack.
- Pay attention to results from any recent GAZex events.

Additionally, stay alert to the environment you are skiing in, including such factors as:

- Changes in the weather and acute temperature swings
- How quickly tracks are filling in
- A ski pole test to feel for layers
- How much snow is on and around trees
- Affects of wind events on the terrain

If you do decide to conduct an active test, first consider the following:

- Be absolutely certain that no one is below you.
- Make sure that there is a visible run-out path.
- Avoid testing on any slope when there is a road below. That’s WYDOT territory.
- Choose small testing areas (small slopes, small cornices) rather than big ones.
- Finally if you still feel like you have to test the slope, consider skiing another slope altogether.

Remember, slopes behave differently when they are tested than when they are skied. An upper-slope ski cut or cornice drop provides much more impact to a slope than a fall line ski track. Just because a slope has been skied doesn’t mean it won’t release with an active test.

Jay Pistono is the Teton Pass Ambassador, also known as the Ambassador. He is a longtime local backcountry skier and guide whose diplomatic skills extend to the Snake River in the summer as well.
TAYLOR MUSINGS
continued from previous page

things anonymously that we’d never say to someone’s face, but manners lubricate our lives while doing our best not to mess with others works in our freedoms and taking responsibility for our own actions. Living

Monday February 20, 2012: Sidecountry Ramblings

It’s time for my mid-winter rant about backcountry (I should say sidecountry) behavior. It was inspired Saturday when I watch three people ski an avalanche chute just outside the Snowbowl boundary together at the same time. This particular slope had a large skier-triggered avalanche on it this year. I doubt these three riders read the avalanche advisory, so I’m aiming my comments at Snowbowl parents who may have kids, teenagers or older, ducking the ropes or skiing out-of-bounds. Once you leave the ski area, you’re on your own. The areas just outside the ropes are backcountry. There is no slope management or patrol. You should be prepared to deal with a burial or trauma. It would be a major operation to extract someone from the Rankin Lake basin just outside Snowbowl. Folks are treating this area as part of the ski area. It’s not. Do you think people who would ski three at a time down an avalanche chute know when the snow is stable and when it isn’t? Everyone wants to ski the gnarly terrain; the sidecountry is popular. Have you talked to your kids about doing avalanches, and skiing out-of-bounds?

I also call on us as a varied community of avalanche professionals to think critically and speak fairly in informal settings as well. Craft a post for a forum, a response to a blog. Talk to folks you might not otherwise at the trailhead, share conditions reports, reach out to help educate the ripper kids, take them on a tour with you. Step up as a leader in your community.

Conclusion

So, after almost two months, did we make the right calls or did we get away with it? I think some of both, this time. But all of us make mistakes, enter crisis from time to time. Often the true test – the measure of character, individually and as a community – comes after the event. The real questions revolve around how we handled crisis and its aftermath. Have we assimilated the lessons into our practice, owned our actions, handled ourselves with grace?

Lynne Wolfe has been skiing on and around Teton Pass since 1981. During the winters she teaches avalanche courses for AAI and other local course providers; ski guides for Rendezvous Ski Tours at their Teton yurt system, on the pass and Grand Teton National Park; and in her spare time is the editor of The Avalanche Review.

In this photo you can see that the final two phases were characteristic of wet debris. The last wave carved a smooth trench in the preceding wall of quickly hardening snow. Here, Trevor Deighton and Maya explore the runout of the poof chute. The avalanche has been characterized as HS-AI3-D3-5.Gil

Photo by Kevin Emery, www.lifesfly.com

Teton Pass Community

The following was a letter to the editor of the Jackson Hole Teton & Guides from Jay Pistono, representative of permission of Jay and Friends of Pathogens

Since the avalanche on Taylor Mountain on January 24, I have been over loaded with comments about it while on the pass and from the community in general. If I thought the avalanche on Taylor was confined to affecting only that area or only that individual I could almost walk away from the discussion, but the issues reach far beyond Taylor, and some of the attitudes surrounding the incident deserve attention. My approach includes our freedoms and taking responsibility for our own actions. Living

Segment from previous page

The following was a letter to the editor of the Jackson Hole News & Guide

Teton Pass Ambassador, Jay Pistono, has some guidelines and reactions printed on this story’s pages. As our backcountry becomes more traveled, we will need to surmount our competitive natures and communicate where we are going so we know who is above and below us, who we might affect directly or even indirectly.

Call for leadership

I still treasure my collector’s volumes of The Teton Times, looking at accidents, not just the fatalities, is a fabulous learning tool. Before internet resources, I would photocopy case studies from the volumes and hand them out to folks who might not otherwise at the trailhead. Then develop their own critical thinking. Fatalities since 1998/99 are catalogued on avalanche.org, but the analyses are inconsistent, incomplete. Fatalities deserve in-depth investigation, insightful analysis. Accident case studies are crucial for education, not just for us to use in our classes, but for the public and the participants. I call upon my peers and mentors in the avalanche forecasting field to speak out formally in your forecasts, call out your constituency as did Dudley Imperotta of the Missoula Avalanche Forecast Center in this forecast:

In this photo you can see that the final two phases were characteristic of wet debris. The last wave carved a smooth trench in the preceding wall of quickly hardening snow. Here, Trevor Deighton and Maya explore the runout of the poof chute. The avalanche has been characterized as HS-AI3-D3-5.Gil

Photo by Kevin Emery, www.lifesfly.com
January Teton Storm & Avalanche Cycle

Above and left: Natural avalanches on the Beaver slide, west side of Teton Pass, become big piles that dwarf the WYDOT road-clearing machines. Photos by Jamie Yount, avalanche technician for WYDOT.

Below: "Lucky Dog" on Wolf Mountain. Interesting that the largest, steepest slide path on the hill stayed intact, even after getting its legs cut out from underneath it. Photo by Doug Workman.

For more about this storm cycle, see story and snow chart on page 26.
SILVERTON: David Lovejoy triggered this cutbank when his ski tip touched the snow on the uphill side of the road. Things have simmered down some, but skier triggered slides are still likely on anything above 35 degrees. See story about this day on page 33.

Photo by Billy Mason, January 2012
TELLURIDE: We remotely triggered this avalanche with a L2 class from .3mi away (at 11300’, crown around 11800’). 20120211 1130 north aspect SS-AS-/R3-D3-O/G ~500”x500”x 2-4” crown. Initiated a major collapse on small test slope, with visible cracks that travelled around small lake, and up north-facing slope. The photo sequence captured it. Crazy. Everyone is pointing to the small convexity that failed from initial collapse nearby… with the big avalanche just getting rolling above, unnoticed for another few seconds. Too much hang fire to investigate crown. However, later in the day as the light changed, we could see a faint yellow/brown dust layer on patchy bed surface. After an afternoon of many test pits on the bulge in the middle of the basin with ZERO noteworthy results with ECTs, PSTs, RBs. On the way out, Peter Inglis and I stopped to dig a pit at the location where we originally initiated the collapse. We found extremely weak facets sized 5-6mm below a knife-hard faceting melt freeze crust, with hints of the yellow/brown dust layer, and 3-4mm striated facets above the crust. Performed several stability tests, CT, PST. Results with the CT were CT12 Q1 Sc (sudden collapse). Results with the 2 PSTs performed were identical. PST 40/100 (End) just above that stout melt freeze crust.

Photos by Ian Havlick

SHASTA from Nick Meyers: Multiple (three off middle peak, two on steep aspects and rollovers below Heart Lake) natural avalanches on NE aspect above Castle Lake occurred late in the storm. Size R2D2 or 3. Blocky and cohesive debris from a wind-affected slab. Crown depth 24-40” deep. Failure on facets located above the crust, about .5-1” of facets on an east-facing crown. Appear to have failed during the storm with strong windloading from the SW winds. At least one slide appeared triggered by a cornice collapse.

Photo by Kai Allen, mid-January 2012

Stories from Winter 2011/12
All that I’ve ever experienced in the mountains and in the snow is available for information that I store and retrieve as if my brain were a relational database. and questions tell me something. Not everything, but they do provide useful slope and watching what happens when they hit the snow. Do they bounce off without even touching the snow directly just by tossing a few rocks around at the of the character of the surface layers. I can often find a little bit of that something slopes that I will not ski. If I can’t get anything else, I want to know something new. As Lynne Wolfe has said, it isn’t about do we go or not, it’s about where we go. We pay close attention to the snowpack in every possible way every step of the way. We know our locales. Colorado might seem like a big place, and it is. But the places where we ski are not as many as some might expect. We gain an intimate knowledge of local conditions in these places as we return to them often. We not only follow the CAIC forecasts and reports, we also make our own detailed observations, which often add nuance and insight to the general nature of the forecasts. We parse this information through ongoing discussions throughout the tour. I want to communicate every little thing I observe, but I do balance and prioritize that so my partners don’t have to decipher my non-stop stream of consciousness. If I really think it’s important, I don’t hesitate to mention it. Naturally, larger groups present greater communication and other challenges. We’ve all heard the rhetorical question, “Would you go into a bar if you knew there was a considerable chance of getting shot?” Honestly, I don’t think this question adds much value to my decision-making process. That’s because if I do ascribe to that, I simply would never ski in Considerable conditions. My decision is already made at that point. It is my nature that I do want to go out, and I do poke around to see what will happen. I want to know about conditions even on slopes that I will not ski. If I can’t get anything else, I want to know something of the character of the surface layers. I can often find a little bit of that something without even touching the snow directly just by tossing a few rocks around at the slope and watching what happens when they hit the snow. Do they bounce and skip away down the slope? Do they punch in a little bit? Do they disappear without making the slightest disturbance? The answers to these kinds of tests and questions tell me something. Not everything, but they do provide useful information that I store and retrieve as if my brain were a relational database. All that I’ve ever experienced in the mountains and in the snow is available for retrieval and analysis against new information. The experience of backcountry skiing is that vivid. I have skied a lot of days in my lifetime, and I remember them with surprising facility. Likewise, poking around in the snow on different slope angles and aspects, ski cutting some; thinking about deposition patterns with respect to wind; looking at how the terrain interacts with the wind to create different patterns of deposition; feeling the texture of the snow at various depths with a pole, with my hands, with my skis – all these things give me information I can use in combination with other information I may get from digging a study pit, or just a hand pit. I register everything I experience against what I also know happens historically, not only in this season, but in seasons past. Yet I neither expect nor am I looking for 100% certainty in anything. I do want to know as much as I can about what I am dealing with so I can then make detailed tactical decisions within my overall strategy, which is to learn what I can and test my skills without taking what I decide are unreasonable risks for me and my partners. Again, I want our decision to be about where to go, not whether to go. Defining Acceptable Risk There is a lot of discussion after accidents about risk tolerance. So what is an acceptable versus an unacceptable risk? Long ago realized that a precise answer to this is beyond my reach. My behavior in the mountains is situational. I might ski a line today that I wouldn’t ski tomorrow, even though the conditions may only be marginally different because I know that marginal difference can be highly significant. And the difference between this 38-degree northeast-facing slope and the adjacent 33-degree north-facing slope (just for example) is one I am intensely curious to know. But it’s a lot more than just the slope angles, of course. We talk in detail around exactly how and where we are going to put our tracks on a slope. I look for tiny terrain features that give me a clue about how and where an avalanche might break and run. I pick lines that stay clear of those slopes that are defined by objects near the surface where the slope angles increase. I pay close attention to subtle changes in the shape of the terrain. I tend to be pretty inclusive, allowing new people to join my groups. But I check people out first. Skiers who often fall on their first turn in steep terrain, or who can’t visualize a line and then ski it, or who consistently make poor route-finding decisions will be coached gently but firmly that maybe they are not ready for this activity. We talk about all these things too. A big part of managing the risk is being in complete control at all times. A good decision doesn’t mean much if you can’t execute it accurately. It does take a long time to learn not only what information to look for, but also how to integrate it all in a way that helps one to use all these details appropriately.
Margaret Wheeler Tackles Tough Questions
Story by Margaret Wheeler

What is your risk tolerance personally and institutionally? Personally...Begin first with the general:

It seems to me that a discussion of risk tolerance has to include the ideas of perceived vs. actual risk exposure. Imagine a situation where someone’s personal risk tolerance is low, and his or her perceived risk exposure is low – but his or her actual risk exposure is high. A low risk tolerance can be skewed by an offset in perceived risk so that a gap between perceived and actual risk means that this person’s risk exposure is skewed higher than they realize.

Closing the gap between perceived and actual risk is one of the desired outcomes of a avalanche education for both recreational and professional skiers. The idea logically assumes that if people understand the amount of risk they are actually exposed to, they will make different decisions. Further, we have seen that one of the outcomes of the human factor (and human error) is that emotional reactions or desires can override the awareness of risk and consequence.

I think this situation probably applies to all of us in some degree or another. Do we truly “accept” the risks we are taking? I’m not sure we do – rather, I think we have lapses in perception that disconnect us from understanding consequence. Perceived vs. actual risk is related to the ideas of likelihood (What are the chances something will avalanche?) and consequence (What will happen if it does?), but most particularly the idea of consequence. Human factors and errors in perception are large and the patterns of snow deposition and evolution of a snowpack change the decision we make together about where we are going to ski.

From the general to the personal:

I have (I think) a conservative approach to risk in both my personal and my professional decision-making. My goal is to build in a buffer, a margin of safety, as a way to manage uncertainty. This is due to two convictions:

1. I have a general perception that when folks “hang it out there” in the mountains, they are most likely coming through unscathed due to luck and skill, but that luck figures in more prominently than they recognize. Hence my increasing hesitation to hang it out there in my personal risk tolerance.

2. My current opinion is that we humans are not very accurate in our perception of risks. We can work very hard (and do, particularly in a professional context) to increase our accuracy of perceived vs. actual risks, but we have to accept that we will never fully know.

I use this idea of inaccuracy as one of my basic operating assumptions, and consequently build in a greater margin in my risk management. Engineers call it a safety factor; you double and triple check the calculations you make about how strong a piece of material or a widget will be, but in the end you multiply your results by some number to allow for unforeseen errors. The more complex the situation, the greater the uncertainty, the higher the consequence...the higher the number.

As time goes by, and as my professional life shows me a longer and longer list of consequences, I can see and feel my safety factor number getting higher.

Consider the following example. As a ski bum in Chamonix I was the classic profile: enough skill to get myself into high-risk terrain, but without an accurate understanding of my own risk exposure. What kept me out of trouble was relying on the knowledge and experience of the people I was skiing with – which possibly a combination of situational awareness and some level of risk aversion. For example, after a big storm I wasn’t the one hanging it out there on the big lines – I would wait until other people had skied them first (!), give it some time to get the scoop on the conditions, and then decide. Further, I grew up skiing in NH and had very little experience with the high mountain environment. I was relying on the knowledge and experience of the people I was skiing with – which was pretty good. But my risk perception of the environment we were skiing in was probably not very accurate, and I think this is where I was most exposed without knowing it. My safety factor was $N = 1$.

Institutionally?

In the guiding context we have built-in conflicting dynamics of a higher risk exposure and the need for a decreased risk tolerance. The higher risk exposure comes from the environment we work in, and the need for a decreased risk tolerance is because we take on a higher level of responsibility for our clients than we would in a non-guided group.

There are several other factors that figure into the landscape. For example, the nature of the trip and the environment can bring with it different levels of risk exposure – consider the inherent risks of an introductory rock climbing course vs. a guided trip to a Himalayan peak.

It is also important that clients understand that they themselves are taking on some risk. It is my professional obligation to manage and minimize risk, but also to inform them that I cannot control the environment, and I cannot remove all risk.

Yet at its core, I think that the professional guided context requires a safety factor greater than $N = 1$. This factor is our means to manage uncertainty in a high-risk environment where we have responsibility for other people. As guides, we are continuously striking a balance between maximizing our clients’ reward and managing risk. Teaching guides to manage these points is one of the central challenges of guides’ education. It is also coming into focus as one of the most valuable forms of continuing professional development as guides build on more experience to the foundation of their training and certification.

There are loads of resources out there to build tools and techniques to deal with human desires and errors. Operational risk management, systems approaches... the aviation, medical, and financial sectors have a lot to offer. But I think that our mountain community has some real opportunity here as well.
MANAGING RISK on Avalanche Courses: AIARE Perspective

Story by Tom Murphy and Colin Zacharias

Knowledge of avalanches, guiding, and teaching compose the foundation of a professional avalanche instructor. For both the person and the profession, this foundation is rooted in the practice of risk assessment and risk management.

Avalanche course providers and instructors embrace those elements and hopefully, encourage effective risk management methods that are recognized and practiced by both peer and profession.

The American Institute for Avalanche Research and Education (AIARE) provides course materials, instructor training, and continuing professional development (CPD) for avalanche course providers in the US. As part of the curriculum, a risk management plan is promoted.

During the AIARE Instructor Training Courses (ITCs) the risk management dialog begins with a discussion of personal vs. professional risk acceptance. Theoretically each individual operates within an acceptable risk band that contrasts risk and opportunity. If the risk is too low there is missed opportunity and lessened experience. And, if the risk is too high there is consequence including injury, disability, loss of career or life. The person engaging in the activity, and often, his community of peers, defines the theoretical parameters of the personal risk acceptance model.

The professional circumstance is different by degree. The stakes are arguably higher, the transparency of process clearer by necessity, and the operational methods of risk assessment and mitigation well documented and transferable between industries. The conditions and the avalanche problem. As the devil is in the detail below are a few general recommendations

The successful plan can employ a simple terrain use strategy. One overarching theme is repeated; on instructional days where we travel through potential avalanche terrain, AIARE instructors look at proposed terrain through the student’s eye.

Don’t take students into terrain they will not be able to manage (without an instructor) on their own, once the course is completed.

Many students will return with friends to the same course location and terrain. They often repeat the new familiar tour – and likely in different conditions. If you are taking students into terrain where the decisions requires your expertise, requires you to lead through the terrain, or requires you to “thread the needle,” you may be doing your student’s a disservice.

While modeling is often the best instructional method, and the essence of all terrain instruction, the student benefit comes from the instructor modeling in “student-led terrain.” Terrain that the students can also manage themselves—with coaching from the instructor. The risk benefit includes safer terrain margins and likely safer post course student practice.

The picture obviously includes a venue with terrain varied enough for daily terrain choices appropriate to conditions and the avalanche problem. As the devil is in the detail below are a few general recommendations to include in the Risk Management Plan.

Course Operating Area

- Terrain options suitable for each day’s activities determined prior to course start
- Terrain options are pre-viewed and discussed in pre-season staff training
- Terrain photos and quality topographic maps available for pre-course trip discussions
- Communications plan established
- Rescue plan created specific to course operating area and includes outside agency response options.

Hazard Management and Course Operations

- Pre-course student logistics information that details expectations: the physical requirement, a time plan/ agenda, and a skill/knowledge prerequisite.
- Pre-course Instructor Meeting. At least one day prior to the course start review:
  - Student resume and skill/experience
  - Instructor review and documentation of current and forecast wx, snow conditions, stability / hazard and avalanche conditions.
  - Each day’s learning objectives and proposed terrain use.
  - Each instructor takes terrain options that have been previously agreed upon by all instructors during the pre-trip instructor meeting. Alternatively, chosen in the field during a face-to-face instructor meeting. Each student should have a “voice” and a “veto” on each day’s terrain choice. This includes the skiers of “new” or previously unfamiliar terrain as chosen for course use.

- Instructors follow the same procedures for daily risk management that is taught and demonstrated to students. This includes a daily trip plan (use of the AIARE field book “Trip Plan” page) that is essentially a pre-trip risk forecast. This is one of the tools the students takes with them. After the course they can rely on it to continue the process for managing their risk in avalanche terrain.

- Rescue response briefing. Each student must participate in a rescue response briefing prior to the first field trip. This includes communication plan (radio, cell) with list of frequencies or phone numbers, and action response plan.

Of utmost consideration is the involvement of operations management/ownership during pre-course training, planning, and documentation. Those who steer the operation practices and purse strings need to be present to support the process of understanding, assessing and treating the daily avalanche risk. This ensures the intent to keep, not kibosh, best practices implemented by those most at risk.

Summary

- While the complexities of risk assessment and risk management are profound – given the fickle nature
Sunshine greeted us as we crested the knife-edge north ridge of Mount Queen Bess deep in the heart of the Coast Range of British Columbia. We were two instructors and three students having an adventure, out exploring for the sake of seeing where we could go and using our skills in the mountains. The weather had been perfect for the past three weeks of our month-long mountaineering course. This was not a common occurrence for the Homathko Icefield. Our entire group of 15 was thrilled with our luck and psyched to take advantage of the good weather to explore an even more remote corner of the range on a five-day mini-expedition to Mount Queen Bess, a helmeting granite buttress surrounded by glaciers. This unanticipated exploratory mission was a cool opportunity for our students to use their newly developed skills to plan and execute a fun, rarely explored side loop from our route traversing the Homathko Icefield. After three weeks in the mountains our students had demonstrated sufficient competence that we felt comfortable allowing them to plan and largely lead this mini-expedition on their own, with instructors acting as advisors, coaches, and mentors as needed. On this particular day, due to the steep technical nature of the snow and rock climbing, we, as instructors, were leading our attempt on Mount Queen Bess.

Weather luck always runs out eventually. That afternoon the sky filled with a cap of white that offset the north ridge as a storm bore down upon us. We rapped from the ridge and descended a 50-degree snow slope with running protection. Snow/sleet/rain mixture stings our faces. Rappel the bergschrund to marky whiteness on the glacier below. Repeat the process with darkness sweeping through the white-out storm conditions. Beeline through whiteness across the glacier toward the invisible rocky spine of the west ridge, knowing that it'll be better to bivy in the morning, the night out, than in the middle of the stormy glacier.

We reach the rocks just as darkness truly settles on us for the night. It's a chilly night in a “puppy” pale for warmth, but we have water, a little food, and high spirits from the epic adventure of the day. The choice to bivy is an extension of the problem-solving skills we've been practicing for calculating the icefall and heavy crevasseing of the final two miles of glacier travel that separate us from our comrades back at camp. A basic likelihood and consequence assessment has lead us to the conclusion that we will wait this one out. The ridge is open at the moment with darkness settling through the white-out storm conditions. Beeline through whiteness across the glacier toward the invisible rocky spine of the west ridge, knowing that it'll be better to bivy in the morning, the night out, than in the middle of the stormy glacier.

In the end everyone got onboard with this new route. I had done my homework and, for this reason, I had the route approved of this new route. Approval of this new route.

A culture of exploration
Last winter, in my dual roles as NOLS winter instructor and program supervisor, I was involved in planning and executing a new 10-day winter route in the north end of Grand Teton National Park. This route was specifically for our Winter Instructor Seminar (WIS), a training opportunity for existing instructors to further develop winter camping and backcountry skiing skills. The ultimate goal of this annual seminar is to assess instructors as competent to work winter backcountry skiing courses for the school. One innate challenge on instructor seminars is finding a balance between providing opportunities for aspiring instructors to make decisions with real consequences and operating within/setting an acceptable level of risk in an institutional setting. This new route development process involved great learning for me, especially in the realm of crossover between personal and institutional risk tolerance, and how institutional risk tolerance can vary between individuals within the same organization.

As I considered the fortuitous opportunity to pioneer a new seminar route in the northern Teton, explore an area of the Park new to me, expand the terrain options of our winter program, and get paid all at the same time, I was excited. The set up seemed perfect. My experience, as a mountaineer for NOLS/sand personally, has allowed me to provide sections of tricky group management and terrain surrounding Berry and Owl Creek drainages (including terrain from Berry and Owl Creek drainages). I sought to draw concrete comparisons to other areas that are new and unknown to me – and sometimes areas that are just largely new and unknown, period. Exploration has become, without me consciously realizing it, a commonly accepted form of risk for me in both my professional and personal worlds. It is a piece of what I do and love about working for NOLS, this opportunity to take my technical and leadership skills and apply them in a completely new geographic region. I seek out exploratory routes and opportunities, embrace the thrill of the unknown, and trust that my skills will allow me to figure it out and manage risk appropriately as I go.

I soon met the reality that apparently not everyone saw the situation through the same lens. I was faced with questions of feasibility and appropriateness of this new route from colleagues. I was asked to do further research on exactly what risk tolerance versus my risk tolerance with students, I’ve frequently found myself thinking, “Well, I’m not going to do something on my own that I wouldn’t feel comfortable doing with my students.” In more recent years, however, I’ve found myself making more conservative decisions with my students than I may have made if I were on my own personal time with a competent partner. I’m not sure what has shifted in me. Perhaps I am just becoming more aware of subtle differences in my professional versus personal risk tolerance levels, the weight of responsibility for other people leading me to choose a more conservative option. Perhaps my competence and skills as a skier, climber, and manager of risk have progressed far enough beyond those of my typical students that the difference between my competence and their competence is playing a larger role in what I’m willing to do. At the end of the day, I’d say that I want the same thing for myself and for my students – to enjoy the beauty and adventure of the mountains and to come home healthy and happy to ski or climb another day.

Culture of Exploration

Managing Risk
In many respects, my personal awareness of risk and my risk tolerance have evolved in close conjunction, intertwined really, with my development as a NOLS instructor. Managing risk is what we do on a NOLS course, whether I’m skiing in the northern Tetons, mountaineering in the Waddington Range of BC, or a city, canoeing through the Yukon. Through professional and personal time in the mountains I have honed specific skills to manage risk, gained experience, and developed judgment. The risk-assessment tools I most frequently use are quite simple: weighing likelihood and consequence, acknowledging the number of “less than ideal” factors building up, identifying a situation’s human factors, maintaining open lines of communication with my colleagues/partners, paying attention to my own desires and ego. I have also learned to strike a balance between giving my students freedom to develop their own judgment through experience, perhaps by making mistakes, and choosing to draw the line and step in when the lesson is not worth the associated risk.

Through much of my career in the mountains over the past 10 years, occasionally reflecting on my personal risk tolerance versus my risk tolerance with students, I’ve frequently found myself thinking, “Well, I’m not going to do something on my own that I wouldn’t feel comfortable doing with my students.” In more recent years, however, I’ve found myself making more conservative decisions with my students than I may have made if I were on my own personal time with a competent partner. I’m not sure what has shifted in me. Perhaps I am just becoming more aware of subtle differences in my professional versus personal risk tolerance levels, the weight of responsibility for other people leading me to choose a more conservative option. Perhaps my competence and skills as a skier, climber, and manager of risk have progressed far enough beyond those of my typical students that the difference between my competence and their competence is playing a larger role in what I’m willing to do. At the end of the day, I’d say that I want the same thing for myself and for my students – to enjoy the beauty and adventure of the mountains and to come home healthy and happy to ski or climb another day.

Culture of Exploration

Managing Risk
In many respects, my personal awareness of risk and my risk tolerance have evolved in close conjunction, intertwined really, with my development as a NOLS instructor. Managing risk is what we do on a NOLS course, whether I’m skiing in the northern Tetons, mountaineering in the Waddington Range of BC, or a city, canoeing through the Yukon. Through professional and personal time in the mountains I have honed specific skills to manage risk, gained experience, and developed judgment. The risk-assessment tools I most frequently use are quite simple: weighing likelihood and consequence, acknowledging the number of “less than ideal” factors building up, identifying a situation’s human factors, maintaining open lines of communication with my colleagues/partners, paying attention to my own desires and ego. I have also learned to strike a balance between giving my students freedom to develop their own judgment through experience, perhaps by making mistakes, and choosing to draw the line and step in when the lesson is not worth the associated risk.

Through much of my career in the mountains over the past 10 years, occasionally reflecting on my personal
of the avalanche phenomena – the solution begins with the choice of appropriate “teachable terrain.”

• The terrain in which the student learns best about avalanches and own limitations is terrain that they are able to manage. In this terrain the student can identify hazardous terrain, imagine consequence, create options, and importantly choose and act upon safer decisions.

• Quality learning often takes place in a low stress environment. During a student led activity, the worst modeling occurs when the instructor takes over the lead to reduce the likelihood of incident. The best modeling occurs in terrain where the student can see themselves, on their own, doing what the instructor is doing, and managing the same terrain. The instructor can model the student’s terrain choice with appropriate group management, travel techniques, and good communication.

• Each operation has a risk management plan that is reviewed and implemented by both management and employee. The plan includes pre-season instructor training and pre-course instructor meeting.

• All terrain choices are pre-discussed by the group of instructors. All terrain decisions are made using consensus. Everyone has a voice, and anyone has a veto. These practices need not be onerous or impractical. The examples cited above are easy to execute and certainly can be expanded upon. These procedures should be transparent and shown to our students in an effort to show them the concern for group safety. After all, managing risk is a big part of what we’re teaching and what they are expected to do for themselves after leaving the course.

Tom Murphy is the operations director for AIARE. He lived and worked in Alaska for 20 years building and operating the Hatcher Pass Lodge. He currently resides in Creston, CO. His claim to fame is having a letter to the editor in the first issue of TAR.

Colin Zacharias has worked in the avalanche and ski guiding industry since 1980 and is a certified ACMG Mountain Guide. His avalanche work included ski areas and highways before switching to full time ski guiding for CMH in the late ’80s. After 30 years of heliskiing Colin transferred his focus to mountain guiding, avalanche education, guide training, and operational consulting and serving a post as the ACMG technical director. Currently, Colin is a CAA Professional Member and ITP Level 2 professional training program course leader. Since 2003 Colin has served as AIARE’s technical director, advising on curriculum development for both course content/materials and Instructor Training. As a mountain safety specialist a portion of his time is directed to consulting for heli and unco-ops operations in both Canada and the US. Outside of the avalanche world Colin still guides private clients in the mountains and is employed in mountain safety for the old film and television industry. In this employ, work has taken him to Argentina, New Zealand, Borneo, Fiji, and most recently a third trip to his favorite country, Monaco. Colin frequently travels and works with his wife, Julia Tuffy, who is every bit the adventurer as Colin, working as a stunt woman, aerial dancer, choreographer and founder of the contemporary and aerial dance group, Aerial Dance Society.

AVY COURSE RISK TOLERANCE continued from page 22

This past year I participated in – and then facilitated – several group sessions focused on risk management for guides and instructors. The result is a collection of factors that can skew decision-making in our professional lives. I am mid-project in developing this list of factors into a tool for reflection designed to identify patterns in our decision-making, and in linking this tool to some of the ideas offered by Daniel Kahneman in his book, Thinking, Fast and Slow. The exercise is called “Human Factors for Mountain Guides,” and the basic outline goes like this:

1. Reflect on days you had a near miss, or finished the day with the perception that you were pushing it. Write down 1 - 3 of these; describe them in a few sentences.

2. Read through Human Factors for Mountain Guides (see next page).

3. Fill out the worksheet (a condensed summary of Human Factors for Mountain Guides, not included here) for each of your near-miss experiences, checking the boxes that enumerate factors you think might have applied on that day.

4. Use the worksheet to track your decision-making, with the goal of looking for patterns in your System 1 decision-making (see Kahneman).

How do you manage students/clients and their desires in the field? Any tricks or tips?

It seems there are two types of groups: students, i.e., folks that bring some level of decision class, and clients on a guided objective. Of these two, the instructional groups are often already focused on risk management as part of the course goals or curriculum, whether it is an AIARE LI course or an introduction to backcountry skiing course. In this context it is easier to identify and manage people’s desires. Being in the mountain environment means that people are presented with actual hazards and potential rewards that drive decision-making. And a successful course environment makes it easier (and emotionally safer) for people to both express the emotions these hazards and rewards create, and to examine how they affect decision-making.

For guided objectives, managing people’s desires can be much harder – in fact, I see it as one of the central challenges of my job as mountain guide. At the root of the challenge are the contradictory forces of desire and risk, and as a guide I am charged with striking an appropriate balance between these. The decision-making is ongoing: navigation and route finding, managing people, evaluating weather and conditions…all these factors are woven into the complex issues of hazard assessment and management. And the added pressure of managing desires can be very powerful, and the most difficult to control.

There are a myriad of ways to manage clients’ desires – and the bottom line driving my professional approach is this: My clients are here (on this day, in these conditions) because they expect to do things; describe them in a few sentences.

• It is my job to manage their risk better than they would have in the same place without me there.

• It is my responsibility to keep their risk exposure at a level that is acceptable to them AND to me.

To these ideas you can add the need for clear communication with clients of what the risks are for a given objective, and the ongoing assessment of my clients’ abilities and skills…and on and. And through it all, there is the clear and ongoing statement of goals for any given objective: “The goal is to get home safely.” It sounds obvious, but it is crucial to remind people whose emotions and desires may have internally overwritten this with, “The goal is to get to the top.”

Yet, the issue is not all analytical…

A few years back I was watching the movie, Steep, with a group of friends and co-instructors at the AMGA. We watched Doug’s segment in silence, in awe of his skills and person, and in sadness. Folks who were sitting there who knew and loved and hung out with Doug had seen the movie before, and yet there we were…silenced in our daily bustle by the images of him discussing risk and consequences.

When the movie ended, I suddenly wondered if the people sitting in that room would somehow be marked. It seemed that they fully understood the risk and the potential for loss and consequence, and yet they went on living out their lives in the presence of this knowledge. I am still pondering if this is true: have we all been marked in this way? Or is that actually a more emotional way of expressing the basic idea: that we don’t truly perceive the risks that we take?

Resources

The Black Swan: The Impact of the Highly Improbable, Nassim Taleb, 2007

Heuristics Trap in Recreational Avalanche Accidents: Evidence and Implications, Ian McCammon, 2004

The Better the Sure, the safer! World Golden Rules for Group Interaction in High Risk Environment, Gerthi Dünser and Karl Benf Benz, 2004

The Human Contribution to Non-technical Skills, Ian McCammon, 2004


Mistakes were Made (But Not by Me), Carol Tavris & Elliot Aronson, 2008

The Checklist Manifesto, Atul Ghwande

The Black Swan: The Impact of the Highly Improbable

The Human Contribution to Non-technical Skills

Safety of the Sharp End: A Guide to Non-technical Skills

Mistakes were Made (But Not by Me)

The Checklist Manifesto

Emotional Intelligence, Daniel Goleman

A GUIDE’S RISK TOLERANCE continued from page 21

Margaret Wheeler is a ski, alpine, and rock climbing guide who has led trips throughout Europe and North America.

An active member of the guiding community, she is an instructor of guide training for the American Mountain Guides Association (AMGA) and serves on its board of directors and as president of the organization. She is involved in avalanche education through her work as an AIARE (American Institute for Avalanche Research and Education) instructor and trainer. In the development of her ski mountaineering career, Margaret has been a member of several women’s expeditions pioneering first ski descents in India and the Atlas Mountains of Mongolia. In 2006, she became the second woman in the United States to complete her international IFMGA/AMGA guide certification. Margaret is co-author of the book, “Backcountry Skiing: Skills for Ski Touring and Ski Mountaineering.” She holds a bachelor’s degree in history from Dartmouth College and a master’s in mechanical engineering from the University of Washington.
Results of the Group Brainstorm

In groups of three or four, guides and instructors worked together as a group to generate answers to the following question: What pressures have you experienced in your decision-making as a mountain guide? Answers from two different group sessions were combined and reorganized from the original brainstorm list into the following multiple categories. Going forward, the goal is to use these categories to build a tool for near-miss analysis.

Type 1: Pressures Created by our Relationships and Group Dynamics

Pressures created by dynamics outside of the group

1. Influence of guided groups. Pressure from other guided groups/patients. Competition between companies.
2. Influence of non-guided groups. Pressure from recreational parties. Client says, “They went up, why didn’t we?” Influence from recreational parties: “bad examples.”
3. Competition for resource. Resource scarcity. “We gotta get to the climb first,” rush to set up or take down ropes, first tracks, first to base of the route.

Pressures created within the dynamics of the group

1. Diverging client expectations. Diverging expectations within the group of clients.
2. Diverging client abilities/fitness. Diverging physical or technical abilities within the group of clients.
3. Client-client pressures. Guests put pressure on each other based on differing abilities and agendas. Differences in client skill sets when they know each other: “She’ll be fine,” “He’s OK, it’s good for him.”
5. Guide-guide communication breakdown. Lack of communication with other guides. The expert halo limits inter-guide communication (guides don’t speak up because they don’t want to offend peers/other professionals). Our new guide in a rock star/slash a high reputation. Hesitation to take the lead results in a leaderless group.

Pressures from our clients’ abilities (physical and technical)

1. Client pushes themselves too far. Client is tired/exasperated, and we’re far from home. Client is physically pushing it, exhausted, or hasn’t had enough food/water. We are guiding clients while they are not feeling well.
2. Client is not fit for the objective – does not have the fitness or technical ability needed. Skill set of clients is not adequate, but group is already committed, already on a route/mountain.
3. Lack of proper equipment. Client is not prepared with proper equipment – you arrive at a climb/trailhead, and client does not have the appropriate gear.

Pressures from clients’ mental/emotional dynamics

1. Client lacks self awareness – technical, physical, emotional. • Pressures from clients who want to “bite off more than they can chew.”
• Client expectations are unreasonable given their skill set.
• Client puts pressure on themselves and/or others and really needs or is able to do it.
• Client doesn’t actually know what he/she wants from the trip.
2. Lack of respect for guide. Clients lack respect for the judgment of guides. Clients think they “don’t need a guide.” Clients will not follow guide directions for technical, movement, or self-care.
3. Poor personal skills. Clients are aggressive or unpleasant. Clients lack respect for the judgment of guides. Clients think they “don’t need a guide.”

Pressures created by the guide

1. Guide’s desire to overtake obligation to client. Guide fails to remember that it’s about the client, not about the guide.
2. Guide’s desire to deliver client reward. Guide wants to give client reward. Guide wants to “push on” and finish the route for client in the face of weather/darkness coming on.
3. Incongruent evaluation of client’s abilities. Guide’s expectations of clients’ performance are unreasonable or incongruent.

Type 2: Pressures Created by Context – Social, Economic, Temporal

Pressures created by weather and conditions

1. Limited weather window. “Today is our weather window and we have to make the most of it.”
2. Dangerous or difficult conditions. Weather and snow stability create conditions that make it difficult/dangerous to achieve objective.

Pressures created by financial exchange of hiring a guide

1. Financial pressures direct technical/financial risk management. Your decisions cost the company/your employer money. A trip has a higher ratio then it should because of the balance between running the trip and making money.
2. Clients have committed money and/or time. Commitment because of opportunity costs: clients have traveled long distance, paid a lot of money. Big summits or objectives mean more money has been paid. Greater expense – greater expectations.
3. Client’s judgment compromised by finances. Client screening (by the office or the guide) is compromised by the desire to fill the trip/make money.
4. Office pressure to deliver the product. Guide feels pressure from the office to deliver the product.
5. Financial/work scarcity creates burnout. Guide works too much even though they are tired or burnt out. Guide takes too much work in busy season.
6. Fear of competition. Need to create repeat business. “If I don’t get ‘em on the top they will use a different guide next time.”
7. Tips are better with successful trips.

Pressures created by trip structure

1. Solo guiding. Guide is working alone – has no backup if something goes wrong, no opinions from others structure.
2. Lack of alternatives. Guide has no alternative options – lack of a Plan B or an unsatisfactory Plan B.
3. Language or cultural barriers. Barriere Linguistique – language barrier makes communication more difficult.

Pressures created by our professional community

1. Local ethics, protocols, or techniques. “We do it this way.” “You Americans and your safety.”
2. Value judgment based on technical level in our mountain cultures, climbing the big objective is often valued more than the quality of experience.
3. Operational pressures – must satisfy owner/employer.
4. Pressures from our peers. Guide wants to have a good answer for, “What did you do today?” Desire to impress other guides. Pressure for consensus, or conflict with other guides.
5. Pressures of time – finishing in a reasonable time and conditions.

Pressures created by our guide’s relationship

1. Client wants to please guide. Client wants to please guide. Client is often away from home.
2. Guide feels responsible to guide. Client misunderstand the role and rule for hiring a guide. Lack of awareness or clarification by the office (or the guide). Client wants to see the guide climb at his or her level.
3. Personal vs professional. Clients fail to see the line/distinction between the personal and the professional relationship with their guide. Clients are always on vacation, guides are always working.
4. Misunderstanding of financial obligations. Unhappy client wants a refund if they don’t achieve their objective. “I’m paying you to get me to the top.” – Client, 2006.
4. Limited window of possibility. Client is going home tomorrow and therefore wants a particular objective regardless of existing conditions.

Pressures created by our ideas of self-worth

1. Personal goals – guide wants to summit or do first guided ascent.
2. Ego/pride connected to day’s outcome we want to “out guide” others. Desire for a perfect record/year (12 for 12 on the summit)
3. Seeking acceptance by peers and/or clients. Trying to impress them.
5. Scarcity: Want to get first tracks or be first on a route.
6. Errors: Guide doesn’t want to “look bad” – made an error and is trying to hide it.
7. Guide fear of missing out. Other guides are taking their clients to the top, so I don’t want to miss out.
9. Pressure to be professional. “I’m supposed to know the answer.”

Pressures from our own insecurities

1. Gender – female guide/male clients, wanting to prove you are as strong a guide as your male peers.
2. Age – “I’m getting older, I need to do this now. I should be able to do a yr.”
3. Being the greenest – guide needs to prove him/herself. Pressure to move to quickly (as a guide) from learning to doing.
4. Locality or culture – “I’m not from here.”

Pressures created by our guide-client relationship

1. Pressures of good/return clients. They have been out with you before. You want to provide “the goods” for a good group.
2. Need to build/maintain reputation. Pressure to provide great experience – to ensure reputation and repeat business.
4. Feeling financially obligated to deliver. Guide feels responsible because the client paid money to deliver the product!
5. Desire for variety. Guide wants to get a client into a new terrain (even if client doesn’t care either way).
6. Desire for client progression. Pressure to take clients to new heights quickly through the transition from learning to doing. Pressure to assist client in achieving the guide-recommended goal.
7. Multiple attempts on the same objective. Client returning for the third time to the same objective.
9. Guide burnout plus client scarcity. “I need a rest day, but client only has today.”
10. Tips. Working for the tip can create negative pressure?

“Reverse” Pressures

1. Overconfidence/familiarity.
2. Routine – repeat objectives.
3. Over-reliance in equipment. “I’m coming to the office to deliver the product.”

Converging Factors: Multiple Challenges Ramp Up Pressure; Convergence of Challenges and/or Stressors

Concept: Taken alone, any one of the above factors may not be enough to derail a guide’s good decision-making. But when there are more than one of these factors/pressures, convergence can occur. This is concurrent with our thinking about risk management and accident analysis.

• Example 1: Weather is deteriorating, but we bail the clients will be unhappy and might ask for money back, especially if we get home early. But if we stick it out the consequences are going to be worse.
• Example 2: As a business owner, weather and conditions lead to shutdown (example, day four of a heli-skiing week, and no one has skied yet).

Converging Factors: Multiple Challenges Ramp Up Pressure; Convergence of Challenges and/or Stressors

Concept: Taken alone, any one of the above factors may not be enough to derail a guide’s good decision-making. But when there are more than one of these factors/pressures, convergence can occur. This is concurrent with our thinking about risk management and accident analysis.

• Example 1: Weather is deteriorating, but we bail

• Example 2: As a business owner, weather and conditions lead to shutdown (example, day four of a heli-skiing week, and no one has skied yet).

Can you find a pattern? Use the above list as a tool to review and analyze near misses that you have seen or had.

Margaret Wheeler facilitated a presentation on Human Factors as part of AMGA Professional Development Clinics in October 2011. The above is a summary of results of the workshop sessions.
pertinent negatives. Again nothing, I railed, “Never, ever, ever enter red light terrain in an institutional context without acknowledging that you are doing so. Our protocols say that you must document any time you enter yellow or red light terrain.” We measured the slope at 28 to 40 degrees with multiple obvious convexities and there were the tips of shubs poking out, indicating potential sour spots. Two test pits revealed HS was 180 to 150 and the ground was a boulder field, CTRM1=q+120 to 130. I got an ECTX however on the 31st tap, a Q1 propagation again down 130, theoretocally deeper than our pressure bulb. We discussed and split the group with half skiing the slope we investigated and half booting down a short, 50+ degree slope that Jesse had checked out. People apologized and I swallowed my frustrations, managing to say that I wasn’t upset but believed we had received a gift, a lesson that would be learned best experientially and that in this case we had a no-consequence incident. I added that we would debrief at camp that evening, using the morning’s class as a debrief tool. As we reviewed the human factors chart, the students could identify each of the negative factors at place where we descended. Specifically, they were distracted by a binding failure and repair just prior to getting to the crux; they perceived some schedule/goal pressure; and finally fatigue, stress, and performance played a role as we had been out in the field for more than a week with long days of travel. We then discussed my role and could identify all of the positive traits.

As Lynne and I talked about this incident we attributed the first three positive factors (situational awareness, watchfulness, self-awareness) to what Lynne likes to refer to as intrinsic, also known as reflective competence (see sidebar below) or subtle pattern recognition, developed over many years of backcountry winter travel. In my capacity as an educator I role modeled the proper way. And I had to flex my role model muscle, as it was my binding that had failed. Even after the quick repair, my students were more interested in the failure than the terrain, I declared a moratorium on binding questions.

So what? Well, I truly do believe this incident was a gift. Anytime these folks enter steep terrain, visions of me squawking at them to pay attention, document, and discuss will pop into their heads—thinking, “What would Robby do here?” similar to the visions I have of Lynne and Heavy D (Don Sharaf) any time I enter avalanche terrain. These thought processes in the NOLS winter program come as I mentally perform a post-mortem test. I hear them challenging my route selection, test pit accuracy and efficiency, and pushing me to communicate succinctly.

I’m wondering if we need to somehow modify our training if this happens on day 13 of a 15-day training, or was it simply a fluke? Regardless, I know what I’ll be emphasizing next year, and inevitably something else will come up, demanding vigilant watchfulness on the part of trainers as we groom a new crop of winter professionals.

Robby makes his home in Victor, Idaho, where he works at NOLS Teton Valley as a winter program supervisor, thinking about how people think.
COOKE CITY: A New Year’s Eve Tragedy In Two Parts
Story by Eric Knoff and Doug Chabot

PART 1 by Eric Knoff

On December 31, 2011, two people were killed in separate avalanches in the mountains outside of Cooke City, Montana. One victim was a skier, the other a snowmobiler, both Montana residents. During the three days before the accidents the mountains around Cooke City received over 3' of dense snow totaling 4" of SWE. Consistent northwest winds blew 30-40mph with gusts in the 60s during the storm. The new snow was deposited on a layer of facets formed during an unusually dry December. This rapid load produced unstable conditions, prompting the Gallatin National Forest Avalanche Center (GNFAC) to issue a backcountry Avalanche Warning for the area.

The initial Avalanche Warning for the mountains around Cooke City was posted at 5pm on Friday, December 30. At this time, 2" of SWE had been recorded over a 48-hour period at the Fisher Creek Snotel site (elev. 9100') near Lulu Pass, creating our official warning criteria of HIGH avalanche danger on all slopes. Issuing the Avalanche Warning in the evening allowed it to be picked up and disseminated by the media by early Saturday morning.

I was in Cooke City at the time and spent much of December 30 ski-touring around Lulu Pass. My partner and I experienced widespread cracking and collapsing and triggered a few small avalanches. Precipitation Intensity rates were high throughout the day, and the storm continued to rage as we reached town at 5pm. On Friday evening the weather forecast was for another 1-2' of snow to accumulate by the morning of Saturday the 31st accompanied by strong northwest winds.

As forecasted, an additional 2" of SWE totaling 1.5' of snow accumulated at the nearby Snotel site by Saturday morning. This new precipitation pushed the 72-hour storm total to 30' of snow equaling 4" of SWE. The GNFAC extended the avalanche warning throughout Saturday the 31st, New Year’s Eve Day, which dawned clear and cold. Temperatures were in the single digits and winds were blowing 10-15mph out of the NW. By 11:30am the ambient air temperature had only warmed to 8°F, but sunshine and fresh powder had drawn a large number of skiers and snowmobilers to the slopes around Daisy Pass and Lulu Pass. By this time, my partner and I had remotely triggered a size-D2 avalanche and observed both natural and human-triggered avalanches in the surrounding terrain. We both felt uneasy about the conditions and agreed that an avalanche incident was a good possibility.

At approximately 11:45am my partner and I were finishing field observations near Lulu Pass. As we were loading our skis on the snowmobiles, I glanced across the valley just in time to watch a snowmobiler finish a turn midway up the northeast face of Mt Henderson. Suddenly, the slope broke around him, and he disappeared from my view in a wall of white. I couldn’t tell if the snowmobiler who triggered the slide had been buried or if other riders were involved, but the sheer size of the avalanche made my partner and I both realize that the situation was serious.

I immediately radioed Cooke City Search and Rescue, and we headed to the scene. My partner and I both felt skating to the scene was a safer option, and we arrived around the same time as search and rescue. Arriving on the scene, we were informed that a piece of the victim’s boot had been visible on the surface, cutting down on search time. Members of the victim’s party dug the rider out in approximately 12 minutes with his head buried 3' deep. The victim was pulseless, and party members initiated CPR. Upon arrival, search and rescue applied an AED without success. CPR was continued for approximately 45 minutes before a physician in Cooke City gave notification over the radio to end CPR. The rescue was concluded, and the scene was clear by 1:30pm.

The avalanche broke 500' above the rider, catching him while he was riding downhill. Due to the confined nature of the path, escaping the slide was nearly impossible. The slide ran a total of 1000 vertical feet. The crown of the avalanche ranged from 1-4' deep and propagated 300-400' wide. The slope angle at the trigger point was 35 degrees, but increased to 40 degrees near the upper portion of the crown. The debris ranged from 7-10' deep near the toe of the slide. US classification of the avalanche is SS-AM-D3-R4.

PART 2 by Doug Chabot

Two hours after this incident, skiers triggered a slide south of Cooke City in the Absaroka Beartooth Wilderness approximately five miles to the south of first incident. The accident occurred a mile inside Montana/Wyoming border the husband decided they should turn on their beacons. He had an Ortovox Patroller while she had his 20+ year-old Ortovox F2. After turning it on he commented that the rechargeable batteries were weak. They continued touring despite widespread cracking and collapsing and weak batteries.

After breaking trail up a broad valley for close to a mile, the two skiers turned up an adjacent drainage with very narrow, steep walls. Many avalanche paths funneled into this gully from far above. Around 2pm they decided to ski out of the drainage and seek a more comfortable spot for

Continued on page 30 ➔
I recently attended a rare event: a memorial for someone who didn’t die in the mountains. This particular high-achieving friend died of alcoholism, but was his addiction really so different than my own devotion to mountain sports? He knew alcohol would kill him, but chose to drink. And I am increasingly certain that if anyone spends enough time in the mountains, he or she will die there.

I often hear friends make statistically insane comments such as, “You can die on the way to the mountains just as easily as you can die in the mountains.” That statement, for the record, is a stinking pile of self-delusional excrement that does not smell any less foul with repeated exposure. The ignorance behind those words makes me seethe internally—because I once believed exactly the same thing.

I do a lot of presentations about mountain sports, and sometimes share a list of dead friends to remind myself and the audience that the hidden price for the stunning photographs is all-too-regularly life itself. There are 27 names on my list. Not one of those friends died while driving to the mountains. Not one died on a commercial airline flight. To equate the risks of mountain sports to everyday activities like driving or even the chance of death from cancer is completely idiotic. Every friend on my list drove to the mountains a lot, and some even wrecked vehicles and spent time in the hospital from those crashes. But they did doing mountain sports.

As the list grows longer, I have a harder and harder time understanding why I take the risks I do out there. Yes, I’m careful; yes, I use good gear; yes, I run away a lot in the face of peril—but there are always elevated dangers in sports such as skiing, whitewater kayaking, and paragliding. Each friend’s death has been a crack in my mental foundation of “managed risk.” And then, two months ago, that foundation was shattered with the sound of someone’s spine breaking. I had launched my glider off Mount Lady MacDonald, north of Canmore, and was 500 feet above my friend Stewart when he plummeted into the rocks shortly after takeoff. I almost puked in the air as I watched and heard him hit. I didn’t think anyone could survive the impact he took, and the spinning fall down the scree that followed. Thanks to prompt first aid from some great people who happened to be hiking in the area, and to a helicopter rescue team from Canmore SAR Stewart was in a good hospital only two hours after his accident. He remains there, with hopefully temporary spinal damage. I was thrilled when I heard that he had survived—unlike the dead, he would have the opportunity to say what he needed to his friends and family. He might even recover fully.

Just one week before Stewart crashed, I had the best flight of my life, straight over the iconic granite spires of the Bugaboos in southeastern BC. Pure joy is how I’d describe that flight. But I haven’t flown since Stewart’s accident in August; the thought honestly makes me nauseous. Why?

Strange, Stewart’s survival has affected me far more than if he had died. The difference with Stewart is that I can look into his eyes and see the damage. I can talk with Stewart and see the pain he is fighting through. While I admire the hell out of his courage and commitment to fight for every millimeter of progress, I also imagine not being able to hold my own children. Stewart’s wounds don’t fade into memory the way a fatally injured person’s still staring at you in the face. Some of Stewart’s comments are beautiful even as they are heart-rending: “If I could just get one hand back it would make all the difference.”

Some of my own anger probably comes from an ever-greater sense of mortality. I desperately love the fullness of life, and I desperately love mountain sports. I look at Stewart learning to eat again (he does have one arm back!) and feel true happiness that he is able to, but then I look at my glider in its bag and have to look away. I love sharing the mountains with people, but wonder how many of them will end up on my list. My world view is falling apart, and it’s about as comfortable as getting scalded in the shower. I want to jump away, but there’s nowhere to go.

No single day in the mountains is worth dying for, so it must be the sum of the days that is worth that risk. I tell myself that, but these days I have more empathy for the religious who have lost their faith. They, too, are often angry. The psychiatrist Elisabeth Kübler-Ross said there are five stages of grief. If so, I’m only on stage two, anger, and a hell of a long way from the final stage of acceptance. How will I ever accept this level of carnage, year after year?

Will Gadd grew up in a family that hiked, climbed, and went into the mountains whenever they could. Some of his earliest memories are of long backpacking trips, wind-blown summits, and surviving winter-skip trips. The first sport he really got into on his own was caving. When he was 14 he started kayaking. At 16 he bought his first climbing rope and did his first new rock route. At 25 he first flew a paraglider. At 41 his daughter came into the world. She’s already doing all the stuff he did as a kid, and she’s an athlete too.

This article was originally published on December 5, 2011, in the online magazine, Explore, which can be found at www.explore-mag.com.

A LOOK AT RISK

Story by Christian Santelices

What is acceptable risk? I think we all understand why we do what we do in the mountains. We understand the joy skiing untracked powder gives us and those of us who make our living as guides and instructors understand the impact it has on our guests. That’s the easy part.

But where do we draw the line between pushing the limits of safety on our own or with clients? I have a list of people who have pushed the line both personally and professionally, and they or their clients are not around to testify to the wisdom of their decisions. It’s hard to “get over” something that’s still staring at you in the face. Some of Stewart’s comments are beautiful even as they are heart-rending: “If I could just get one hand back it would make all the difference.”

Some of my own anger probably comes from an ever-greater sense of mortality. I desperately love the fullness of life, and I desperately love mountain sports. I look at Stewart learning to eat again (he does have one arm back!) and feel true happiness that he is able to, but then I look at my glider in its bag and have to look away. I love sharing the mountains with people, but wonder how many of them will end up on my list. My world view is falling apart, and it’s about as comfortable as getting scalded in the shower. I want to jump away, but there’s nowhere to go.

No single day in the mountains is worth dying for, so it must be the sum of the days that is worth that risk. I tell myself that, but these days I have more empathy for the religious who have lost their faith. They, too, are often angry. The psychiatrist Elisabeth Kübler-Ross said there are five stages of grief. If so, I’m only on stage two, anger, and a hell of a long way from the final stage of acceptance. How will I ever accept this level of carnage, year after year?

Will Gadd grew up in a family that hiked, climbed, and went into the mountains whenever they could. Some of his earliest memories are of long backpacking trips, wind-blown summits, and surviving winter-skip trips. The first sport he really got into on his own was caving. When he was 14 he started kayaking. At 16 he bought his first climbing rope and did his first new rock route. At 25 he first flew a paraglider. At 41 his daughter came into the world. She’s already doing all the stuff he did as a kid, and she’s an athlete too.

This article was originally published on December 5, 2011, in the online magazine, Explore, which can be found at www.explore-mag.com.

A LOOK AT RISK
Where do we draw the line between pushing the limits of safety? I have a list of people who have pushed the line both personally and professionally, and they or their clients are not around to testify to the wisdom of their decision or to the benefit found from crossing the line.

in the mountains with clients affect my guests certainly, but more importantly they affect their loved ones – spouses, children, parents, and friends of the folks who are skiing with me that day. It would be a living nightmare to have to sit in front of those people and explain why I decided to take them to a place that killed or injured them. I often think about my Argentine friend and what he must be going through. I don’t think he’s working as a guide anymore. In Europe, he likely would have been prosecuted and put in jail if his decision was found to be unsound.

The hardest thing is when I have clients who are better skiers than me, and who have a certain agenda. It’s sometimes tough to ratchet them back and look at terrain and risk from my perspective. The problem is that I want to give them what they want, but I need to really think about my decisions and what could go wrong on those days. Here are some tools I use to help me make decisions and manage terrain:

Follow the snowpack on a daily basis.
Only by knowing what is going on below can I hope to make wise, educated decisions about what to ski. Ask those you trust about what they are seeing and experiencing in terrain that you want to ski.

Know my clients’ abilities and desires.
Ask questions, find out what their goals are for the day and what they have done in the past. For bigger objectives, make sure they work their way up to their goals. Preparation is key.

Do a post-mortem check.
What is the likelihood of something happening on this slope and what would the consequences be? What would really happen to that “safe zone” if the slope went big? If I got caught here, would my client be able to dig me out? Could I really hope to dig them out in time if something happened? Do I even want to risk that possibility?

Work the terrain.
Use the macro and micro terrain features to help keep you on the right side of the snow. Decided to ski the avalanche path? Ski the small ridge within it, for example.

Use double checks.
I will often “check” my decision with ALPTRUTH and/or FACETS before dropping into an avalanche path. A great exercise that we did in AAI’s guide training this year is figuring out where on the FACETS scale each of us live in our decision-making model. I live in Acceptance – I want my clients to have a great time and to think I’m an awesome guide. That often affects my decisions, and I need to recognize that every day.

Reflection.
Every day list down and think about my day and the decisions I made. What could I have done better? Where did I make a questionable decision? What did I do well that I should remember for next time?

In the end, what’s important as a guide or personal skier is to always ask questions, to strive to learn more, to be open to questions or criticism from our peers. Humility will help to keep you on top and open to learning.

Christian Santelices believes that experiencing nature firsthand has the power to transform people’s lives. As a fully certified IFMGA/UIAGM mountain guide, professional photographer, public speaker, writer, and community activist, his career has been dedicated to helping facilitate this process. During the summer months you’ll find him working in the Tetons as co-chief guide for Exam Mountain Guides. The rest of the year he teaches avalanche courses, ski guides, and leads custom adventures and corporate community-building retreats worldwide through his guiding company Aerial Boundaries. He lives in Tetons Valley, Wyo.ah, with his wife Sue, daughter Mariela, and son Nicolas.
GET IT DONE; STAY SAFE
Reflections on The Grand Delusion
Story by Mattie Sheafor

Years ago I worked with and became friends with Alex Lowe. Alex embodied the rare combination of genetic ability and the drive to proficiency that most of us dream of but can never fully experience. He was psyched like none other, and when he was in the mountains he wore a huge smile. But just ask him about Jenny and his three boys, and his eyes twinkled, his smile shone exponentially brighter as he spoke. He had a terrific smile anyway, but to see this man’s face actually become radiant – there was no doubt about what lit his heart up.

Alex’s passing shook my foundation. I received the news while on my own climbing trip in the Alps. A lot of us seemed to think if anyone was immune to these realities, it was definitely Alex. And in the wake of the sadness I remember considering that maybe I was done with climbing. When I next checked my email I found a last bubbly note from him exhorting me to do my best and enjoy every moment.

Earlier this winter I found myself belaying Alex’s youngest, now grown son at a frozen cliff and standing beside the man (one of Alex’s former partners) who stepped in as his dad years ago after Alex died in the avalanche on Shishapangma. It was different than if Alex was here, but it is still good. Something about Alex’s energy remains in those of us who can’t forget him.

I started climbing 25 years ago this month. Alex is but one of the 21 friends on my own list of those who have died in the mountains. One name belongs to my best friend, Karen, who disappeared after topping out on a rad Alaskan grade VII route, six years ago this May. I still think about her every single day. I’ve stopped being surprised by this. Instead, I am just grateful for a friend who touched me so profoundly.

And lately, when news comes of another friend lost to the mountains I have to be as honest as Will is in his essay, there’s a further stretch to be made. There is a kernel of elitism at the core of these arguments that doesn’t ring wholly true to me.

I cannot discount this possibility: that all the incredible ways in which climbing has informed and shaped my life might have been achieved walking a different sort of path, maybe becoming an avid disciple of another type of sport/discipline that holds less inherent risk. So I spend a little more attention to diversifying as I age, and maybe one day, if I work at it, standing in a river’s current watching a fish rise will teach me too. This is the route I’ve traveled through, it makes up a place to work toward greater capacity, and there is no room for masks – I love the simplicity. Pretense falls away quickly whether you are on the sharp end of the rope or trying to lift something heavy over your head. You either do or you don’t, no pretending. Only certain personalities seem to persist in these places, and generally they are ones I am predisposed to liking. It makes for an interesting camaraderie.

In climbing we have this mutual vulnerability in spades. Nothing like sharing a portaledge and a poop tube to break down walls. Holding someone’s line while they try to ascend something at their limit is akin to a privilege, it is an act of trust and partnership to the core. This connection is the part I value the most.

Lately I think I have to be satisfied with the idea of holding competing tensions: No single day in the mountains would be worth losing time with the people I love or their suffering. No way. And, I love all that climbing accesses for me, both within and without. I churn about the inherent risk manifest in my sport, but attending to managing it through every means at my disposal makes me present. And processing the accompanying fear (do not feel terrifyfied satisfying? Is that addiction? Rejuvenation? Evolution?) It is what it is. Until I figure out a better answer, I will do my best to prepare. And my hopeful self will continue to spunge on creamy with SPF. We are younger than we’re going to be. Get it done, stay safe. And tell your people you love them as often as you can.

Mattie Sheafor lives in Jackson, WY, with her two sons, where she works as a reading teacher at Jackson Elementary School and guides for Exum Mountain Guides, Aerial Boundaries, Chicks Rock, and Chicks with Pucks. Mattie is the founder of Women That Rock, the first women-teaching-women climbing nonprofit in the US. She works with Marmot and Mountain Athlete.

THE MORALITY OF MOUNTAIN SPORTS
Story by Rob Shaul

Occasionally we visit the moral/business aspects of mountain sports. One of my sponsored athletes, Mattie Sheafor (see story above), a good friend of Will Gard’s, forwarded me his essay (see page 28) – and I thought it would be a good opportunity to poll the reactions of the rest of my athletes, asking them, “Knowing the dangers of what you do, why do you continue to challenge the odds. Why risk everything for your sport?”

I was looking for honesty – and for the most reasons. Some of these guys certainly like the rush of combat too, but are hesitant to admit it.

Rob Shaul is a professional strength and conditioning coach and the founder of Mountain Athlete in Jackson, WY.
IN THE DEN OF THE DRAGONS
A Perspective on Guiding & Instructing in Avalanche Terrain

Story by Jim Woodmencoy

It has often been said that we are entering the “Den of the Dragons” whenever we are in avalanche terrain in the mountains. I first heard this from Doug Fesler up in Alaska, and I will credit him as the originator of this great phrase.

While we may be entering the realm of the dragon while out there guiding skiers or instructing an avalanche class, it is not very often that we actually get to see one up close and breathing fire. There may be visual evidence of dead dragons laying around, those that died of natural causes or those slain by the local ski patrol or highway department, offering us the opportunity to say, “See, there’s dragons in these here hills.”

In some conditions we may even awaken one on approach, or step on one’s tail with a ski-cut and get some action. But most of the time that we are out in the mountains our job is to avoid an actual battle with the dragon.

The conundrum is that some of the best skiing and best terrain for teaching an avalanche course is exactly where we might trigger or become involved in an avalanche.

It’s always a great learning tool if we can spot or even provoke an avalanche from a safe distance. But getting close enough to ride them like a bucking bronco is certainly too close.

It will make you look like a god or a hero when you do show clients “the goods,” but it is a very fine line we walk to get there, between taking them to “the best terrain” and being “totally safe.” Teaching or guiding in avalanche terrain requires that we take one extra step back from that line.

As a backcountry ski guide or an avalanche instructor your first priority should not be to impress your clientele with “the goods.” Foremost in your mind should always be, “Is this slope safe enough?” – safe enough to take my group onto without starting an avalanche.

Dragons and Bisons and Bears, Oh My

Everyone’s comfort level is different. Some will push the envelope a little further than others. It might be because they are a more aggressive skier, have a more confident personality, or have less experience. A guide or instructor who has been involved directly with an incident during their career – whether it be a close call, a client burial, or a fatality – is less likely to push the limit.

Always striving to dazzle the clientele with the most awesome terrain should become secondary to safety, and should never override or interfere with your decision-making process.

Teaching an avalanche field course or guiding skiers in the backcountry is really more like being a tour guide in Yellowstone. Everyone wants to see a grizzly bear and a buffalo. And everyone wants to get as close as possible to get a really good picture. Grizzly bears are the more ominous of the two creatures, and we tend to give them more respect and a wider berth. We certainly don’t want to surprise a grizzly when we are hiking through the woods. Hiking in grizzly bear country is like skiing on a high avalanche hazard day, we tend to be extra cautious. The grizzly bear is more like the dragon – we don’t often see them, but when we do, we back off as expeditiously as possible.

The buffalo, on the other hand is a more docile-looking beast. They graze in tranquil open meadows just like a domestic cow, often within easy reach alongside the highway. They exhibit no real signs of danger and will allow you to approach without ever lifting their head from the grass. Much more like touring on a lower-hazard day with fresh, untracked powder slopes beckoning.

So, we walk right up to that buffalo to get the best photo, and in the blink-of-an-eye that big old shaggy one-ton bison charges without warning. You may have time to turn around and yell just before you tosses you 10 feet in the air and tears a six-inch hole in your ass with his horns.

Just like the allure of that untracked slope, or that perfect example of a 38-degree northeast-facing slope to dig a snowpit on, they may look docile, but be prepared to get “buffaloed.” As a guide or instructor you always want to show your customer the best of the best. The pressure to deliver can cause us to make bad decisions – a heuristic trap that isn’t really on the list we give to students!

It’s not an easy job, getting as close as possible to the “goods” without ever over-stepping that boundary. But as professionals we need to be able to delineate where that boundary is on any given day. And if we don’t feel like we can, then we must step back even further, take it down another notch, until we can assure ourselves that we will not be awakening the dragon, missing out the grizzly bear, or irritating the mighty bison.

Over the span of the last 30-some years Jim has worked as a mountain guide in the Cascades and Alaska, a climbing ranger in the Tetons, an avalanche forecaster in Alaska, a heli-ski guide in Wyoming, and an avalanche instructor. Jim is a AAA certified instructor and also a meteorologist for Mountain Weather in Jackson, Wyoming.

THERE’S ALWAYS ANOTHER RUN
Story by Roger Yam

What is your risk tolerance personally and institutionally? How do you and your company manage students/clients and their desires in the field?

Essentially I try not to differ the two. I have always felt I would care for my clients and students similar to my loved ones and friends. So from this heartfelt position I try to make the best decision for the people, terrain, and situation I am in.

The differences for me are that with groups, clients, and students, I have the extra challenges of group size (especially cat skiing) and skill level (novices for students and clients). When I ski personally, I am usually with a smaller group. It is usually one to three people, and they have greater skills and ability to ski tougher lines. That being said, many of my non-professional friends rarely practice rescue skills but have good terrain and snowpack awareness.

On the flip side of things, when I work at a cat-ski operation where there is a high terrain familiarity and constant management of the terrain (i.e., pro-level obs, tracking of layers and avy cycles) I am always amazed what we can ski with clients on a daily basis, especially in times of instability or high hazard.

Conversely I am also amazed how conservative some other guides are at those same times. On a NOLS course, there is a greater tradition of conservatism due to the low level of skills and “school” and not guiding context. However, during my most recent NOLS course, due to the amount of time we spent out there, we were able to ski 30+ slopes during a high hazard period because we had the time to gain confidence in the snowpack and certain terrain features. I think if I was skiing a different area with less time and knowledge I would be more prudent.

I read about your idea of the “Powder Demons.” (see TAR 30-3 editorial) I am a victim of the demons for sure. I have lived and worked in places, spent way too much money, taken endless courses and probably an unhealthy amount of time in search of the “good stuff.” The motivation that makes me wake up at 5:30am for a dawn patrol with friends is the same energy I put into a guides’ meeting, trying to figure out where to ski. The same energy is put into choosing safe places, good snow, and everyone coming home in one happy, blissful piece.

This is a good thing, but the motivation we get to ski should not affect our clear, thoughtful, and ethical practice of backcountry skiing. When I feel clouded in judgment in either a professional or personal setting, I look at myself and realize how lucky I am to be skiing and have this choice in front of me. That perspective allows me to walk away because there is always another run, another day, and another time.

Roger Yam is the skiing Korean who can be found deep in the Tetons for NOLS and in the Selkirk Mountains for Ratelack ski lodge.
Risk, Risk Tolerance, and Teaching in Avalanche Terrain

Story & photo by Jake Hutchinson

Author disclaimer: The following are my personal thoughts and opinions, not necessarily those of the good people who employ me!

What is acceptable risk in avalanche terrain while teaching? Can you ever take the risk meter to zero in the mountains? How much farther do I push my risk threshold when I'm alone or with a partner or two versus when I'm teaching? All of these things have been running through my head since Lynne first solicited my opinion on this stuff. As I ponder it, I realize the answers are nearly as complex as the Wasatch snowpack right now, and I also realize both my teaching and personal thresholds have taken a tremendous step to the cautious side this season – or have they?

I guess the first two questions may be the easiest and least complex. I believe it is a disservice to take students of avalanches into the mountains, teach them about the snow, and then avoid avalanche terrain no matter what the snow tells us. What does a student learn after careful evaluation, discussion, and testing reveals a stable snowpack, a solid group with all the skills and gear, and then a decision is made to ski the 28-degree slope? I trigger avalanches while on avalanche courses, which means I’m taking students into steep, avalanche-prone terrain. I also turn around and choose a mellower line or a different drainage more times than I remember. If we don’t use our own experience, skill sets, and judgement to guide our decision-making in front of students, then what are we really teaching them?

I guess my first rule is that a student getting caught in avalanches, no matter how small, isn’t an option. Students unintentionally triggering avalanches doesn’t sit well with me either. So, I treat every field session as a guided ski tour, which I guess is essentially it. I always enter any avalanche slope first and perform whatever snow assessment may be necessary before bringing students out onto the slope. I try to guide students to think through the stability assessment and a go or no-go decision for the slope we are assessing. I have both changed student’s minds and had mine changed by their assessment and reasoning.

The great thing about teaching in the Wasatch is that in most years, the snowpack is generally quite stable and straightforward. Many years and in many courses, students can be safely managed in complex avalanche terrain and steep slopes, which allows for great teaching opportunities for group management, terrain choices, and where and when to dig a pit or do a stability test. This season all bets are off and a different but maybe more impactful terrain management skillset and teaching opportunity has come into play. Since we buried the facets with a hard slab, I have become a master at seeking out small test slopes and pockets. Most of my field sessions have been spent on terrain at or below 30 degrees, with very careful consideration given to the terrain above and around me. I’ve also been quite leery of corniced ridges pulling into low-angle terrain. We currently sit in a deep-slab problem with a low chance to trigger a slide, but consequences are severe at best if you do find one. This season has drastically changed where I go and when. I have backed off a few notches in both my teaching and my personal skiing decisions.

My personal risk threshold has certainly changed over the years, I feel more confident in my skiing, assessment skills, and avalanche-management techniques than I ever have. I am certainly willing to accept the possibility that I or one of my partners may trigger an avalanche while out skiing, and we often do. Most of the time it’s intentional; occasionally it isn’t. The deciding factor often boils down to what kind of avalanche are we dealing with? Soft slabs or hard slabs? New snow or old? Large and full of venom or small and predictable? This year I had big aspirations of skiing some lines I haven’t touched in years due to working too much and playing too little, but I’ve put them on the shelf until next year. As I constantly tell my mom, dying in an avalanche isn’t an option for me. In a year like this the meadow skipping and long, remote ridge walks seem to suit me just fine.

Risk at Age 50

Story by Phil Powers

With the burgeoning of backcountry skiing and the search for the best lines on the steepest powder, the likelihood of someone dropping in from above while we slog up the valleys below is greater than ever. Those skiers are triggers. Judging the slopes and picking a route for one’s own party is hard enough. Wondering if someone will trigger an avalanche above us brings yet another concern to backcountry travel.

Even climbing in summer presents the possibility that those above us might send missiles our way – it’s happened for years in places like Cathedral Ledge near North Conway. One of my dear friends was killed when someone recklessly lobbed a rock down a vertical face in the Wind Rivers. It’s one thing to worry about people above when one is on a face that is topped by a road, quite another while forging a new route in the Wind River Range.

Concern about other people is real. Any visitor to the mountains, frontcountry or back, must take the effect we might have upon others seriously. Since some people don’t, be more wary than ever. Add “other people” to the list of hazards we confront when we venture out. It is a variable that, to me, seems unpredictable in a whole new way.
I once felt pretty good about my ability to manage risk. Reinhold Messner went so far as to argue that through his experience as a backcountry skier he had gained such an edge that they might change the odds. In his essay, The Will to Survive, (2001) he wrote, “I would even dare to suggest that the climber who is in tune with himself and the world will not normally perish on a mountain.” Does this mean that every mountain accident has a spiritual cause?”

I felt that way myself once. Sleeping on the ground more days than not and climbing or skiing when I woke bred an awareness and a confidence that led me to believe I was safe on any terrain. I relished that feeling and believed in its truth. The deep experience for our students by moving them through the terrain to meet our day’s objectives. I perceived the avalanche hazard High in the northern San Juans. I had been in this zone many times on High hazard days, and I knew the terrain well – I knew where the dangerous spots were, and I had confidence in my ability to manage a group through these hazards. Talking with my co-instructor, David Lovejoy, we both felt that our plan was acceptable given our institutional risk tolerance. We also admitted that we didn’t see ourselves making it very far before turning tail.

As we arrived at the trailhead, I was aware of my desire to facilitate a learning experience for our students rather than let them simply pass through to meet our day’s objectives. Moreover, while my avalanche antennae were alert and buzzing, fear of our route and the hazards we would encounter wasn’t overwhelming. I perceived the risk to be manageable and within my range of tolerance. Starting up the track, a track the students had traveled before during Low hazard, I noticed a lack of awareness to the risk at hand. Excitement about the new terrain was high; putting people into a jovial mood. Conversation drifted away from the storm, the snowpack, and the acute hazard at hand.

To draw attention to the hazard, I let students lead the group with one of us close behind. Shortly thereafter, a student stuck his ski pole gripped into a bank above the skin track to excavate a column for a hand shear: whumph! The bank avalanching along the next 100’ of the up track. Dangerous, no; telling, yes. As we came to a switchback not more than a quarter mile from the trailhead, we stopped, discussed, and reassessed our day’s objectives. We believed that we could dig a few pits in safe locations near where we were. Students spread out, collected data, and came back. No one wanted to dig a pit without experiencing a whumph upon approach or excavation. I asked my TA what he thought; he replied, “I don’t like this, I’m not very comfortable.” This sentiment was palpable throughout the group. I stated that if the group wanted, we could continue up the skin track and manage the hazard. A choice was offered. They chose to go back to the flatland in and partake in practice rescue drills.

When given the opportunity to be involved with the decision-making and risk management, students’ desire to be out in fresh powder was outweighed by the element of fear. Prior to opening the decision-making up to the whole group, students’ perceived risk seemed low(er), and their risk tolerance seemed high(er) as they were guided. When ownership in the decision-making process increased, they moved away from the expert halo perception track, and correspondingly, their risk perception and tolerances shifted.

The outcomes from this experience had both short-term and potentially lasting effects. Students were able to experience a decision-making process where the outcome didn’t match their initial desire. The experience of pulling the plug and turning back on a premeditated plan is invaluable. Students were able to use class data to make a conservative decision in a real-life risk-management situation. This will hopefully have the lasting effect that, even in groups with more experienced members, there is a shift in their natural risk tolerance? These are questions that won’t be answered, and while important to ponder, they take a backseat to the learning opportunities afforded to all on this day.

Chris Marshall is on the Adventure Education faculty at Prescott College and on the board of KPAAC, the Kachina Peaks Avalanche Center. He is taking spring of 2012 off from instructing courses in order to sample powder around the West. Congratulations to Chris for winning an AMGA course scholarship for 2012.

I once felt pretty good about my ability to manage risk. Reinhold Messner went so far as to argue that through his experience as a backcountry skier he had gained such an edge that they might change the odds. In his essay, The Will to Survive, (2001) he wrote, “I would even dare to suggest that the climber who is in tune with himself and the world will not normally perish on a mountain.” Does this mean that every mountain accident has a spiritual cause?”

I felt that way myself once. Sleeping on the ground more days than not and climbing or skiing when I woke bred an awareness and a confidence that led me to believe I was safe on any terrain. I relished that feeling and believed in its truth. The deep knowledge and awareness of the mountain world I possessed allowed me to go to some pretty wild and remote heights and come back intact.

Recent research – popularized by David Brooks in The Social Animal – points to the ability of the human mind to make sense of and draw conclusions from the myriad data that our conscious mind ignores. In my opinion, it’s not Messner’s “spirituality” that is at play in keeping us safe. It is the extraordinary work that our subconscious mind can do once it has

Phil Powers is a long-time climber with first ascents in the Alaska, Teton, and Karakoram ranges. He has authored two books on climbing and now serves as executive director at the American Alpine Club and co-owner of Jackson Hole Mountain Guides. He lives with his wife, Sarah, and children in Colorado.
AN AVALANCHE LESSON FROM MY FATHER

Story by Jonathan S. Sheftz

My father taught his two sons so very much, but he never taught us anything about avalanche safety. Except for passing along what he heard about how important spitting is if buried in an avalanche. Which of course is entirely worthless. Although all of that was okay, since we were just skiing inbounds back East anyway.

But I thought of my father recently when I was trying to Say Something Profound. At my AIARE Instructor Refresher Course this past fall, we discussed course closure, including Colin Zacharias’s Where Do We Go From Here? article. I had never been very concerned with course closure – thank all my students for their hard work, pass out the official certificates and course evaluation forms, urge them all to continue with their education, and wish them well. What else was there to say? I’d already said everything I could possibly think of to say, whether in the classroom, in the field, or via feedback on the extensive homework assignments.

This year though was different, as it was the first year, in my six years of avalanche safety instruction, that a former student had been in an avalanche. Both the former student and his partner were okay, but I was not. I joked that the course had been very large with numerous other instructors, and as had half empty, or rather in the context of avalanche safety class graduates, 99% effective versus 1% failure. But I was not. I joked that the course had been very large and the other instructors had failed me, and as had half empty, or rather in the context of avalanche safety class graduates, 99% effective versus 1% failure.

I thought of a recent incident, publicized as the forecaster for H2O Guides in Valdez. His AIARE-qualified instructor, and AAA affiliate member. When he is not searching out elusive freshies in southern New England or trying to convince skiers to run up and down ski areas in the NE Rando Race Series, he works as a financial economics consultant and has been qualified as an expert witness in both federal and state courts. He lives in western Massachusetts with his wife and toddler daughter, who has already learned about avalanche safety in the form of proper probing techniques (see photo below). He can be reached at jshefftz@post.harvard.edu.

Jonathan Shefftz

The granddaughter getting an early lesson on avalanche safety in the form of proper probing technique.

Lethal Clients

Remember to include the quote about how as a guide, your clients are always trying to kill you.

I think that seriously says a lot about how a guide has to survive the same risks, day after day, whereas for a client, the once-in-a-lifetime opportunity can lead to more risk taking. Note how the recent CMH fatality was an executive working in Dubai – that has to put lots of pressure on a guide to take risks.

Jonathan Shefftz

BE SAFE, HAVE FUN, GO SKIING

Story by Chris Shelly

Risk tolerance, risk perception, risk management, risk acceptance – what do these terms mean to me on a professional and personal level? How do I differentiate or manage risk on a professional level as opposed to a personal level? Well, money for one – albeit not much, but money nonetheless.

For me the difference between professional and personal risk is a tomato/tomahawk. When I get paid to keep people safe I want to do just that, keep them safe. They think it is all about fun, which is just fine by me – educate them. I also want to show them a great experience and meet, or hopefully even exceed, their expectations. I have a priority list: be safe, have fun, then go skiing. I always try to keep it in this order. I also believe in being as aggressive (determined by me on experience and ability level) as I can and pushing back – never the other way around – and always sticking to my safety protocols. There is a difference between taking risks and taking chances, and therein lies the rub.

On a personal level I adhere to the same way of thinking, but now I am only taking care of myself and friends, not the public or paying clients. And yes, I owe myself and friends the same consideration as I do strangers who may or may not know I am looking out for them, and that they are looking out for me. At the end of the day if we are all smiling, can do it again tomorrow, and can call our parents and friends with only stories to tell, that was a good day and risk has been managed – till the next time.

Chris Shelly worked as the snow-safety director at Moonlight Basin for a number of years as well as the patrol and snow-safety director at Ohau, NZ. He currently works as a mechanized ski guide and as the forecaster for H2O Guides in Valdez.

uPAGE 34 THE AVALANCHE REVIEW VOL. 30, NO. 4, APRIL 2012

During the Russian Civil War, from which they barely escaped to America, as he heard the other children playing in the snow.

How he longed to join the other kids throwing snowballs, making snow angels, and sledging down hills! Those were very painful memories for him, although he always told them in a positive way, to emphasize how grateful he was to be able to ski as an adult (especially with his two sons).

For a backcountry skier to turn back from an enticing yet potentially unstable slope, or even foregoing any backcountry turn-oriented skiing, while others are out skiing there, and having fun, and probably coming back from that one outing just fine – that can be just as unhappy and lonely as a little kid shut away in a small house during the Great Depression.

But if you get to live like my father did to ski every year for over five decades straight, complete a fulfilling career, teach your two children to ski, see them marry and bless you with grandchildren, and in the last moment at the very final end have your wife of nearly five decades loyal as ever by your side... whether profound or otherwise, that’s my course closure.

Jonathan Shefftz is an AIARE-qualified instructor, NSP avalanche instructor, and AAA affiliate member. When he is not searching out elusive freshies in southern New England or trying to convince skiers to run up and down ski areas in the NE Rando Race Series, he works as a financial economics consultant and has been qualified as an expert witness in both federal and state courts. He lives in western Massachusetts with his wife and toddler daughter, who has already learned about avalanche safety in the form of proper probing techniques (see photo below). He can be reached at jshefftz@post.harvard.edu.

The granddaughter getting an early lesson on avalanche safety in the form of proper probing technique.
TRICKS FOR COMMUNICATING RISK

Story by Kent McBride

My risk tolerances are much less when than I first began guiding (thank you, experience). I also believe that my tolerances are much less than what is expected of me institutionally, just like most guides would claim.

The way I manage my clients and students desires for risk-related adventure is to point out the hazards that I’m truly concerned about by getting as close as possible to existing risks while still assuring safety. Just staying in the parking lot and telling my clients that it’s not safe and they shouldn’t be there is good enough — obviously there are exceptions, and they are based on judgment. Getting out near the hazard also helps me stay in tune with minute changes in the snow. This year’s dangerous snowpack in the Tetons is a prime example of curbing clients’ appetites for steep skiing in tricky hard slab conditions. Simply put, the Tetons have a very weak continental layer on the ground with a thick maritime slab-on-top.

During an hour approach you can highlight the key points of a Level I avalanche course to help outline concerns to the client. An example of this might be digging a pit with a client to show them what layers exist and what this means for overall stability or instability. If I don’t have time to dig a full pit for buried facets, I will ask clients to do a pole test by turning their pole upside down and pushing as far into the snow as they can, reaching into the resulting hole and pulling out a handful of faceted snow. This is an easy way to show weak structure. Getting up on a vista and passing around a pair of binoculars while pointing out numerous crowns with debris piles at their base is an easy way to convey hazards to my clients.

Another interactive display of snow stability is to utilize the force that a group of four to five clients can generate by gathering in a flat safe zone and jumping together to cause a collapse… this really gets their attention and drives home the fact that the snowpack is very weak.

We start out skiing runs without any consequence, and if the clients are following directions and I have their respect, then we can move to more serious terrain. If you show them good and fun skiing they will most likely follow your instructions.

What really helps is discussing the hazards and what I’m trying to avoid. They respect this, and it makes everything seem a lot easier to understand. With education we become a team. I work with a lot of return clients, and we have mutual respect for each other. I try to treat them like ski partners and have fun.

Kent McBride is a UIAGM guide who works with Exum Mountain Guides, First Ascent, and many others. He lives in Jackson, Wyoming, with his wife Penny and son Kai, who is a fool for homegrown strawberries.

fi\ntiction

She loves me, she loves me not.
She loves me, she loves me not.
She loves me...

Story by John Stimberis

She was so kind and full of promise when we last met, last winter. She arrived full of love, returning from an unexplained absence. She told me she learned her lesson; everything was going to be different this time and all was well until she left, again. My heart was broken. The landscape about me was a frozen wasteland in her absence. She met someone else, down south. I stared at an empty sky and longed for her return.

She came back, burst through the door and embraced me like she had never left. The door was wide open and the cold blew in. It felt good, so good considering SHE was here. I smiled, we played, and life was good again. But she had a few tricks up her sleeve. It wasn’t going to be so easy this time. Love and longing; absence makes the heart grow fonder. Her love was tumultuous, full of surprise and intrigue. She challenged me in so many ways, but we worked through it. Best of all she was staying this time. Maybe a little too long.

It felt like our winter together never really ended. When she did finally leave her memory was strong, a constant reminder that she was not far. The memory of our winter together continued to dominate our summer apart. So much so that summer never felt quite right. Did it really arrive? Will she really return?

Rumors started that she would. Oh the rumors! The boys down at the OCF always seem to have a pulse on what’s happening. We stood upon the shore, the edge of the continent, staring into the future, awaiting her arrival. The memory of a lost summer faded just as the first sense of her arrival began to reach us. She’s a lost summer never felt quite right. Did it really arrive? Will she really return?

It’s going on as long as this time, I can tell. It’s for real.

She needed to get away for Thanksgiving, but by early December I was beginning to have my doubts. And I continued to wonder through the month. Wonder turned to worry, until she sent a little love just before the New Year. It was just enough to keep our hope alive and make us happy, but then nothing.

The rumors were out there. She was up north this time. Something to do with homegrown strawberries. We want our students and instructors with their heads up, their eyes open, and their thoughts focused on the situation at hand. We have also added a fifth level to the matrix that reflects the path the expert might take: either the reflective path of the true master or the compliant path of the false master.

We draw this model in a circle, indicating we move all the time between these levels of expertise. We draw a loop back to aware and competent and label that loop mindfulness—the intentional consideration of how we think that is vital in the lifelong process of developing our judgment, making us aware and competent master practitioners. We draw another loop of complacency, a trap of the expert who is not reflective and risks becoming unaware of their incompetence.

As educators, we should strive for reflective competence. The ability to intentionally develop our own judgment and to pass on the lessons we have learned to our students requires that we spend time reflecting on our decision-making process. How can we expect to teach others if we cannot articulate what we ourselves have experienced? In our opinion, the hallmark of an expert is not that she has reached a level of subconscious heuristic processing. It is that she has developed the intentional practice of self-reflection that allows her to understand why she subconsciously chose to follow or ignore the heuristic at hand. It is this willingness to question one’s underlying decision-making processes that allows one to truly become an expert. Once an individual enters the cycle of mindfulness, she becomes a much better student and educator.

The way I manage my clients and students desires for risk-related adventure is to point out the hazards that I’m truly concerned about by getting as close as possible to existing risks while still assuring safety. Just staying in the parking lot and telling my clients that it’s not safe and they shouldn’t be there is good enough—obviously there are exceptions, and they are based on judgment. Getting out near the hazard also helps me stay in tune with minute changes in the snow. This year’s dangerous snowpack in the Tetons is a prime example of curbing clients’ appetites for steep skiing in tricky hard slab conditions. Simply put, the Tetons have a very weak continental layer on the ground with a thick maritime slab-on-top.

During an hour approach you can highlight the key points of a Level I avalanche course to help outline concerns to the client. An example of this might be digging a pit with a client to show them what layers exist and what this means for overall stability or instability. If I don’t have time to dig a full pit for buried facets, I will ask clients to do a pole test by turning their pole upside down and pushing as far into the snow as they can, reaching into the resulting hole and pulling out a handful of faceted snow. This is an easy way to show weak structure. Getting up on a vista and passing around a pair of binoculars while pointing out numerous crowns with debris piles at their base is an easy way to convey hazards to my clients.

Another interactive display of snow stability is to utilize the force that a group of four to five clients can generate by gathering in a flat safe zone and jumping together to cause a collapse… this really gets their attention and drives home the fact that the snowpack is very weak.

We start out skiing runs without any consequence, and if the clients are following directions and I have their respect, then we can move to more serious terrain. If you show them good and fun skiing they will most likely follow your instructions.

What really helps is discussing the hazards and what I’m trying to avoid. They respect this, and it makes everything seem a lot easier to understand. With education we become a team. I work with a lot of return clients, and we have mutual respect for each other. I try to treat them like ski partners and have fun.

John Stimberis is a highway forecaster for the Washington Stats DOT, vice-president of the AAA, and a fine amateur photographer. He steals time from a busy winter to write this meditative fiction.
IMPROVING YOUR SAFETY
with Smart-Antenna Technology™

Buried beneath an avalanche, the SMART-ANTENNA TECHNOLOGY of the 3+ and S1+ automatically switches to the best transmitting antenna. The patented technology makes searches faster and easier.

---

**TURNAGAIN PASS**

continued from page 13

moderately thorough full assessment on him. I asked him the questions like his name, date, where he was, and what had happened. He knew his name, guessed it was Tuesday, and didn’t know what had happened. We helped him back into his ski, and he took his own skis off, and C&D proceeded down.

I located my gear and was preparing to catch up with them when Wendy (Chugach Avalanche Center forecaster) came on scene. I remember at some point after we located C, I told someone that it might be a good idea to go down and find Wendy as she had a sat phone in her pack. I gave Wendy a quick recap of what happened and continued down to catch up with C&D. About halfway down, D traversed to the car and I went with C straight down the roadside where D picked us up, and we proceeded to the hospital. I think the official diagnosis at the hospital was concussion with a clean CT scan.

Thoughts on beacon storage on the body

My initial exposure to avalanche safety was as a ski patroller in high school. We were taught “beacons belong harnessed to torso over base layer of clothing under outermost layer.”

In 2003 or so I took a level I course from Alaska Avalanche School along with the two victims from the avalanche last month, and we were taught “beacons belong harnessed to torso over base layer of clothing under outermost layer.”

In 2007 I met my fiance while skiing with her and her boyfriend at the time. They were both mountain guides and were up here to take the AMGA test for ski mountaineering in Valdez, and they were wearing beacons in pockets. I brought this point up with him and made the argument that I am about to make.

As a rescuer I can see why it is advantageous to have a beacon in the pocket, but as a victim I don’t see the advantage – in fact I see several disadvantages. One swipe with a utility knife is all it would take to open up a sewn-in pocket, and then all you have is a beacon to his torso.

---

Editor’s Note: Who has answers to Cody’s questions? Send your replies to the editor by July 1, please.