

## What's Wrong with Traditional Avalanche Courses?

We have known for many years that the more avalanche courses a person has taken, the more likely they are to be caught in and possibly killed by an avalanche. In the early 1980's, Ray Smutek wrote a groundbreaking article called "Experience and the Perception of Avalanche Hazard" in which he addressed the problem of why experienced leaders seem to be more likely to get caught in avalanches. His contention was that, due to subtle subconscious conditioning over time of avalanches not happening (an educational process called negative event feedback), experienced leaders became less able to perceive terrain hazards over time. There was a tendency for them to gradually let down their guard until they were unfortunately caught by "The big one." Therefore, he proposed that avalanche courses be altered to include better training on the perception of terrain hazards. His article was important, not only because it pointed out a disturbing problem with experienced leaders getting caught in avalanches but also because it *acknowledged that there was a serious problem with "traditional" avalanche training*. In the book "Snowy Torrents" (as well as the annual editions of Accident Reports in North American Mountaineering by the American Alpine Club), there are numerous accounts from survivors of avalanches who indicated that they had taken avalanche courses, recognized the presence of terrain hazards and slope instability out in the field -- and in many cases even felt that an avalanche was about to happen but still did not turn around. For one reason or another, awareness was not turned in to action. The frequency of these incidents has made it clear that *not even the perception and awareness of terrain hazards is having an affect on reducing avalanche fatalities*. Having been a member of the Ski Patrol Rescue Team and an avalanche instructor for nearly twenty years, I believe there are at least four additional causes for the obvious failure of traditional avalanche courses in reducing avalanche fatalities. My experience with traditional courses, their instructors and their graduates is that:

- 1) Too much time is spent on avalanche survival, rescue procedures and the supposed importance of "practice transceiver searches."
- 2) Too much faith is placed on a student's ability to assess risk by learning complex topics such as snow pack physics.
- 3) Not enough time is spent on group dynamics, problem solving, decision-making and conflict resolution. Often overlooked skills include how to anticipate turn around decisions and improve group communication.
- 4) Virtually no time is spent on learning how to use topographic maps to select and navigate safer routes. This is sad because the single most important factor in reducing fatalities may be knowing how to choose a safe route prior to the outing. Also, it should be obvious that it does no good to select a safe route at home if the student cannot navigate that route precisely out in a snow storm.

I believe these problems all evolved from the history of avalanche instruction itself. Most avalanche instructors (including myself) received their original training through the National Ski Patrol and/or the Search and Rescue Community. This has led to a heavy emphasis on avalanche survival and rescue techniques. It is only natural that instructors would train their students the way they themselves were trained. The students in turn are often looking for a quick (and glamorous?) solution to the avalanche problem. Avalanche courses have therefore evolved into a love affair with Avalanche Transceivers and Transceiver Searches. I have heard more than one instructor boast that they had gotten their transceiver search times down to under three minutes. *The problem with this is that transceivers do not stop avalanches. Nor are there many cases in the records of transceivers stopping avalanche fatalities*. In the pages that follow! I will outline some of my concerns regarding each of the four problems noted above and suggest some alternate teaching strategies which may help reverse the poor track record of current avalanche courses.

### I. PROBLEMS WITH TRANSCIEVER SEARCHES

I realize that what I'm saying may seem like blasphemy to many. Currently accepted dogma is that you and all your friends should each buy a \$300 transceiver. Then you should all learn how to use them by hiding them in the fruit section of your local grocery store. The belief is that your transceiver will then help to save you should you or your friends be caught in an avalanche. This belief has been greatly reinforced by clubs (which may require them for fear of liability suites if they don't), outdoor stores (which profit from selling them), and avalanche instructors (who received their training from ski patrols and therefore tend to think in terms of rescue rather than avoidance). In opposition to this common view, I maintain that placing your safety in the hands of a transceiver is wishful thinking. The truth is that transceivers may not be reducing fatalities. In fact, they may even *increase fatalities* by giving their users a false sense of security. Even a brief review of avalanche incidents would reveal that transceivers have led to very few live recoveries. By contrast, they seem to be useful primarily

in helping searchers recover the bodies. The record number of avalanche fatalities (16) in British Columbia this past winter (1997-98) serves as a case in point. The majority of victims were wearing transceivers, yet there was *not a single case of a transceiver leading to a live recovery*. Similarly, in December of 1996, two young men were killed trying to climb a known avalanche slope in high avalanche conditions near Snoqualmie Pass, Washington. Rescuers found their bodies the next day by following the still-beeping transceivers worn by the victims. Both victims had been trained in how to use transceivers rather than how to avoid avalanches. I believe we owe it to the families of the above victims to take a long hard look at current avalanche training procedures. By downplaying the problems of real transceiver searches and overlooking avalanche avoidance options, avalanche courses legitimize risk taking and therefore may do more harm than good.

I believe the goal of avalanche courses should be to reduce fatalities. Fatalities are most likely to be reduced by teaching the concept of avoiding avalanche accidents to begin with. Examine the course content of a Driver<sup>s</sup> Education Class. This is an appropriate analogy since the consequences of getting caught in an avalanche are about the same as the consequences of getting caught in a major car crash. Consider how much time in a Drivers Ed class is spent on defensive driving skills (how to avoid a crash) and how much is spent on what to do after the crash happens. There is very little time spent on surviving car accidents (other than to wear your seat belt). While knowing how to use a transceiver has been likened to putting on a seat belt, the truth is that their safety record is completely different. Seat belts have been clearly documented for having saved many lives while transceivers have not. Seatbelts are simple to use with little that can go wrong, whereas transceiver searches are complex and a lot can go wrong. Recognizing the importance of avoidance over survival and rescue, Drivers Ed courses spend little time on how to rescue a friend caught in a car crash. Rather they emphasize, as they should, anticipating hazards and taking the necessary precautions to avoid those hazards. Don't get me wrong. I am not advocating that transceiver searches be abandoned altogether. I own a transceiver myself. I have taught and participated in many practice searches. My concern is that transceiver skills are being over emphasized while other far more important skills are being neglected or even completely overlooked. Students are told of the benefits of transceivers without being told of their ineffectiveness in real avalanches. I'm also concerned that practice searches are done in a hopelessly unrealistic manner (see below). The result is that students leave avalanche courses with an overly optimistic view of transceivers. This view then encourages them to take risks they otherwise would not have taken. I'm aware of the argument in favor of using transceivers. I understand the need for a rapid rescue should a person be buried by an avalanche. But I've also spent hours digging in real avalanche deposition zones. I've spent entire days dragging victims out in body bags. I've seen first hand the shock and devastation endured by a family who had waited hopefully all day at a trailhead only to be told that their loved one was dead. In the two years I served on the Ski Patrol Rescue Team, we did not have a single live recover. Telling your friends to play with their transceivers in the fruit section of their local supermarket underestimates the power of real avalanches, trivializes the difficulty of real transceiver searches and overlooks the dire consequences of what happens when their transceiver fails to save them.

**Below are some of the important differences between practice searches and real ones:**

- 1) Real avalanches tend to happen during bad weather (snowstorms, rain storms, high winds, etc.) which limit visibility and group communications. Practice searches by contrast tend to take place on calm sunny days, giving participants a false notion of easy communication and good visibility.
- 2) Real avalanches usually happen when the group is tired, cold, hungry and dehydrated. These conditions all affect thinking, memory, decision-making, communication and group dynamics. Often it was the very presence of these human factors which caused the group to get caught in an avalanche in the first place. By contrast, practice searches occur when participants are well rested, warm, well fed and well hydrated.
- 3) Real avalanches cause stresses on participants that practice searches simply cannot duplicate. In a real search there is often shock, disorganization, disagreement, and outright panic. Dazed and confused, searchers may even forget to turn their transceivers from transmit to receive (thereby giving false signals to other searchers). In practice searches, there is the assistance of a strong leader directing a calm, rational sequence of events that is often little more than a run through of "textbook" search steps.
- 4) Real avalanches, especially the destructive slab avalanches we often see here in the Northwest, run on a surface of ice and leave behind an ice layer that is as smooth and dense as ice at a skating rink. This ice, being tilted at an angle of 35 degrees, is very difficult to ski across and virtually impossible to walk on. Quite often searchers must ski or walk down non-released slopes on either side of the release. Yet I have seen countless practice searches done on sure footed, soft snow slopes with a slope angle of less than 20 degrees (not to mention the even more ridiculous practice of doing searches in a city park).

5) In real avalanches, the snow in the deposition zone is often twenty to one hundred times denser than the unconsolidated surface snow. Any one who has done a search in a real avalanche deposition zone knows that avalanches, once they stop, set up like concrete. The snow literally becomes as hard as a rock. This increase in density greatly reduces transceiver signal range making it much harder to find the buried subject. By contrast, practice searches are often conducted with transceivers which are either buried casually in a foot or two of unconsolidated snow, or even worse, simply laying on the snow or ground. Both depth of burial and snow density dramatically reduce the strength of the victim's transceiver signal. This is the biggest drawback of practicing "in the fruit section." You get an overly optimistic notion of transceiver signal range. It may be 100 feet in the supermarket. but then less than 20 feet in a real search!

6) Perhaps the most overlooked difference between practice searches and real ones is what happens after the signal location is determined and the digging begins. With the practice search, the transceiver is quickly dug out and the students all celebrate their achievement. In a real search, however, the victim is typically buried in the deposition zone (or base of the avalanche slope). This snow has been super compressed into blocks which are virtually impossible to dig in. It may take an hour or more to dig down two feet. Rather than telling students to practice in the fruit section of supermarket, avalanche instructors should instead tell them to practice digging out in the parking lot. This would give students a much greater respect for the difficulty of digging in real avalanche deposition zones.

7) Even if the victim could be dug out quickly, the prospects for survival would not be great. The sheer weight of dense snow makes it difficult for buried victims to breathe (it takes only three minutes to die from suffocation). For example, in Washington only one victim has ever been found alive after being buried at a depth of greater than two feet. (The one survivor happened to have wound up in an air pocket created by a log.) Even if the victim winds up on the surface, they may still suffocate due to their lungs being filled up with snow during the avalanche.

All of the above should help to illustrate the huge differences between practice searches and real searches. These hard realities should also make clear the absurdity of practicing in the fruit section and "getting your transceiver search time down to under five minutes." If transceiver "practice" searches are utilized at all, students should be warned about the above noted differences and informed about how unsuccessful transceivers have been in actually saving lives. During the Avalanche Avoidance Course at Bellevue Community College, we too conduct "practice" transceiver searches. But while most avalanche courses practice transceiver searches in order to instill confidence in their use, we practice searches for the exact opposite reason. We want to show our students exactly why they should not place their faith in transceivers and transceiver searches. We do this by adding several twists to the traditional practice search. We arrange for virtually everything that can go wrong to go wrong. We bury the transceiver deep and pack the snow in densely on top of it. We arrange for students to make mistakes to illustrate group dynamics problems. We also clearly spell out the differences between our practice "scenario" and a real search. The goal is not for students to leave with a glowing appreciation of transceivers but rather with a clear and sober understanding of *how unreliable transceiver searches really are*.

I have many more concerns about practice transceiver searches, not the least of which is the mind-set it promotes in snow travelers that avalanches are something to be "survived" rather than something to be "avoided". I am also concerned about the false message that if you are caught, you needn't worry because your buddies will be able to save you. The cold truth is that a disturbingly high percentage of people who are buried in avalanches are killed by them - whether they are wearing a transceiver or not. Avalanche instructors, books and videos are fond of saying that "the best way to survive avalanches is to avoid them." However, students are given a confusing double message when more time is spent on rescue techniques rather than avoidance techniques.

## **II. RISK ASSESSMENT MAY IMPLY RISK ACCEPTANCE**

My second concern has to do with how risk management is taught in traditional avalanche courses. I have heard many avalanche instructors talk about "assessing the risk factors so that you can make your own decision about whether or not to ski a hazardous slope."<sup>1</sup> There are two problems with this approach. The first is that avalanches are very complex in nature. Having my degree in the Physical Sciences and having assisted in both physics and chemistry labs, it is obvious to me that the general public does not deal with complex topics very well. Errors and misunderstandings are common, anticipatable results. It is likely that students will miss critical data and therefore make poor and occasionally even disastrous choices. The second problem with this approach has to do with consequences. Avalanche hazard assessment is often discussed as if one were trying to come up with a weather forecast. This ignores the obvious fact that a blown weather forecast might only result in someone getting wet,

whereas a blown avalanche assessment may result in a fatality. Given the likelihood of errors and the consequences of those errors, I question the wisdom of introducing too much complexity (such as snow pack physics) in to basic avalanche courses. I would maintain instead that there is "safety in simplicity" and argue that awareness of the possibility for a "weak layer in the snowpack" is better than an incomplete understanding of "temperature-gradient metamorphosis". Even if students did understand snow pack physics, this knowledge is practically useless since few students actually go out and dig a snow pit on their own. Even if they dug a pit, they are better advised not to rely on their own analysis. Avalanches are extremely complex and very difficult for professional experts to predict. It is foolhardy for amateurs to be betting their lives on a shaky "risk assessment".

I have also heard many avalanche instructors talk about the concept of an **"acceptable level of risk"** which varies from person to person. Peggy Luce, a friend and former student of mine who became the second American woman to climb Mt. Everest, described this as the "race-car driver syndrome." It is only by taking great risks that you become famous in the outdoor community. High-risk takers seem to be admired not only in America but especially in places like Japan and Europe. They are adopted as role models and looked up to by students and instructors alike. It is instructive to note that while Europeans may lead the world in transceiver technology and guide training, they also lead the world in avalanche and climbing accidents and fatalities. Is this, then, really the kind of example we ought to be following?

I have heard it advocated that climbers and skiers have the right to "choose their own level of risk" and it is not up to instructors to question the actual risk-taking process. But this position ignores the fact that taking risks with avalanches is a lot like playing Russian Roulette. If you play this game, it's not a question of if you'll be caught, it is only a question of when. Moreover, the consequences of getting caught could possibly be a fatality. I believe if this were more clearly pointed out to risk-taking students, they would be less likely to want to play the game. *A reduction in fatalities will not occur by teaching students how to play this dangerous game, but rather by persuading them of the importance of not playing the game to begin with.*

Many students (and instructors) have argued that it is "my life and therefore my decision to make." But even this position ignores the affect that your death would have on your friends and family. While on the Ski Patrol Rescue Team, I participated in several "avalanche rescues. 'I We saved no one. Instead on every mission we did nothing but drag people out in body bags. This fact! in itself was very depressing. But the hardest part of it all was delivering the bad news back at the trailhead and dashing any hope family members waiting there might have that their son, daughter, brother, sister or best friend was still alive. I know of whole families that, even ten to twenty years after the fatality, are still devastated by the event. The sudden! tragic loss of a loved one out in the mountains and the grief and second-guessing associated with it seem to be too much for many people to deal with. This experience has persuaded me that *climbers and skiers do not have a fight to kill themselves and in fact have a responsibility to those who raised them and those who love them to anticipate hazards, take adequate precautions and avoid getting killed if it is at all possible.*

### **III. GROUP DYNAMICS...A PARTIAL SOLUTION**

In 1994, Jill Fredston, Doug Fesler and Bruce Tremper wrote an article entitled "The Human Factor --Lessons for Avalanche Education." Their article was prompted by the "increasing number of avalanche accidents in which the victims have some level of avalanche training. By investigating avalanche accidents, we have learned that the human factor is a major contributor." In their conclusion, they stated "In teaching mountain travelers how to evaluate avalanche hazard. . it is not enough to focus on the physical factors causing avalanches." *Their recommendations included placing more emphasis on teaching route selection, decision-making and group dynamics as critical elements in the human factor of avoiding avalanches.* Their thoughtful analysis makes it clear that more time should *be* given to group dynamics. Essential topics include communication of concerns versus suffering in silence, problem solving, decision-making (versus avoidance, denial and wishful thinking), and conflict resolution (how to anticipate, avoid and deal with group conflicts should they arise). However, this change alone will not reduce fatalities unless students are also taught practical skills for actually avoiding avalanches.

### **IV. IMPROVING ROUTE SELECTION AND NAVIGATION SKILLS**

Which leads me to my final concern. . is it possible to avoid avalanches and still travel on snowy mountain slopes? I have heard some avalanche instructors maintain that it is not possible, that there is always some risk. I disagree with that position. I believe that it is possible to travel safely on some terrain most of the time with

absolutely no risk (or at least substantially less risk than drivers face every day while driving their cars). Moreover, the basic principles of identifying safe terrain and choosing safe times are very simple and can easily be taught to beginning students to a high level of mastery (i.e. where they get 100% correct answers) in a fairly short period of time. These skills include how to select a safe route on a USGS 7 1/2 minute topographic map and how to stay on that route through basic navigation skills while actually out in the snow. I believe strongly that *the most important tool we have to avoid avalanches is a topographic map*. Sadly, map reading and snow navigation skills are hardly mentioned much less taught in current books, videos and courses on avalanches (other than those courses which we teach at Bellevue Community College).

The methods currently used to teach evaluation of slope angle are a good example of this problem. Current books, videos and courses talk about using inclinometers to measure slope angle. But inclinometers only work well if you are actually on the slope or exactly perpendicular to the slope of concern. Using equal length ski poles to measure slope angle also requires you to actually be on the slope. A far better method is to use a ruler (on the baseplate of most compasses) and examine possible route options on your map BEFORE YOU EVER LEAVE HOME. If you find a spot on the 7 1/2 minute map where there are two or more brown contour lines in one-sixteenth of an inch, you have found a slope that exceeds 33 degrees and warrants your attention. We have been teaching this simple method for evaluating slope angles as part of selecting routes for many years but I have not seen it even mentioned in any other course, video or book. Maps not only allow you to analyze your route and chose the safest option, but they also permit you to analyze possible hazards that are out of sight and upslope from you. Maps can also be used to distinguish ridges from valleys and determine slope aspect to the wind and sun as well as potential elevation and temperature changes. So why is it that map reading is not taught by traditional avalanche courses? Perhaps it is because instructors assume that students already know how to read maps. Even if this is the case, few students (or instructors) seem to be aware of how map reading can translate in to avoiding avalanches. I believe the real reason goes back to how avalanche instructors themselves were taught. Since map reading was not part of their original training, they do not see the importance of teaching it to their students. For the same reason, traditional avalanche courses fail to teach snow navigation, despite the fact that many avalanche fatalities could have been avoided if the victims had only been able to stay on route.

## **CONCLUSION**

The true test of a successful avalanche course should not be whether students felt their instructor was knowledgeable or even whether students felt that they got their money's worth. Rather, it should be whether or not the students are all still alive ten years later. If the goal of avalanche courses is to reduce avalanche fatalities, then traditional avalanche courses have failed in that mission and major changes should be considered. In particular, we need to re-evaluate the current emphasis on transceivers and transceiver searches and the underlying message this sends to students about the acceptability of taking risks. We should make it clear that practice searches bear little resemblance to real avalanche searches and that transceivers do not stop either avalanches or fatalities. We need to stress instead the importance of avoiding avalanches and focus more classroom and field session time on those skills which will reduce fatalities. While adding sections on group dynamics and decision-making would be an excellent first step,<sup>1</sup> by itself it is not enough. More time also needs to be spent helping students learn how to select and navigate safer routes. It should not be assumed that students already know how to read maps or can translate this skill into safe route selection decisions. Greater emphasis needs to be given to snow navigation. It does little good to choose a safe route at home if you cannot navigate that route out in a blizzard. Yet even students with years of experience in the mountains often don't have a clue how to navigate a route in a white-out. Finally, we should examine our own role models. Outdoor instructors need to emulate driver education instructors and school bus drivers instead of world-class climbers and racecar drivers. This may result in a course that is less glamorous, but it will help us achieve our goal of fewer fatalities.

I hope this article might lead to the kind of changes that will actually help rather than hinder the decision making process of backcountry travelers by giving them the skills they need instead of merely the skills they think they need. I realize some of the ideas stated in this article might seem radical (and even outright wrong) to some. I am very interested in feedback on this matter from students, avalanche instructors and other avalanche professionals. I therefore encourage you to write me with your concerns, both positive and negative. Thank you for taking the time to read this article and consider these ideas. I look forward to hearing from you. *Please feel free to call me at (425)888-3031 or send your comments to: David Spring, 49006 SE 115th Street, North Bend, WA 98045. I can also be reached via e-mail at wildernessspring@aol.com.*