

EXPERIENCE AND THE PERCEPTION OF AVALANCHE HAZARD

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On March 3, 1979, fourteen members of a Seattle mountain climbing club set out for the summit of Suntop Mountain. As they neared the top, eight of them left the security of the trees and marched out together onto an open slope. A slab triggered and all eight were swept down the hill. Everyone in the party had attended the standard one-hour avalanche lecture that is part of the club's "winter travel" course. Several were considered to be highly experienced winter mountaineers. The person breaking trail had been climbing for more than ten years. Interestingly, it was his third avalanche ride.

On April 28, 1975, a mountaineering class from a local university assembled at Timberline on the old Mount St. Helens. The instructor, a climber of more than ten years experience, led them into the approaching storm in search of a site for their overnight snow camp. He selected a sheltered spot known as the Sugar Bowl, in the lee of a large, steep moraine. A spontaneous storm release avalanche killed five of his students.

On January 16, 1974, two experienced instructors working for a large wilderness school took 15 students on a two-week long "expedition" into the Wyoming Tetons. Their immediate objective was Glacier Gulch, but they never got there. On the 5th day, while traversing a steep moraine, an avalanche overwhelmed the party, killing three. The Park Service Report described the leaders as "competent mountaineers" and considered the group "well led".

There is one common denominator in these incidents. They all involved "experienced" to "highly experienced" mountaineers. Yet nearly every back country avalanche report reads the same. "No precautions whatsoever were taken". Indeed, incidents involving several people are the rule, indicating that the most basic precaution in traversing avalanche terrain, that is, crossing one at a time, is also the most frequently ignored (Gallagher, 1967, Williams, 1975, Stethem, 1979). If anyone should know about avalanches, it should be mountain climbers, especially winter climbers and ski mountaineers. If they were beginners, it would be easier to understand, but why the "experienced?" The question "why?" and some thoughts on what can be done about it are the subject of this presentation.

It is very fashionable in mountaineering circles to speak of "risk". "Avalanches are one of the risks of climbing," is an oft-heard comment. Admittedly, this has a romantic, even heroic flair to it, and it is certainly a convenient way of dismissing the problem. Risk is, without question, an integral part of mountaineering. There is a risk of falling, which mountaineers temper with ropes and belays. Vast sums are spent on specialized apparel to offset the risks of hypothermia and frostbite. Risks are accepted, but they are first recognized, evaluated, and limited. For each person, there is a point at which the proposed activity is no longer worth the risk. This sequence of recognition, evaluation, and qualified acceptance is what appears to be absent, not only in the accidents cited, but in the vast majority of accidents reported. Most avalanche accidents, at least those involving recreational mountaineers and tourers, were not a freely and knowledgeably accepted risk.

Simpson-Housley and Fitzharris (1979) suggest psychological blocks to perception, blocks technically known as repression and sensitization. They suggest that "optimism may be displayed by a climber, who may know of avalanches, but considers them to be unlikely while he is climbing the mountain". The paper further suggests that the risks associated with an avalanche may be too great for us to knowingly live with, so "...rationalization, repression, and denial are the defense mechanisms employed to avoid anxiety about the hazard."

Simpson-Housley and Fitzharris spoke of climbers knowing of avalanches. Most mountaineers do indeed know "of" avalanches: they can tell you the difference between a slab and loose snow avalanches; perhaps they've seen or experienced an avalanche; but what do they know "about" avalanches. There's an important difference. We all know "of" nuclear reactors, but what do we know "about" them.

Steve Couche conducted an avalanche awareness survey in the form of a simple eighteen-question examination of winter back country users in the Mount Hood, Oregon area. The scores were compared with experience level and previous training of those surveyed (Couche, 1977). The experienced consistently scored higher; those with some formal training did likewise. However, the survey also revealed that:

1. More than nine out of ten (92.4%) failed the test by scoring less than 70%.
2. The average score was 42%. Three years of experience raised the average only 6 points; formal training only 12 points.
3. The most frequently missed question was: "What clues might help in recognizing an avalanche slope?" Only 12% could answer it correctly.
4. The failure rate was roughly the same for the question: "Can you name some clues that can help you determine whether a slope is stable or not?"

Couche's work seems to indicate that, regardless of training and experience, or of what they knew "of" avalanches, very few knew how to recognize terrain hazards.

Apparently training programs are deficient and experience is an unreliable method of learning. In light of this, some important aspects of the teaching and learning process, as it relates to avalanche hazard awareness, must be considered.

The first concept is that of avalanche "safety". Avalanches are destructive phenomena similar to earthquakes, floods, hurricanes, tornadoes, and rockfalls. Perhaps this concept, i.e. paradoxically linking a destructive natural phenomenon with the word "safety", is one conceptual stumbling block affecting the learning process, or one of the defense mechanisms we use to deny the existence of hazard.

The second concept, one which is extremely important since it deals directly with "learning from experience", involves a process referred to here as "negative event feedback". Through negative, non-avalanche events, erroneous information is acquired which blocks the accurate perception of hazard. Consider the following examples:

Joe Novice spies the clearing on the west side of Alta Vista in Mount Rainier Park, climbs up and has a glorious time sliding down. No avalanche occurs. Because nothing happened, a negative avalanche event produces negative or erroneous feedback. Alta Vista West is recorded as "safe" and will be used as a standard of comparison when evaluating similar slopes. Alta Vista West is a known avalanche slope, but generally becomes hazardous only with east wind loading.

When Joe Novice makes a tour with Carl Competent, whom he considers an experienced mountaineer, such a negative event takes on still more impetus. Joe follows Carl on a zigzag ascent of Panorama Face. Again nothing happens, although Panorama Face has, in the past, swept away many an unsuspecting climber. Note that even if Carl's stability evaluation is flawless, his failure to explain his reasoning process and the potential hazard of the slope under other conditions has produced a strong negative event feedback in Joe. This situation is very frequent in large parties: the tenth person in line rarely has any idea of why decisions are being made.

Joe's negative event feedback will be further reinforced when he later checks the route they took against the descriptions in the climber's guide. "Sure enough, that's the route." Guidebooks are one of the less obvious sources of negative event feedback. By failing to mention a hazard, a negative action, the reader is subtly, but erroneously led to believe there is no hazard. Magazine articles and photographs are a variation of the guidebook theme. The currently popular, mass circulation adventure and skiing magazines often depict enticing scenes of "experts" cavorting in extreme avalanche terrain.

There are many sources of such negative event feedback and mountaineers who also downhill ski are subjected to the most misleading kind. For example, tired of closure signs put up by patrolmen, Pete Powderhound takes up back country skiing and discovers Nirvana. "Over behind Mount Thunder is a bowl that looks exactly like Green Valley at Crystal Mountain. And up north, there's this hidden spot that reminds me of Scott's Chute." Pete has no idea of how many bombs have been set off in Green Valley, or that skiers have been buried in Scott's Chute. Pete is loaded with negative event feedback of the worst kind. Each ski area run is a remembered joy, not even remotely associated with avalanche hazard. Those involved in helicopter ski guiding must regularly contend with this situation.

Through the mechanism of negative event feedback, it is conceivable that "experience" may actually reduce a person's awareness of avalanche hazard. Worse yet, because he has entered the ranks of the "experienced", he begins to pass on his incorrect data to others who accept it unquestioningly.

Perhaps it is time to re-evaluate the content of our educational efforts. Are we wasting lecture time with meaningless distinctions between kinds of avalanches, and esoteric discussions of snow crystal types? When we leave a lecture, are we sure that everyone in attendance will be able to recognize an avalanche path?

The following is a brief list of suggested training priorities:

1. The objective of "first contact" training programs should be avalanche path recognition. Avalanches run where they have run in the past. And indeed avalanche accidents tend to occur in places where they have occurred in the past. If a person does decide to cross a known avalanche slope and a non-event ensues, the lack of an avalanche is now correctly attributed to conditions rather than the terrain.
2. Specifically describe how negative event feedback can produce perceptual blocks to hazard recognition and discuss the origins of negative event feedback.
3. Emphasize that the only way to be safe is to avoid hazard; to avoid hazard we must recognize it; and if we are to recognize hazard, we must constantly be looking for it. Rod Newcomb put it very succinctly: "Think about snow stability 100% of the time. I am constantly looking for any sign of instability--If, for an instant my thoughts begin to wander, that may be the moment the avalanche outsmarts me".

#### References

Couche, S. 1977. An Avalanche Survey of Winter Back Country Users in the Mount Hood Area. Mazama, Vol. 59, No. 13. Augmented by personal communication.

Gallagher, D. 1967. The Snowy Torrents, Avalanche Accidents in the United States, 1910-1966. USDA Forest Service, Fort Collins, CO.

Simpson-Housley, P. and Fitzharris, B.B. 1979. Perception of the Avalanche Hazard. Snow Avalanches, A Review with Special Reference to New Zealand, New Zealand Mountain Safety Council, Wellington. Also in the New Zealand Alpine Journal 1977, under the title, Individual Appreciation of Avalanche Danger.

Stethem, C. and Schaerer, P. 1979. Avalanche Accidents in Canada, 1. A Selection of Case Histories of Accidents, 1955 to 1976. National Research Council, Ottawa, publication NRCC 17292.

Williams, K. 1975. The Snowy Torrents, Avalanche Accidents in the United States, 1967-71. USDA Forest Service, Fort Collins, Co., Report RM-8.

Discussion

LaChapelle:

I could not be happier to hear your comments about what people really need to know. People coming to avalanche courses should hear about route finding, which is a really important point.

Your war stories were organized climbs that were scheduled in advance. I would like to suggest that tours are planned assuming safe conditions will exist at the scheduled time. If nature has something else in store then one must be willing to re-schedule. Many accidents could have been avoided by changing plans.

Roch:

I disagree because of the difficulties in recognizing avalanche slopes. Every slope of 30° is bound to avalanche. If you don't want to take any risk, then you had better stay home.

Smutek:

That is true. Perhaps one of the things that people need to be impressed with is the extent of avalanche terrain in the mountains.

McClung:

I agree with Andre Roch's comment. People do accept risks in the mountains and they know they are accepting the risks. If you looked at the number of people in this audience who have been buried in avalanches, I would wager that you would find that they are the most knowledgeable people around and that they have incurred these burials because they have accepted the risk.

Smutek:

If you look at this audience, you are looking at a very select population. There are some 20,000 or 30,000 active climbers in the United States and only a small fraction of them is here.

Of the 30,000 climbers, there are about 1,000 high risk climbers. These tend to be well educated in terms of hazard and hazard recognition. That leaves another 29,000 of what I call low risk mountaineers, and my comments were about that group. Risk is part of climbing and the question is: are risks taken knowledgeably or are risks taken blindly? There are certain patterns that lead me to believe that a large number of climbers are not taking them knowingly.

Some people took my suggestion that recognition of terrain hazards be the first level of training to mean a "don't go there" thing. On the contrary, I would never tell anybody that, nor would I tell them to go somewhere. I am not going to tell you what level of risk is acceptable to you. All I suggest is that a person who recognizes the terrain will change his thoughts.

Fesler:

I think that many climbers are not really aware of what risks they are taking because they do not have a clear understanding of what physical processes are at play. When crossing a particular path, they do not recognize the clues, and they do not have a system for making a decision.

Stethem:

I would like to come back to the subject of terrain. It is obvious to a climber trying to scale a mountain that there is a hazard. In looking at avalanche accidents it seems to me that many of the people involved are casual recreationists and the slopes are not necessarily big ones. I think people who are teaching courses should put more emphasis on terrain evaluation of small, inconspicuous slopes which tend to catch more recreationists than the huge, obvious ones.

Cronmiller:

Beside recognizing safe terrain, we should teach people that they are usually the trigger of avalanches in unsafe terrain.