

## What's Next for Snowmobile Specific Avalanche Education?

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**ABSTRACT:** Snowmobiling education and outreach is evolving in North America. The Alaska Avalanche Information Center is working to integrate and communicate snowmobile culture by cultivating quality instructors who are avid riders, developing snowmobile slope tests, and encouraging progressive snowmobile outreach.

### 1. INTRODUCTION

Responding to the continuing rise in snowmobile avalanche accidents and fatalities across North America, the Alaska Avalanche Information Center (AAIC) is looking for ideas and improvement. Working as a statewide 'go to' agency for avalanche information, education, and coordination, AAIC is actively seeking ways to integrate and communicate snowmobile culture.

We have completed several action items identified by the center's members to see where to put our energy in terms of snowmobile outreach. We offer snowmobile specific education, we are partnering with local snowmobile clubs, we post on web forums frequented by snowmobilers, we are creating snowmobile friendly pages on our website, we are developing snowmobile slope tests, and we are cultivating an instructor pool of avid snowmobilers who live to ride.

This summer we sent out two surveys; the first to gauge general snowmobile perception on avalanche education and another to learn what snowmobile specific education is being offered in North America and how. AAIC is participating in round table communication between the American Avalanche Association (AAA), the American Institute for Avalanche Research and Education (AIARE), and key educators in Canada to help snowmobile education improve, catch up to the trends in snowmobile travel, and change sledding behavior to reflect a more informed, risk aware culture.

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### 2. HISTORY

The typical snowmobile fatality is a male rider who triggers an avalanche larger than size 2 on a persistent weak layer. He or persons in his party end up buried in a terrain trap. The common thread seen over and over in snowmobile accidents is the travel choice and technique is inappropriate for conditions. In most cases the riders don't have basic avalanche safety information or equipment. In some cases they are apprised of the information or have the equipment, but don't have the skills to apply the information to the terrain they get on. When an avalanche does occur, they don't have the experience they need to perform an effective companion rescue. (Klassen, K. and Kelly, J. 2008)

In the past two years, three benchmark accidents are acting as catalysts for the implementation and standardization of snowmobile specific education and accident prevention. In Alaska two men died February 2010 in an avalanche that was the unfortunate dirty laundry list of avalanche factors: many persistent weak layers, big storms stacking up, warming temperatures, terrain steep enough to slide, terrain trap, more than one person on-slope, and a large group exposed to the runout. The media seized the opportunity to again make avalanches sound like mysterious events that have nothing to do with the people who trigger them.

In March 2010 the Boulder Mountain incident in British Columbia shook people into forced awareness. This event, along with the eight deaths at Harvey Pass December 28 2008, brought avalanches to the forefront of the British Columbia Coroner. The Coroner's Service was so alarmed it convened an investigation on causes of snowmobile accidents and made recommendations on how to prevent similar

accidents in the future. We can all learn from these recommendations. While they are not surprising, the hard part is to actually implement them: more education, information and community involvement. Encouraging land managers and the snowmobile industry to participate in awareness, signage, and terrain classification of popular rides is an important step. The bottom line is having the funds and integral individuals to build effective channels through which public avalanche safety programming can communicate with snowmobilers. John Kelly, the Canadian Avalanche Center's Operations Manager put it this way:

*If we can move to a situation where the clubs, manufacturers and administrators of snowmobile activities invest [in the CAC] and participate in its activities, then I believe there is a great opportunity to be more effective at developing an avalanche safety net for the sport. Let's remember that high-risk sledders, a group we find hard to reach with bulletin information, is paying very close attention to the latest models of sled, their performance parameters and who is doing what in the new "in" spot in the backcountry. This is a targetable group and some of the snowmobile community have forged businesses based on the ability to reach them. They can and they must help us to reach that group too. (Kelly, 2010)*

From 1999 to present, 26 of the 55 avalanche fatalities in Alaska were snowmobilers. (AAIC, 2010.) This trend is paralleled throughout North America. AAIC is based near Valdez Alaska, where on any given winter day there are far more snowmobilers out in the snow, cruising into avalanche terrain, than other recreationalists. There is a growing population of hybrid skiers and snowboarders using snowmobiles to access deeper terrain. We recognize that our local bulletin and education needs to focus on snowmobilers and those using snowmobiles for access within and to avalanche terrain.

We have two snowmobilers on our team who make this happen. Mike Buck and Sean Wisner believe in what they call "prophylactic search and rescue". For more than 15 years, they have hosted community and youth snowmobile classes, for free, out of the goodness of their hearts and from a desire, as leaders and founders of the local search and rescue, to not have to dig more people out of avalanches. Mike, a local riding legend, navigates more miles of avalanche terrain in a week than most people cover in a season. This riding experience combines with his background in teaching (Masters of Education and a full career of high school teaching), creating the perfect snowmobile instructor and mentor. We can brag about Mike because he not only has achieved a lot for himself on a sled, but also has created a culture of safety amongst his riding partners, snowmobile club, and community. Sean eats, breathes, and works a culture of safety. As a fire chief and rescue technician in the oil industry by profession, and a ski bum/heli guide turned sled head for play, Sean blends a deep passion for the mountains with attention to and awareness of risk management. Our center is lucky to benefit from these two integral links to the snowmobile community. Our quest is to cultivate more mentors and instructors who ride for the joy of riding - not because it is a necessary evil that some treat it as.

### 3. TARGETING SNOWMOBILERS

Culture and socioeconomics set snowmobiling apart from the snow sports traditionally targeted by avalanche educators. A unique culture that includes different clothing, gear, and approach/familiarity to the mountains. To own a sled, one needs the money and mechanical know-how/inclination to keep it running. The majority of avalanche educators have come from the ski culture. Some may use snowmobiles as an access or load-carrying tool, but few choose to play on a sled on their day off. This is why snowmobile education has been limited, possibly ineffective, and by no means a part of the snowmobile culture. Instructors need to be avid riders, not skiers on snowmobiles.

For years now the avalanche education community has been missing the mark in not realizing the riding community is very diverse in its makeup. A cross section of riders could be disparate as having hardcore mountaineers, backcountry snowboarders, resort skiers, cross-country skiers, and a moms' snowshoe fitness group all in the same class. John Kelly recognizes this, "Disaggregating the snowmobile user group into target segments is therefore imperative from a prevention program standpoint, and pretty standard marketing procedure. By understanding who is at risk, we can produce a strategy on how to influence them." We need to target students who most need the information. Blaine Smith, with the Alaska Avalanche School, responded to a question about what is the primary demographic represented in the classes he teaches, *"Most of the time we preach to the choir. If they're in a class they're already concerned about safety and are most of the way there just with their attitude. We get mostly men with families and responsibilities. There have been a few teens and early 20's, but most came with their fathers or were conscripted by their mothers. They'll run the spectrum from trail riders to radical high markers."* Snowmobile students' engagement and positive participation in their own learning is heightened when they feel the information is applicable to how they ride.

We believe if sledders teach sledders, at least they speak some dialect of the same language and productive communication can begin. An instructor who rides has credibility and is able to get snowmobile students the information they want and need.

#### 4. RESULTS FROM SNOWMOBILE SURVEYS

As educators, we want to positively influence the decisions snowmobilers make in avalanche terrain. We provide tools with which they can assimilate their information and observations, and then teach them to apply it to their terrain selection and travel techniques. On the flip side, what do snowmobilers want from their avalanche education? Two separate surveys were sent out during the summer of 2010, the first was

designed to gauge general snowmobile perception on avalanche education and the other was to find out what snowmobile specific education is being offered in North America and how. Both the general user and educators' surveys produced three similar themes about where snowmobile education can improve.

The resounding message was that snowmobilers want snowmobile specific classes, and will not accept chasing skiers and snowshoers around in the field. Riders need the curriculum to reflect their way of life, appreciating their choice to ride an engine in the mountains. Instructors pretending to know how to ride a machine just doesn't cut it. They have to wear the gear, talk the talk, and most importantly, be able to demonstrate the slope tests that could save a life. As Doug Chabot of the Gallatin National Forest Service puts it, *"The instructors must be bona fide riders. Skiers who snowmobile a little are not as good. A serious rider not only has an intimate knowledge of their concerns, but also has 'street cred' with the audience. I cannot emphasize this enough. There's really no other way. If you aren't a solid rider you have no business teaching the course. It's no different than having someone teach lead climbing who doesn't do it himself."*

Once snowmobile specific education is offered, how do educators attract riders and increase participation numbers to spread the knowledge? To get more 'bums in seats' (as one educator put it), the scheduling of snowmobile avalanche training needs to reflect the demographic. Over and over both surveys said that the cost of a class was not the biggest issue, the timing was. They need it to fit into their work, family, and play schedules. Educators who partner with local clubs and shops are able to schedule classes at opportune times, such as pairing a class with a snowmobile event. If a class includes field time, the logistical factors increase. To get student and machine to the snowy mountains requires a good deal of planning. This means that the traditional 3-day Level 1 from Friday to Sunday might not work for the average snowmobiler. Lori and Randy Zacaruk of ZacsTracs in Canada have had good results by hosting evening classes in students' hometowns, then giving

them a few dates to choose from for their field sessions. We found out the hard way that hosting a snowmobile class over Super Bowl weekend is not the best idea.

In addition to providing snowmobile specific formal education that has good attendance, the avalanche industry needs to continue the development of snowmobile specific avalanche bulletins, web tools, and outreach. A backcountry user's education begins long before the student physically steps foot in the classroom and continues long after. Our education efforts have to take a holistic approach by improving not only the information provided in formal education, but supporting the on-going learning process with a snowmobile user friendly web world and access to mentors.

Web sites and tools integrating snowmobile language and visuals is key. For a snowmobiler, looking at skiers and boarding is about as fun as watching a turtle walk in circles. A sledder needs to look at the web bulletin and in three seconds pick up the danger level for the day. Then, if attention lasts three minutes, the user should be able to get the gist of the snowpack concerns i.e. weak layers, wind loading, rising temperatures, etc. Further reading might not be common, but if a user does dally on the bulletin page they should be able to find terrain suggestions specific to sled travel. Snowmobiles put more impact on persistent weak layers due to the weight of the machine and spinning track, so bulletins need to be clear on what persistent weak layers exist and if there is a possibility a sled and rider could trigger them, what terrain should be avoided. (How persistent weak layers are identified is a skill set that should be addressed in snowmobile education.)

The responses from avalanche educators were heartening. It is evident that the snowmobile specific education does not need to reinvent the wheel, as Ethan Greene, Director of CAIC said, *"I don't think we need different education standards for motorized and non-motorized courses. The way to teach different topics is often different, but people going into avalanche terrain need to know the same stuff. How they approach different issues may be different based on their travel mode (i.e.*

*don't teach snowshoers too much about slope cutting as it might not be the best tool for them)."* Educators recognize the material will be the same or very similar, but the delivery is what will make or break snowmobile specific classes.



Figure 1: AAIC Snowmobile specific class in Thompson Pass, Alaska

There are many people who have taken the bull by the horns (or the machine by the handles) and are offering and improving snowmobile specific education. In Canada about 40 educators offer snowmobile specific Avalanche Skills Training Level 1, an awareness class that usually includes at least 6 hours in the classroom plus a full field day. The Canadian Avalanche Association offers a 7-day professional Level 1. In the U.S., it appears there may be 20-30 educators offering snowmobile specific classes ranging from 1-hour awareness through 3-day Level 1s. Some of the Forest Service districts require guides to attend a 2-day class, also offered to the public. As a result they were the probably the first in the U.S. to really address the need for snowmobile specific education. This land use regulation drove forecasters to branch out as educators and develop programs and classes to meet the need.

## 5. SNOWMOBILE EDUCATION REDUCING RISK

How do snowmobilers decrease their risk? The risk taken by mountain riders is often greater than other backcountry travelers due the greater exposure. The vastness of terrain covered in a single outing would make a backcountry skier's head spin. Sledders must recognize their actions are

more risky and develop the skill set matched with their risk acceptance. Some ideas that have grown into our curriculum to facilitate this are:

- Reduce exposure to slopes that could slide: discouraging sled groups from parking in the run out to watch a rider above them or helping a stuck rider who has attempted a high mark. We need to help sledders identify avalanche run outs (teach alpha angles) and demonstrate side terrain or high points that can protect spectators from becoming bowling pins.
- Help riders understand that a slope may have a 'sweet spot' and teaching them to avoid punching their high marks into these spots until much slope testing has been accomplished.
- Conduct an initial "follow the leader" evaluation ride so the instructor can assess the skills of riders. The slope test evaluation techniques will be different depending on the skill sets of the riders.
- Include a communication segment on hand signals and group management. Have a pre-plan for stops and roundup stops (close proximity to the instructor) when the instructor needs to relay verbal instructional information.
- Make sure all riders have a reliable machine during courses. Having a back-up plan for how breakdowns and instruction will be handled saves valuable time.
- Teach that in regards to rescue, snowmobiling is both an uphill and a downhill activity; rescuers will not always be approaching a debris pile from above. Iterate that primary search patterns will be different for snowmobilers.
- Remind snowmobilers they have the ability to travel outside the area a daily bulletin covers, this means they not only need the awareness and skills to verify the bulletin at outset, but also must have the observation skills to see when the conditions have changed enough to know they are moving beyond the

forecast area and into unknown and untested snowpack.

While snowmobile travel has many advantages over other modes of travel in the mountains, educators need to point out some of the significant disadvantages of traveling on a sled in avalanche terrain. Snowmobilers are not able to feel the intricacies of the snow, nor are they able to hear whumphs or see shooting cracks as easily due to the speed of travel and noise of the machines. As educators, we can help overcome or at least even out the advantages and disadvantages for our students by emphasizing meticulous observations and timely decision making.

## 6. SNOWMOBILE SLOPE TEST DEVELOPMENT

In addition to passive observations, backcountry users need the ability to test for instability within the snowpack. This is necessary to verify and/or augment information gathered in the quest to push travel into steeper, bigger terrain. Active testing by skiers and boarders on foot include the ski pole test, hand shear test, and stepping above the track. Further investigation might include jumping on a test slope or cutting a cornice. Currently in favor with avalanche workers a few tests that require more skill and tools are the Compression Test, the Propagation Saw Test, and the Extended Column Test. (Tremper, B. *Staying Alive in Avalanche Terrain*, pp.155-168.)

Snowmobilers have the advantage of having a few more hundred pounds and a high-powered tool to test slopes. Slope tests that capitalize on this benefit sledding education and safety. Lori Zacaruk says, "*With every track you make you are learning something about the snow. Side hill the cut banks beside the trail... slopes with the stability, the slope angle and the complexity that you feel comfortable with. Jump into them. Side hill the heck out of everything. Criss-cross, put pressure on the slope and see what happens. 'How did the snow react? What can you see in the track?'*" Mike Buck and Sean Wisner encourage use of the snowmobile as a slope testing tool. They have defined seven slope tests that give

riders more insight into snowpack characteristics: the looping slope test, downhill traverse test, rollover ride-out test, rip saw cut test, parallel rip saw test, rollover rip saw test, and the impact test. The “rip saw” technique is used for several of the tests. It is the process of leaning the snowmobile into the slope and counter-steering with the downhill ski in the air causing the track to cut deep into the slope. Riders should have this skill mastered to obtain quality results.

These tests were described in detail in the April 2010 *Avalanche Review* article, “*Advanced Avalanche Education Developed for Snowmobilers*” and are demonstrated and utilized in AAIC’s snowmobile field education. AAIC has made an effort to share and discuss these with other educators who are on the same track.

Lori Zacaruk submitted Figure 2 as an example of a slope test she recommends.

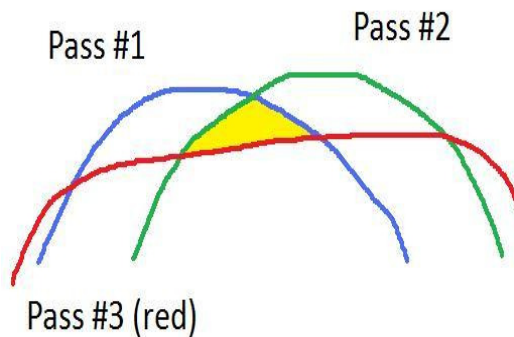


Figure 2: Rainbow wedge test – Make two sweeping rainbow arcs that intersect each other. Side hill below the apex to create unsupported wedges, like the yellow area. Watch and feel the reactions in the snow. These side hill passes act like ski cuts giving the rider the momentum and safer lines out to the side of the path.

Also working in Canada, Jeremy Hanke is an avalanche survivor and avid rider. He is collaborating with leading avalanche researchers to develop slope tests. Although some are resigned that snowmobile slope tests cannot be quantified, we believe

continued research will develop practical techniques based in theory that can benefit snowmobilers’ backcountry decision making.

The caveat being that the test results are only effective if the rider performs them methodically and uniformly each time, similar to other developed tests. This necessitates the need for instructors who can demonstrate the tests well; yet another reason why instructors teaching snowmobile specific courses must be competent riders.

## 7. CONCLUSION

The very nature of mountain riding, speed and distance, requires operators of snowmobiles to acquire more knowledge, experience, and skills than other snow sports. The costs associated with the purchase and maintenance of machines, trailers, trucks to pull them, and other essential riding gear requires snowmobilers to be financially more vested in their sport than the average backcountry skier. Snowmobilers aren’t stupid; they want to protect this investment of time and money and will take steps to educate themselves if the opportunity offered is credible and worthwhile. The current attitude of some that snowmobilers are “uneducated” and “shouldn’t be out there anyway” is nonsensical and downright irresponsible. This attitude drives the growing number of snowmobilers farther away from participating in quality avalanche education.

The avalanche education industry needs to embrace this paradigm shift and recognize the benefits of offering standardized advanced education to snowmobilers. Not only will classrooms fill, but also forecast centers will benefit tremendously from having quality observers covering hundreds of miles of terrain every day.

As far as what’s next in snowmobile education, AAIC encourages the avalanche education establishment to continue developing progressive snowmobile education and outreach programs. It is unacceptable and impossible to ignore this user group any longer. Course curriculum and standards have already been established and are working with other user groups, but are not effective in their current

form for snowmobilers. The reality of our ever-changing mountain life is that we need to help snowmobilers access information they can use, as this targeted information and education is long over due. Partnerships with manufacturers, shops, and clubs will help cultivate experienced riders to teach these courses. The development of field slope tests riders will use and benefit from, will help avalanche educators establish curriculum and course programs that embrace the unique snowmobile community. Delivering snowmobile specific education, which engages sledders to create a culture of safety in the mountains, will have a positive effect and curb fatality rates across the continent.

## 8. REFERENCES

Alaska Avalanche Information Center, *Snowmobile Education Course Provider Questionnaire*, 2010.

Alaska Avalanche Information Center, AAA, & AIARE, *Avalanche Training for Sledders Survey*, 2010.

Kelly, J. 2010. *Forward from Boulder Mountain: Lessons Learned from a Narrowly Averted Disaster*. Avalanche.ca, vol. 93, pp.21.

Kelly, J. 2010. *Patterns of Death: A review of the report from the BC Coroners Death Review Panel on avalanche-related snowmobile deaths of 2009/10*. Avalanche.ca, vol.92, pp.19-21.

Kelly, J. 2009. *The Year of Sledding Dangerously*. Avalanche.ca, vol. 89, pp.32-35.

Klassen, K. and Kelly, J., 2008. *SLEducation: Reversing the Trend in Snowmobile-Related Avalanche Accidents*. Avalanche.ca, pp.21-23.

Sharaf, D., 2000. *Snowmobility: Travel Differences among Snowboarders, Snowmobilers, and Skiers*.

Tremper, B. *Staying Alive in Avalanche Terrain*, Mountaineers Books. 2008. Seattle, WA.

Wisner, S., Buck, M., and Carter, S. 2010. *Advanced Avalanche Education Developed for Snowmobilers*, The Avalanche Review, AAA, vol.28, No.4, pp.12-13.

Zacaruk, Lori. Personal communication. 2010.