

# Avalanche Awareness for Snowmobilers

by [Jim Frankenfield](#)  
[Cyberspace Snow and Avalanche Center](#)

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References to urls and online information can be found at [www.csac.org](http://www.csac.org)

## Introduction

In the time since I was first invited to write this article, several snowmobiling avalanche incidents have occurred, including the first U.S. avalanche fatality of the 1996-97 season, in Utah. Many of these incidents could be easily avoided with a bit of awareness and a few basic precautions. Therefore, in this article I will emphasize awareness and precaution, rather than delve into snow science and snow stability evaluation.

## It Could Be You, or a Friend, or a Relative . . .

The first step to avoiding avalanches is to take them seriously. For some reason, too many people think that they are immune to avalanches. Or perhaps they know better, but the sledding is so good that they would rather not think about avalanche danger. And then there are those who think it isn't "cool" or "macho" to worry about avalanches. These attitudes are found in winter recreationists of all types, and they are certainly not unique to snowmobilers.

For snowmobilers, exposure to avalanche hazards has increased rapidly in recent years. High-power, lightweight machines with improved traction are enabling snowmobilers to get into terrain that was once inaccessible by snowmobile. Consequently, snowmobilers are having to re-think their attitudes toward avalanches and their knowledge of avalanche safety. A similar attitude adjustment and search for knowledge has taken place among many skiers, as venturing out of bounds has become more common, and among snowboarders, also, as their sport has grown. It's time for snowmobilers to do the same.

For those who think avalanches are not worth worrying about, here are some situations to ponder. All have occurred over the past year.

- losing your machine or other equipment in the backcountry, buried beneath a slide
- watching a friend in your group get buried and not being able to execute a quick search for them
- having to return from a trip and speak with the family of a friend who did not return

- putting your friends and family in the situation of having to hear from your sledding pals that YOU won't be returning from the trip

In most cases, whenever these situations have arisen, they could have been easily avoided. If the number of fatalities per year does not seem very high to you, just remember that for each fatality there are numerous others who were very lucky. These are the people who tell me they are "changing the way they sled," that they are buying transceivers, books on avalanche safety, and educational videos.

## **Avoiding Avalanches**

Though it may seem like stating the obvious to say so, you can greatly reduce your exposure to avalanche hazards by taking steps to avoid avalanches altogether. Your first step should be to obtain general information about current snowpack stability conditions in the area in which you plan to ride. Many regions have an avalanche hotline you can call. Similar information is available on the Cyberspace Snow and Avalanche Center's web site, and you can also subscribe to a listserver to receive each bulletin for an area automatically. These bulletins are very educational--follow the bulletins for one area for a season and you will learn a lot. If you are in the United States and the area you sled in isn't covered by any official bulletin, try calling the local office of the U.S. Forest Service. Many Forest Service offices employ a snow ranger who can give you current information.

When planning your trip, consider what you know about the current conditions. If the danger is high or there is a warning in effect, avoid highmarking (climbing hills to see who reaches the highest point on the slope). Plan a route that avoids steep slopes. In some instance, staying at home or going to a less-dangerous area may be the best response.

Once you're in the mountains, observe what is happening around you. Are there signs of recent avalanche activity? Are the winds obviously piling up extra snow on certain slopes? A safety course that includes time spent in the field will help you pick up more subtle clues, but slopes that have recently slid and wind visibly moving snow over a ridgeline are easy clues to spot. The trick is to be looking and thinking. Stop every once in a while for a look around, and think about what you see.

## **Mitigating the Risk**

There are a number of steps you can take to minimize your risk. Even when conditions seem quite stable, these simple precautions should be followed. In fact, they should become a matter of habit.

Never expose more than one person at a time to a potential hazard. If you must cross a hazardous slope, or cross below a hazardous slope, send one snowmobiler at a time. The rest of the group should watch the person exposed to the potential hazard until he or she is out of the danger area.

When sidehilling across a possible avalanche slope, cross it as high as possible and have everyone in the group follow the same track. If you must have more than one person cross a slope at the same time, spread out as much as possible on the single track you all are following. **Never** have one person above another.

One of the most common avalanche situations involving snowmobilers is highmarking, the practice of competing to see who can climb highest on a slope. **Never** have more than one person up on the slope at the same time! If somebody gets stuck up on the slope, let him or her free the sled alone. If you go up there to help, your added weight and the weight of your sled can introduce plenty of stress to the snowpack. Often, that stress is sufficient to trigger a slide

While the stuck snowmobiler is freeing his or her sled, where should the rest of the group be? Well, not right down at the bottom, staring up at the potential avalanche slope! Stay to one side or find a safe spot, but keep an eye on the stuck snowmobiler.

Highmarking inherently involves being on steep slopes with potential avalanche hazard, so if you are inclined to play this game often it would be a good idea to learn more about stability analysis. Various field tests (such as digging a quick snow pit) can help you determine the current stability before highmarking on a particular slope.

Whether highmarking or not, consider your route carefully. Areas with trees are generally safer than open slopes (although they are not always entirely safe). The sides of ridges facing the winds are typically scoured, hardpacked, and safe, while the lee sides are often loaded with all the snow. Cornices usually indicate that the slopes below are or have been loaded by the wind. (Cornices themselves often break farther back than you might expect, so give them a wide berth.)

## **Avalanche Survival and Rescue**

If you are caught in a slide:

- Try to ride out of the avalanche. Sometimes by heading down and to one side at top speed, a snowmobiler can get out of the way of the avalanche. This is an advantage snowmobilers have over skiers and snowboarders, who have little chance of outrunning an avalanche. However, don't assume that you will be able to outrun an avalanche (and therefore use that assumption as an excuse for not worrying about avalanches). Large avalanches can run well over 100 miles per hour.
- If you are losing the battle, make as much noise and commotion as possible. After all, you were crossing or highmarking one at a time, right? And the rest of your group is watching you, right?
- At some point, you may want to part ways with your snowmobile. One school of thought is that it is best to push yourself away from your machine immediately. You don't want to be beat against it or be riding underneath it. Another school of thought is that it is best to hold on as long as you can, until you are yanked away.

Once you and your machine are parting ways, by choice or by force, you probably want to get as far away from it as possible.

- Struggle against the avalanche, using a swimming motion. Grab for trees or other anchors, if you can. If you are near the edge of the avalanche, try to "swim" further in that direction. If you are near the top and can feel the underlying bed surface, try to dig into it with your hands, your feet, or both. Keep your mouth closed.
- As the avalanche slows, get one hand up as high as possible. With a little luck, your hand will protrude from the debris. Use the other hand and arm to shield your face, hopefully leaving more of an air pocket in front of it. This may also help keep snow from packing into the helmet visor too tightly. A full-faced helmet can give you a better chance of having at least some air space.
- As you first come to a stop, see if you can move around. Maybe you can get an arm or a leg up higher or pack out more of an airspace. Before very long, though, you will not be able to move anything because of the concrete-like properties of the debris. Try to conserve energy. At this point, it is all up to your friends on the surface.

## **Chances of Survival**

A person buried in an avalanche must be found as quickly as possible. The most recent statistics show that about 90% of those buried are initially alive, but after 30 minutes, only 50% are still alive. So if you are to have at least a 50-50 chance of saving the person, you must locate and recover him or her within 30 minutes.

## **Recovering a Buried Person**

The odds of recovering a person within 30 minutes are greater if the search party is able to use an avalanche rescue transceiver, or beacon. Exactly how to use beacons and how they work is beyond the scope of this article, but references to this information can be found at the end of this article.

Beacons cost \$200 to \$300 and are worn under your outer clothing while you travel in the backcountry. You turn the beacon on at the trailhead so that it is continuously transmitting. If you need to search for somebody else, you switch the beacon to "receive." Be aware, however, that beacons do not point directly to the buried person, so practice with them is necessary.

If a beacon seems like an expensive purchase, keep in mind that they last indefinitely and can save your life or that of somebody else in the group. To be useful, a beacon must be worn by everyone in the group. If the buried person is the only one wearing a beacon, it's most likely use will be to make recovering the body easier for Search and Rescue, once they get there.

Okay, we have a buried individual. Now what? Other members of the group were watching the person exposed to the hazard, so they should know where the victim was last seen and what general path he or she followed in the avalanche. This provides a general idea of where to begin searching.

Whatever you search method you find you must use, it is important not to panic and not to send for help beyond the immediate area. Remember, you have 30 minutes for a 50-50 chance. Panic will burn up this time, and outside help can rarely get to the scene within 30 minutes. Instead, response is usually measured in hours, not minutes. An exception might be if you were to sled to another group nearby to ask for their help, especially if the only method of searching is probing the snow with probe poles or tree branches. (But you were better prepared than that, right?) Another exception would be to send somebody to retrieve probe poles from a rescue cache at a trailhead or warming hut. In most instances, though, you'll want to stay on the scene and begin searching immediately.

Once you've located the buried person, you have to dig him or her out. So be sure everyone in the group carries a shovel. You can carry a shovel and a collapsible probe under the hood of a machine, and it's a good idea for each machine to be so equipped. But do not put the beacon there--the search will be for the rider, not the machine.

## Case Studies

Let's look at two fatal avalanche accidents involving snowmobilers and see what they did wrong. I know only what is in the reports, but just from the reports alone it is clear that some very basic mistakes were made. My intent is not to get into every detail, so I won't even discuss the details of the snowpack. Instead, let's just see which of the *very basic* precautions we've covered were ignored by these unfortunate snowmobilers.

NOTE: The commentary that follows is based on the accident reports and refers to the hazard bulletin in effect at the time. Follow the links below to read these documents first, and click "Back" on your browser to return here.

Go ahead. I'll wait.

### **Accident Report 1: Utah, December 7, 1996**

There was a Hazard Advisory for that day. So this was not a good day to be highmarking.

Next, note that the report mentions that the people involved were experienced riders. Reports often indicate that victims were experienced snowmobilers--or climber, or skiers, or whatever. Experience at your activity will not help you avoid avalanches. You might even be more likely to be caught in an avalanche since you will be more likely to be getting into hazardous terrain. So keep your avalanche skills on a par with your sledding skills, and particularly with your highmarking skills.

According to the report, a slide had already been triggered in an adjacent bowl by a member of the group. This person had apparently left, but it is unlikely that the four people involved did not know about the slide. So they were ignoring at least one of Nature's clues. A billboard of a clue, at that.

Where were the others when the highmarker triggered the slide? At the bottom of the bowl, where they were caught. Two of them were lucky, while one was hit by his own machine. One has to assume that these folks will not sit at the bottom of the slope next time, but have learned to stay off to the side in a safe area.

Finally, note that no one in the group was carrying beacons or shovels. As a result, there was virtually no chance of them finding the buried rider within 30 minutes. The report gives no indication of a suspected cause of death (asphyxiation, trauma, etc.), but if three people had been prepared to search with beacons (and to dig) they may have found the victim in time.

There were several other snowmobiling incidents during this same period, and some people were *very* lucky. It's unfortunate that this guy wasn't.

## **Report 2: Montana (Lion Head), Feb 25, 1996**

For the Lion Head area, the warning called for a high hazard on 35-degree slopes and a moderate hazard on lower-angle slopes. There is a reminder that *moderate* still means you need to be careful, and it emphasizes that the current conditions make this recommendation especially important. Under such conditions, it would be wise to carry beacons and shovels, which the group did not do.

One of these riders was an off-duty guide who seemed to know that avalanches in the area were possible. On one hand, his advice to swim is credited with quite possibly saving the other two people. On the other hand, the members of the group did not carry beacons and shovels and ignored a few basic rules. So I view this as the classic case of a skilled rider whose avalanche skills hadn't not caught up to his sledding skills.

While it is not clear where the various people in the group were, it sounds as though the guide was up on the slope above the other two people. Remember, never have one person above another. The ones below were in the path.

Finally, the victim was buried in an unlikely spot. This decreased the chances of quickly locating him. Beacons allow you to cover more terrain quickly, especially during the initial search to pick up a signal. Perhaps if only one person had been caught and the other two had been watching from a safe area, they could have located the victim with a beacon search.

## **Learning More**

The best way to learn more is to take an avalanche safety class. It seems like most of these courses are still oriented towards skiers, snowboarders, and climbers, but some are aimed at snowmobilers. The snowmobile community is pretty well organized with clubs and associations, which is a good way to arrange a class. Get a group together through your local club or association, and contact instructors about teaching the class. Many instructors who do not schedule and market classes for snowmobilers will teach one when it is requested and the group is already assembled. Larger groups or regional/national associations may be able to supply smaller groups with a list of potential instructors.

## **Books and Videos**

Currently, most books and videos are oriented towards skiers, snowboarders, and climbers, but materials currently in production will change that situation. Fortunately, much of the information in available books and videos is not specific to any one particular activity. A few items I would highly recommend for snowmobilers are the following:

- *Sledding in Avalanche Terrain* by Bruce Jamieson

This is a very basic book at about the same level as this article. But it is longer and covers more. It is written for snowmobilers and costs very little. For most readers of this article, this book would be the best next step.

- *Avalanche Rescue Beacons: A Race Against Time* by Dale Atkins

This excellent video shows very clearly how to use beacons and the basics of how they operate. It also has a few tips for practicing. Order one with your beacon.

- *Avalanche Awareness: A Question of Balance*

This well-done, half-hour video covers the basic terrain, weather, and snowpack factors affecting snow stability. A good introduction.

These and other educational materials can be ordered on the web at the CSAC On-line Avalanche Store. Proceeds from sales help to fund the Center's public-education efforts.

## **References on the Internet**

The definitive avalanche web site is the "Cyberspace Snow and Avalanche Center". This site maintains links to various other resources around the net and is often the best way to find new related sites. The site contains current avalanche hazard and weather information, educational resources, and more. The incident reports are cross-referenced

by activity, so you can focus on learning about past snowmobiling accidents. The reports are also linked to the hazard bulletin in effect at the time (if one is available), so you can read the bulletin that the unfortunate party should have read (or should have paid more attention to).

## **Conclusion**

The key points made in this article (can you list them?) all come down to being prepared, being aware, and learning as much as you can over time. Know the general conditions before you go, carry rescue equipment that you have practiced with, observe constantly while you are out there, and stop to think about your observations from time to time. This simple approach could have saved the lives of most of those who have died in avalanches. And it just might save yours.

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