# Performing a Snow Profile

Instructor Guide

Safety Talk Overview

Safety Talks are a method to refresh an employee’s knowledge and skills, maintain their interest in safety and illustrate the organization’s commitment to creating a healthy & safe work environment. Safety Talks can be performed on a weekly basis or before the start of a new scope of work and should be about 15 minutes in duration. Generally, these Safety Talk meetings are led by a supervisor and should be mandatory for all crew members to attend. The content should be centred on a single topic (e.g. a safety rule, safe job procedures, recent incident, Joint Health & Safety Committee (JHSC) meeting minutes, inspection results, etc.).

Topic Overview:

The primary objective of working in avalanche terrain is safety. Secondary objectives would include observing and recording of the current structure and stability of the snow pack. This safety talk will discuss the hazards of working in avalanche terrain, what types of things to look for, and general snow profile guidelines.

Demonstration and Discussion Topics

🞏 **Discuss** the importance of doing a snow profile

🞏 **Tour** the work area with workers pointing out where the accidents can occur.

🞏 **Distribute** the “Do’s & Don’ts” section of this handout.

🞏 **Use** the “Instructor Guide” section of the handout as your discussion guide

🞏 **Discuss** how accidents can happen.

🞏 **Remind** employees that they are required to wear adequate personal protective equipment.

🞏 **Explain** what can be done to minimize the risk of accidents (Do’s & Don’ts in handout)

🞏 **Emphasize** that following safe work procedures is mandatory.

🞏 **Make it real** by telling at least two true stories of injuries from your experience.

🞏 **Discuss** the attitude of “it won’t happen to me”. Remind them that an injury can and will happen if they take shortcuts or are careless.

🞏 **Answer** any questions or concerns they might have.

🞏 **Set a good example** by working safely at all times.

🞏 **Document** the Safety Talk by completing the “Safety Talk Record” section and filing it.

Performing a Snow Profile



SAFETY TALK RECORD

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| Discussion Leader: | | | Date: | | | |
| Department: | | | Time: | | | |
| Attendees (Please print your name and sign beside it. If you are a contractor, also include your company name): | | | | | | |
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| Near Miss/Incidents and Investigations Reviewed: (None this month 🞏) | | | | | | |
| (Industry alerts can be discussed here as well) | | | | | | |
| Safety Topic Discussed: | | | | | | |
| Title: | | | | Date: | | |
| Any questions or concerns from workers? | | | | | | |
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| Action Needed: | Person responsible: | | | | Due Date: | Completed Date: |
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| Reviewed By: |  | | | |  |  |
| *Supervisor/Manager Print Name & Sign:* | | | | | *Date:* | |

# Performing a Snow Profile

**Hazards:** Environmental, MSI injuries – lower back strain, fatigue, muscle strain, RSI injuries, avalanche,

**Equipment:** Shovel, compass, GPS, thermometer, probe or ski pole, saw, transceiver, ruler, rope,

**Personal protective:** Clothing should be appropriate for the weather conditions

**Training required:** The lead guide is to be certified at the level of the Association of Canadian Mountain Guides (ACMG) Mountain Guide or UIAGM equivalent, ACMG Ski Guide, or other equivalent certification; ("Equivalent Certification" will be determined by the Standards Committee of HeliCat Canada).

**Avalanches** are an integral part of the natural cycle in the mountain environment. The potential for avalanches exists on steep and even moderately steep snow slopes throughout these areas. People that work in backcountry terrain, and are exposed to avalanches, must accept the risk associated with making that choice. The Avalanche Terrain Exposure Scale (ATES) was developed to help you understand the risks that are an inherent element of travelling in avalanche terrain. While the snowpack changes continuously throughout the winter season, the terrain the snowpack sits on generally does not change. Avalanches don’t happen on flat ground, but they do cascade down steep slopes that run out onto flat and low-angle terrain, so the risk of being in those places must be understood.

**Risk Assessment**

The purpose of the avalanche risk assessment is to determine the potential for snow avalanches and to generate options for risk mitigation. This is an investigative assessment, which includes consideration of factors such as terrain, snow conditions, and history of avalanche events.

**What are the signs?**

You can assess the likelihood of an avalanche by digging into the snow to test the hardness. If you prod the snow and notice a sudden change in resistance than it’s a good sign that the area is prone to avalanches. You can perform a test more thoroughly by digging a snow profile which will allow you to assess the differences in hardness, moisture content, and crystal size in the various layers of snow. Water is a lubricant so if the snow is very wet it will be heavier and denser and more likely to slide. A rough guide is if you can make a snow ball out of the snow, then it is wet.

**Ground**

If the ground is hard and smooth then snow is more likely to slide over it. Long grass also provides a slippery surface for snow.

**Wind Slab**

The most common type of avalanche is called wind slab, and is caused by the effect of wind on falling, or fallen, snow. Wind Slab snow will appear chalky, has a fine texture, and makes a squeaky noise when walked upon.

**Ice**

Avalanches caused by ice usually occur in warm weather when ice masses fall after thawing. Pinnacles of ice, or seracs, are most likely to fall in the morning or evening due to the change in temperature.

**Wet Snow**

A rapid rise in temperature, or an area exposed to direct sunlight can imply the risk of a wet snow avalanche. Snow ball running down the hill is an indicator of this type of avalanche.

**Signs of instability**

* Whumpfs
* Shooting cracks
* Recent slab avalanche activity on nearby slopes
* Triggering a slab avalanche, including ski cutting

**Snow Profile**

For accurate information, dig your pit on a slope with the same aspect and steepness as what you plan on skiing. Also, don’t wait until you’re halfway up your line to dig—the point is to have an idea of a slope’s stability before you’ve committed yourself. Pick a smaller slope with more manageable consequences and you’ll be more comfortable taking the time to do the job right.

Your first step is to do some probing, either with your pole or probe, to get a feel for any weak layers that might be hiding under your feet. You’ll feel a weak layer if your probe seems to drop away into nothing; look for it when you’re digging. Keep the walls smooth and vertical, and don’t be afraid of getting in there with your hands—feel for strong and weak layers, look at crystals. Once you’ve dug your pit, cut out two sides of a shovel-sized column, place the shovel blade on top, and give it ten firm taps from the wrist. If it’s solid, keep tapping from the elbow - and if the column still hasn’t failed after ten of those, give it ten more all the way from the shoulder, watching for collapse the whole way.

Next, isolate a column 90cm across and 30cm deep for what’s called an Extended Column Test, which’ll show you whether the snowpack is likely to collapse and if it has the energy to propagate into a full-scale avalanche. Place your shovel on a corner of the column, just like you did in the first test, and start the tapping process from the top. If the weak layer fails and the column slides, a fracture is able to propagate and potentially release a larger slide. Keep an eye on the quality of the shear, too—a slumpy fracture doesn’t possess as much energy, while an aggressive, clean shear means the slab is poorly bonded to the weak layer, and more likely to produce an avalanche.

do’s:

* Identify the layers in the snow-pack
* Identify the hardness or density in the layers
* Identify weak interfaces between layers and to approximate their stability
* Observe snow temps
* Monitor and confirm changes in snowpack stability
* Determine the thickness of a potential slab avalanche
* Determine the state of metamorphism in different snow layers
* Observe and record temporal and spatial changes in snow properties
* Avoid thick trees as these conditions are often quite different than the slope

don’ts:

* Don’t dig along ridgelines where the wind has affected the snow
* Don’t dive into the middle of a dangerous avalanche path without first gathering lots of additional data about the stability of the snow