

## Considering Considerable And Other Conundrums

Recently, someone said to me, “I don't know how they triggered an avalanche – after all, the avalanche hazard was only rated considerable.” If, to paraphrase Elton John, sorry seems to be the hardest word<sup>1</sup>, considerable seems to be the most misunderstood avalanche hazard rating.

We all know that most skier (or snowshoer) avalanche involvements and fatalities occur when the rated avalanche hazard is considerable. But why is that? Well, it's likely a combination of factors. Firstly, overt signs of poor stability/high avalanche hazard – such as natural avalanches, cracking and whumpfing – have generally subsided. Secondly, the buried weak layer(s) that are resulting in the considerable rating are now buried deeply enough that quick assessments of these weak layers – such as hand shear tests or jumping on small convexities as you pass by, are not reliable indicators of how tenuously the snowpack is balanced. Thirdly, these buried instabilities tend to be highly variable and their location difficult for recreational skiers to predict. Snowpits and standard stability tests (e.g. compression or shovel shear tests) generally do not provide definitive answers regarding the stability of the snowpack or the strength of the weak layer, and are highly dependent on spatial variability<sup>2</sup>. Fourthly, it is possible to ski a long time without seeing any signs of instability in the snowpack and thus gain a false sense of confidence in the snowpack. And finally, but possibly, most importantly, the meaning of considerable avalanche hazard seems to be poorly understood.

Research<sup>3</sup> indicates that recreational skiers view the avalanche danger scale as a linear scale, i.e. the difference between moderate and considerable is the same as the difference between considerable and high. Experts however, recognize that the danger scale is quadratic or exponential in nature, such that considerable is several orders of magnitude worse than moderate. If you look at the avalanche danger scale from this perspective, it puts a whole new spin on “considerable.”

By definition, considerable avalanche hazard means natural avalanches possible, human triggered avalanches **likely**. Expressed in terms of snow stability, avalanches can be triggered by **light loads**.<sup>4</sup> In other words, if you get onto the right piece of terrain, with the right combination of weak layer and overlying load, the chances are good that you **will** trigger an avalanche.

To paraphrase Karl Klassen (CAA forecaster) there are three things you can work with when the snowpack is suspect, such as when the avalanche hazard is considerable. They are, in order of importance: (1) terrain, (2) terrain, and (3) terrain.

Exactly what type of terrain you should choose to avoid will depend on the exact nature of the buried weak layer, but some general guidelines are clear.

Avoid:

- Big slopes with big consequences (an avalanche which will carry you over a cliff, into trees, into gullies, through boulder slopes, onto a flat run-out, etc.).
- Small slopes with big consequences. See big consequences above.
- Large, steep (>30 degrees) open slopes.
- Steep (>30 degree slopes) with widely spaced trees (insufficient anchors). Some of the best

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1 Bernie Taupin & Elton John (1976), Sorry Seems To Be The Hardest Word.

2 Jamieson, B., Campbell, C. (2004). Spatial Variability of Rutschblock Scores in Avalanche Start Zones

3 Longland, Haider, Hageli, & Breadmore. Study Brief: Decision Making by Amateur Winter Recreationalists in Avalanche Terrain

4 A single skier or snowshoer is considered a light load.

glade skiing around the Nelson area, for example, regularly produces avalanches big enough to injure or bury a skier during periods of considerable avalanche hazard. As a rule of thumb, if you can ski through the trees comfortably, the terrain is capable of producing avalanches.

- Obvious avalanche paths - look for flag trees, trim lines, etc.
  - Convexities where shear stress is concentrated.
  - Large openings in the trees with slope angles steep enough to avalanche (30 degrees and up).
  - Traveling or grouping up below big open slopes, avalanche slopes or in terrain traps.
- Remember to look up!

Choose instead terrain that is:

- Lower angled – 30 degrees or less.
- Well supported from below, i.e. no convexities.
- Well clear of terrain traps, large overhead slopes, avalanche paths and run-outs.
- Well anchored by live, mature timber.
- Offers multiple options for safe travel.

So, next time you see that the avalanche hazard rating for your area is considerable, give a little extra thought to your planned route before you leave home, and, when out in the mountains, pull back a little. Have an extra margin of safety in hand: keep group sizes small, practice safe travel techniques, such as exposing only one person at a time to hazardous terrain and choosing safe regroup locations, keep your options open and consider alternative routes. Above all, ask yourself, “If I’m wrong and this slope releases – what are the likely consequences?”



*A lucky skier escaping back up-slope after accidentally triggering a slab on the east side of White Queen Mountain*