# Transitions to Spring Snow Avalanche Problems

Submitted by Alex Marienthal on Thu, 04/07/2016 - 20:21

by Alex Marienthal

Spring is here with longer days and a more predictable snowpack to facilitate objectives that are steeper and farther. These objectives are possible while maintaining a personally acceptable level of avalanche risk. However, these objectives can mean more exposure to other hazards like exposed terrain and prolonged rescue, which increases the consequences of relatively small accidents. The snowpack structure is changing from cold, dry layers to warm, wet and icy layers. This transition creates a fresh mix of avalanche problems.

**Spring Avalanche Problems**

Both dry and wet avalanche problems exist during spring. Dry snow avalanches result from snow and wind-loading that form slabs and add weight to exceed the strength of the snowpack. Above freezing temperatures and more direct sun affect the other half of the stability equation, causing the snowpack to melt, get wet and lose strength, and make wet avalanches more likely.

Wet loose avalanches happen when sun and above freezing temperatures warm and weaken the snow surface. Unconsolidated new snow is conducive to wet loose avalanches that will entrain more snow and become large. Wet slab avalanches occur when liquid water from snowmelt or rain percolates through a layered snowpack. Unconsolidated snow on the surface can melt quickly and introduce liquid water to the snowpack. When the snow surface is frozen in the morning, warming is necessary before wet avalanches are likely.

A snowpack that is wet from top to bottom is referred to as isothermal. Deep wet slab avalanches are most likely during and directly after the snowpack transitions to isothermal when snowmelt is susceptible to pooling along weak layers. **Wet avalanche danger can be high during the transition to a fully isothermal snowpack when the snow is not frozen**. Avalanches deeper than recent snowfall typically become less likely days to weeks after the snowpack has fully transitioned to isothermal.

Persistent weak layers enhance the destabilizing effect of water in the snowpack. Water can pool along weak layers and crusts and rapidly decrease snowpack strength. Persistent weak layers change by aspect, elevation, and from day to day, but they remain a danger until they are completely melted and refrozen together. In spring, the possibility of deeper, dry slab avalanches will persist longest on high elevation, shady slopes, and wet slab avalanches are possible when the snowpack is melting or during rain.

**Spring Travel Advice**

Snowfall will continue through April and there will continue to be new dry snow instabilities, in addition to wet snow instabilities. Long days and more confidence in stability encourage bigger objectives, more terrain, and more steep terrain. Encounters with “small and manageable” instabilities become more likely and can be deadly. Small, but unforgiving slides can catch a skier or rider off guard when a cold, bluebird morning turns to dripping

sweat and t-shirts, or when corn skiing one day is followed by 6” of snow and 25 mph wind the next. Rapid changes in stability and the type of avalanche problem are normal from day to day, as well as throughout the day and with each change in aspect and elevation. Anticipate change. Be flexible with expectations.

Travel when and where the snow surface is supportable, dry, or frozen. Good skiing will be found as the frozen snow surface warms up, but timing is critical as the snow may become weak and unstable. The rate of transition from stable to unstable varies from less than an hour to multiple days, and is dependent on aspect, elevation, snow structure, and temperature change. Cold temperatures and clear skies overnight promote freezing and stability. **When temperatures remain above freezing overnight the snow stays wet and unstable. Multiple days and nights with above freezing temperatures create very unstable conditions.** If the snowpack did not freeze overnight, avoid avalanche terrain or go fishing. Wet avalanches can run far, so consider what is above on hot, sunny days. Does the trail, climb, or riverbank extend up to steep, sunny snowfields above?

Wet avalanche danger is low when the snow is dry or frozen in the morning, and increases if warm temperatures and sun melt the snow during the day. Evidence that wet avalanches are likely includes large rolling pinwheels of snow, point-release (wet loose) avalanches on steeper slopes, and sinking deeper than boot top into wet snow. These are signs to avoid slopes with wet snow. This article from Backcountry Magazine has some good tips for when to turn around in regards to changing wet snow conditions:
http://backcountrymagazine.com/stories/mountain-skills-knowing-when-to-turn-around/

Expect wet snow stability to decrease when going from shady to sunny aspects. Examples include from north to other aspects (in the northern hemisphere), from west to east or south in the morning, or from east to west in the afternoon. Travel on east and south aspects early in the day. Sometimes they will remain cold all day, but if east aspects warm up fast, move to west, or north before those aspects warm up. High elevation and shady aspects will hold cold, dry snow the longest. Steep shady slopes can have dangerously firm snow when it has not thawed. Remember to look for weak layers, storm slabs, and wind slabs if there has been recent snowfall.

After the snowpack turns isothermal, and old weak layers have been thoroughly melted and refrozen together, the primary avalanche concerns become wet loose avalanches and relatively shallow wet or dry slab avalanches. The snowpack is not necessarily more stable, but instabilities are easier to identify and manage than the nasty persistent weak layers of this winter. The depth to which we need to worry about most avalanches is reset to that of recent snowfall, wind drifts, or relatively shallow buried thick crusts.

In spring, more daylight and confidence in stability promote success on steeper and farther backcountry objectives, but these objectives can have large consequences for small mistakes. Keep an open mind, anticipate change, and be flexible with your plan. Have a great spring and summer!