

Preliminary

Alpental Ski Area Back Country —WAC Bluffs Avalanche Accident

February 19, 2012

Time and Date: ~1145 AM PST, 2/19/2012

Submitted by: Aaron Opp (Snoqualmie Pass Professional Ski Patrol) and Mark Moore (NWAC)

Location—back country (beyond ski area boundary) on east end of WAC Bluffs in an area informally known as “80s chute”, just to east of top of Chair 1 at Alpental Ski Area. Alpental lies just NNW of Snoqualmie Pass, central WA Cascades, WA USA)

Slope specifics: starting zone elevation ~ 3800 ft., ENE exposure, 45+ degree slope

Fracture line details: SS-AR-O-R2-D2; Slab size and structure—approx. 1-2 ft deep (width unknown currently) soft slab (Fist to 4F hardness) presumably released to lower density layer above freezing rain crust; initial avalanche likely triggered second slide on lower bench

Avalanche details: Slide caught two (of party of three), one of whom was able to self arrest; remaining victim carried about 400 vertical feet down a 45-60 degree cliffy chute

Fatalities / Injuries: Three snowboarders triggered slide--one not caught, one caught and able to self arrest, one caught and carried down through very steep ice and rock filled chute, and killed

Accident Narrative:

Late morning on the 19th of February, 2012, a party of three snowboarders left the top of Alpental Chair 1 with the intention to ride steep terrain off the end of WAC Bluff. It is unclear whether they intentionally arrived at 80's chute, a very steep cliffy line known to have been first descended in the 1980's, or another steep ridge closer to the ski area boundary. The party followed the WAC bluff control routes skin track out along the WAC bluff ridge. The control route ends at the top of "shot 8"—the recognizable dihedral ramp visible from the base of the ski area.

From the top of Shot 8 the party of three descended skier's right or east towards the 80's chute, into the uncontrolled BC, or side country beyond the patrolled and controlled ski area boundary. They traveled about ~600' where the terrain steepens fast from approximately 45-60 degrees in several chutes along the southern edge of a very cliffy area. The party released several sluffs that ran off the cliff band enroute to their traverse descent into the chute.

The 80's chute has a somewhat funnel shaped upper face around 3800 ft. elevation. The group approached via a cliffy/treed area on the skiers left side of the face. The party proceeded from left to right out onto the upper part of the steep east to northeast facing chute.

At this point and near the middle of the pocket, with the victim in the middle, the party triggered the slab which released approximately 20 ft. above the victim. The first boarder was not caught while the last member of the party was caught but not in the main slide and was able to self-arrest. Unfortunately the middle boarder was caught and subsequently swept down through the choke of the chute/cliff/ice bulge area. The loading and frictional effects from the first slide triggered another 16-18 inch slab fracture on a lower bench, with the resulting slide mass carrying the victim over multiple cliffs and rock bands onto the runout at the base of the cliff area, a total distance of about 400 vertical feet (~3400 ft elevation).

After the accident, the other members of the party called 911 for emergency assistance. Snoqualmie Pass Fire and Rescue established Incident Command and a group of rescuers from the Alpentel Ski Patrol were dispatched. The victim was located by skiing from the top of Alpentel Chair #1 around the base of WAC Bluffs to the run out area below the chute (see Figure 3). He was found at the top of the debris in the mid/upper portion of the runout zone just above some small trees (also Figure 3), apparently dead from trauma. While the victim was found on the surface, a transceiver found in a pocket of the victim's pack had been severely damaged during the fall and was no longer capable of transmitting.

Snowpack Information:

A recent strong storm had brought over three feet of snow (the area reported 14 inches of new snowfall on the morning of the 18th and 23 inches on the morning of the 19th) at lowering temperatures and intermittently strong winds as a deep upper trough followed at front and settled over the NW. The recent snowfall had fallen on a freezing rain crust that formed prior to the start of the snow and in many places was not well bonded with the overlying snow.

On Saturday when heavy snow continued for most of the day, the ski patrol had sensitive control results with both explosives and ski cuts. This was followed by even more results early Sunday on a very active control weekend, with several patrollers taking short rides and up to 4 ft. crowns reported along with large amounts of drifting.

From the information received, it appears that the bed surface for the fatal slide was almost certainly the freezing rain crust but this area never holds much snow cover due to its steep pitch. No surface hoar had been recently observed around the Alpentel area, and it appears likely that the estimated 1-2 ft. avalanche released on a low density layer just over the crust and ice. (No profiles were done at the accident site due to the objective danger of entering this steep cliffy area that had continued to receive further wind transport)

Site Location and Area Photos (all photos courtesy Kevin Marston):



Figure 1. Google Earth map showing approximate location of avalanche accident on the east end of the WAC Bluff area. Note skie area in upper right and area access road in foreground. I-90 lies just out of map picture to left.



Figure 2. Middle and upper part of the ENE face of the 80's chute.



Figure 3. Lower part of chute and runout. Victim located below the small stand of trees in the chute runout (approximately tip of arrow).



Figure 4. Rescuer ski track with small tree stand (above arrow) and victim recovery point just above skier



Figure 6. View uphill toward 80s chute (middle left of photo) and path of slide. Note large cliffy area on looker's right where several small sluffs were released by the approaching party prior to the event.

Ancillary Snowpack and Weather Information:

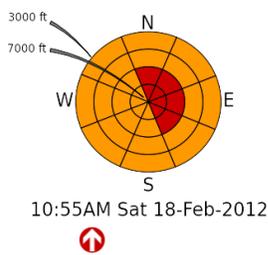
Apparently the party was aware of the avalanche forecast, but did not check with the patrol prior to departing the developed area. However, it is currently unknown whether the party had performed any stability tests prior to entering the 80s chute. However, there were many objective signs that indicated significant avalanche danger, including sluffs triggered by the party enroute to the chute, evidence of many very recent natural slides in and around the Alpental Valley, and the avalanche control results reported by the ski patrol in the Snowpack Information section above. Active avalanche control was also performed that morning at the ski area....and the very loud explosions do not go easily unnoticed.

Avalanche and Snowpack Information: Back country avalanche information and forecasts for the time of the incident from the [NWAC](#) are shown below. This also gives a summary of related avalanche and snowpack conditions. The snowpack information contained in the analysis late Saturday morning (day prior to the incident) indicated the dangerous snowpack conditions observed at that time along with the potential for slides running on a recent smooth crust. And in the forecast for Sunday, the forecast stressed that: *"...cold temperatures should slow stabilization of existing wind slabs and help maintain the threat of further human triggered avalanche activity, especially on previously wind loaded terrain showing no evidence of recent avalanche activity"*

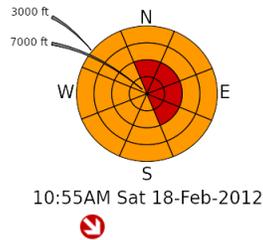
Unfortunately along with great powder conditions, the threat of avalanche activity...and the potential for human triggered slides also increases...especially if deposited over buried weak layers over recent crusts, as was the case near Alpental. During this sad and sobering weekend in the Northwest, human triggered avalanches occurred in many Cascade areas on both the 18th and 19th, with another larger avalanche killing three skiers in the back country just southwest of Stevens Pass Ski Resort (see the associated accident report). Nature is constantly sending out warning messages, and it is up to those venturing into the BC to interpret and act upon them...always assessing the consequences of possible slide release and the ensuing "what if" options of the terrain below...especially if venturing into areas containing terrain traps like cliffs or rock bands.

NWAC Forecast for Feb 18-20, 2012

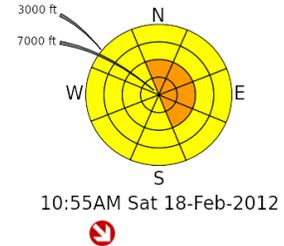
Stevens Pass, Snoqualmie Pass, WA Cascades near and west of crest - between Stevens and Snoqualmie Pass



Danger Rose for Saturday



Danger Rose for Sunday



Danger Rose for Monday

Saturday and Saturday night: Considerable avalanche danger above 5000 feet and moderate below early Saturday increasing into Saturday night and becoming high on lee slopes above 5000 feet and considerable elsewhere...especially on north through east exposures.

Sunday and Sunday night: Slowly decreasing danger expected Sunday except for a slight increase on any slopes receiving sunshine. Danger continuing to slowly decrease Sunday night, becoming considerable on lee slopes above 5000 feet and moderate below.

Monday outlook: Slightly decreasing avalanche danger expected Monday, becoming considerable on lee slopes above 6000 feet and moderate elsewhere. Slightly increasing danger expected Monday night.

Snowpack Analysis

Prior to the recent moderate to heavy snowfall arriving mid-late Friday and continuing Saturday morning, the old snow surface consisted mainly of one of the following:

- generally shallow amounts of recent snow overlying strong near surface melt-freeze or sun crust layers
- shallow wind deposits over an old crust on north through east exposures
- a thin freezing fog or drizzle crust from Thursday night and early Friday (Alpental, Snoqualmie Pass).
- thin wind slab deposits on higher elevation north through east exposures
- shallow settled powder or recycled powder over a firm underlying crust
- some buried surface hoar layers near Stevens Pass (recently unreactive due to burial by several thin crusts)

Increasing moderate to heavy amounts of snowfall at lowering freezing levels and increasing winds were deposited over this variety of pre-existing snow surfaces mid-late Friday into Saturday morning, with up to 12-14 inches of new snowfall being reported as of mid-late Saturday morning. As temperatures cooled during precipitation, a relatively good bond of the moderate to heavy snow accumulations formed with the most of the old snow surfaces below about 5000 feet, and this temporarily helped limit the danger increase associated with the heavy snowfall. However, a gradually weakening bond with increasing elevation above 5000 feet has combined with stronger winds to create increasingly dangerous avalanche conditions on most lee slopes above 5 to 6000 feet and dangerous conditions in most avalanche terrain elsewhere.

Field information from Crystal Mountain early Saturday indicates 4-8 inch soft slabs releasing easily with increasing propagation on either an old crust or previously settled old snow surface, with these slides running far and fast but as of yet only creating relatively shallow debris in the runout. Meanwhile, larger and slightly more sensitive slides have been reported from higher ridges above 5000-5500 ft on morning control at Stevens Pass where slab depths are ranging up to 8-12 inches and some slides are stepping down to facets or surface hoar above an early February crust. Also, increasing winds through the passes are just beginning to make surface snow more cohesive and able to propagate fractures over longer distances.

Detailed Forecasts

Saturday and Saturday night

Relatively strong ridgetop and increasing pass winds, low freezing levels and moderate to heavy snow or snow showers are expected for most of Saturday, with locally heavy snow accumulations likely. This weather should combine to produce a further increase in the avalanche danger as thickening, more cohesive and somewhat brittle wind slabs develop over either the old snow surface or weaker snow layers produced between breaks between showers later Friday night or early Saturday. Some of these slabs may reach 2-3 feet or more by later Saturday and run quickly on an old smooth crust surface. As a result, increasingly dangerous avalanche conditions are expected on lee slopes near higher ridges...especially northeast through southeast exposures where human triggered avalanches should become very likely and where back country travel is not recommended. As indicated earlier, on lee slopes receiving heavy loading, some slides may involve or activate some recently buried weak layers, such as the surface hoar reported about a week ago near Stevens Pass. Also some large and unstable cornice formations are likely near higher ridges, and these overhangs as well as the slopes below should be avoided.

Sunday and Sunday night

Although decreasing light showers and decreasing winds are expected Sunday, cold temperatures should slow stabilization of existing wind slabs and help maintain the threat of further human triggered avalanche activity, especially on previously wind loaded terrain showing no evidence of recent avalanche activity. Also some brief sun breaks should allow for a slight danger increase on more southerly facing slopes receiving sunshine during the afternoon, when recent cornice formations should also weaken. Scattered light showers and relatively light winds late Sunday and Sunday night should allow for a slow decrease in the danger as recent wind slabs slowly settle. However, relatively cold temperatures should make such stabilization a slow process, and may begin to weaken the bond of recent snow to any of several buried crusts.

Finally, in areas experiencing brief partial clearing Sunday night, some surface hoar is likely to form, and this should be closely monitored prior to the onset of light snowfall expected to redevelop on Monday.

Monday Outlook

Light snow showers should briefly develop in the north Cascades and Olympics Monday morning, with briefly increasing light snow expected in the south and central Cascades later Monday morning and afternoon. Along with continued relatively low freezing levels and light winds, light to moderate snowfall accumulations should either maintain existing danger or allow for a slower danger decrease as further shallow soft wind slab deposits are possible. Increasing winds near higher ridgetops...slow warming...and increasing light rain or snow arriving late Monday night may begin to increase the danger by early Tuesday.