Kendall Peak Avalanche Accident—4-9-2010

Central WA Cascades near Snoqualmie Pass

Report prepared by Dan Otter

Date: April 9, 2009
Location: West side of Kendall Peak, approximately 1.75 miles from Snoqualmie Pass
Slope specifics: 5200 ft elevations, NE aspect
State: WA
Country: USA
Fatalities: 0
Slide specifics: 5400 ft, W aspect, SS-AS-R3-D2, 2-3 ft depth by 160 ft across
Summary: 2 skiers caught, partially buried, 1 with minor injuries, 1 with major injuries

Accident Summary: Two skiers from an experienced four-member group were caught in a soft slab avalanche triggered from above. Both skiers were wrapped around trees. One suffered minor injuries. One was critically injured and required helicopter evacuation.

Weather and Avalanche Conditions: The avalanche danger forecast for Friday, April 9th was "High" above 5,000 feet. The danger was downtrending, with an "Avalanche Warning" issued Thursday and forecasted danger decreasing to "Considerable" above 5,000 feet for Saturday. The region received 10-15 inches overnight, accompanied by shifting, downtrending NW-S winds. The storm came in warm and ended cool and calm. Visibility was limited in the morning by a clearing cloud deck around 5,000 feet. Radiation effects increased slightly as clouds cleared through the day.

NWAC Snowpack Analysis from Friday, 4/9/2010

> "Another unseasonably strong cold front crossed the Northwest early Thursday morning, followed by strong westerly flow and moderate to heavy snowfall at cooling temperatures through early Friday. Generally 10 to 20 inches of snow accumulated with the frontal snowfall by early Thursday morning with an additional 10 to 15 inches by early Friday morning. This heavy snowfall along with strong and shifting winds has built increasingly deep and unstable storm slab layers on lee slopes, mainly northeast through southeast facing. This recent weather has also built rather large new cornices along ridges.
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> Some rain and initially warmer temperatures at mid and lower elevations has created a weak crust below the most recent snow.
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> Recent reports from control results yesterday at Alpental and Crystal Mountain indicated that soft slab avalanches were easily ski released and confined to the most recent new snow, generally 1 foot but some pockets to 2-3 feet. Large

cornice control also released slabs on slopes below with pretty good propagation but also confined to most recent snow.

The deep new snow layers should be very susceptible to the destabilizing affects of any sunshine received."

Group Profile: All members were snow professionals with backgrounds as ski patrollers, mountain guides, outdoor educators and avalanche instructors. Each member had logged over 100 backcountry ski days.

Skier 1: Male. 27 years old. Level II avalanche certified. EMT-B.
Skier 2: Female. 26 years old. Level II avalanche certified. Outdoor Emergency Care (OEC).
Skier 3: Male. 26 years old. Level III avalanche certified. OEC.
Skier 4: Male. 28 years old. Level III avalanche certified. EMT-B.

Accident Narrative: The group met at the Alpental Ski Area parking lot around 7:30 am with an ambitious tour plan that would cover close to 14 kilometers. The group's alternate plan was to ski small, treed slopes in the area if they felt the snow was too unstable and the terrain was not manageable.

The group discussed group gear and decided to bring one cell phone, a bivy sack, ski straps for sled construction, a GPS, a small repair and first aid kit.

Twenty minutes into the tour, a member noted that they had neglected to do a beacon check in the parking lot. It was discovered that one of the members had forgotten his beacon so two of the skiers returned to the car to retrieve it. Upon discovering that the beacon was not in the car, they called the other two skiers on their cell phone. The others reported seeing a large, fresh debris pile on Source Lake.

The group decided to move their tour to a different drainage and ski lower angle, lower elevation old growth trees below Kendall Peak. The member without a beacon felt comfortable with this conservative terrain choice. None of the members had significant familiarity with this particular area.

The group followed a fresh skin track and ascended about 1,700 feet over 2 miles that led to the base of the west face of Kendall Peak. Upon reaching the top of the trees, the group decided to continue ascending towards a notch south of the main summit. They ascended a short open slope, which appeared to be protected by a large cliff, and entered another treed section that led to the notch. As they ascended the open slope, two of the members performed hand-shear tests and noted easy results, down 30cm. They shared this information, but agreed that the snow lacked the energy to propagate a failure. In the trees, the snow was heavily wind affected and it appeared the westerly winds had blown the new snow over the ridge onto the east face. Upon reaching the ridge, the group cut a

chunk of cornice onto the steep, wind-loaded east face and observed no results. At this point it was approximately 1:00 pm.

Skiers 3 and 4 expressed interest in exploring the west face. Skier 1 and 2 decided to descend the treed slope they had ascended. There was no discussion concerning how the two groups would interact or communicate.

Skiers 1 and 2 descended one at a time and stopped near the bottom of the trees. Skier 3 traversed the southwest facing shoulder to access the west face and triggered a soft-slab avalanche, 2-3 feet deep and 160 feet wide. The slide ran into the trees below and was funneled by the gully-like terrain shape.

Skier 1 and 2 were swept into trees a few feet apart and partially buried. Skiers 3 and 4 located them by spotting Skier 1's arm waving above the snow. Both victims' airways were cleared within 4-5 minutes.

Skier 2 had minor chest injuries and became a rescuer once excavated.
Shortly after the victims were excavated, a guide who had been traveling in the area with a client contacted the group and offered to assist. He became a valuable member of the rescue party, providing hot liquids and extra warm clothing as well as experience.
Skier 1 complained of difficulty breathing while lying flat and general abdominal pain from trauma. Despite a significant mechanism for spinal trauma, it was decided that breathing and evacuation were the priority concerns. No spinal tenderness or neurological deficits were observed upon assessment. The victim's head was elevated to a comfortable position that allowed for easier breathing. Care was taken to minimize spinal movement as the victim was transferred and secured to an improvised sled.

Rescue: A helicopter rescue was organized via cell phone. An improvised sled was constructed using Skier 1's skis, backpack and poles, the bivy sack and ski straps. Skier 1 was moved out of the trees, downhill 400 feet to a flat, open area appropriate for a helicopter-landing zone. A Sheriff's Department Search and Rescue helicopter arrived on scene around 2:45 pm. Skier 1 was packaged, hoisted to the helicopter and delivered to a waiting ambulance by 3:50 pm.

Skier 1 arrived at the ER about 45 minutes later and was entering late stages of shock from internal bleeding. He is expected to make a full recovery.

Injuries:
Skier1: Fractured pelvis, kidney and spleen lacerations, collapsed lung (hemothorax), rib fractures, ACL rupture, L5-S1 fracture.

Skier 2: Rib bruising.

Avalanche: No crown profile was done, so it is unknown what the failure layer was. The crown is estimated at 2-3 feet deep and 160 feet wide at an elevation of about 5,400 feet.

Accident Reflections: Two key decision points were continuing above the lower trees and the splitting into two groups fro the descent (without discussing specifically how the groups would interact). However, as in all accidents, it was a series of decisions that lead to catastrophe, not just one mistake. Skiing without a beacon was another mistake, for the obvious reasons, but also because it made me doubt any negative intuitive feelings I was having. "Of course I'm spooked, I don't have a beacon"

Not having a tour plan forced us to make all our decisions on the fly, so they were heavily affected by emotion (desire).

Whether we should have continued up to the ridge is a subjective matter. I think that there are a lot of people who have similar risk tolerance levels that would have made the same decision. Others wouldn't even consider it because their risk tolerance is lower. That's personal. Our view of the terrain from below was limited because of our angle and low hanging clouds. From below, you cannot see the slope that slid because it is hidden behind a rock rib. The evidence of wind effect that is obvious from “trumpetsailors” pictures was not obvious that day because of light and clouds.

The slope that slid was perfectly configured to be loaded by WNW winds. It was SW facing and I would venture to say that other SW faces did not see the same kind of loading that day. It was the rib that caused the upper portion of the face to get loaded. Lower down, as we ascended the skier's right side of the trees, the slope had been scoured by the winds.

Regardless, we did go up and we could all have skied the ascent route without incident, though we never would have known that we were sitting in a terrain trap with a sensitive slope above us.

I guess the straw that broke the camel's back was when the goals of the group diverged and our difference in risk tolerance caused us to split up. We had made observations of the snowpack, but were doing a poor job observing ourselves, the human factors.
On the flip side, once shit hit the fan, our experience level as a group was what saved my life. And the fact that we had cell phone service.

Using GPS coordinates, we (when I say "we" from now on, it's referring more to my partners than me, though I was conscious and was an active part of the decision making process) were able to communicate our position. We were told by the SAR/ medics to stay put, they obviously were concerned with spinal injury. Our level of medical training allowed up to make the call that spinal precautions were lower priority than getting me to an LZ and keeping my head elevated so I could breathe (I was bleeding into my chest cavity, collapsing my lung). As guides, we had experience building improvised sleds out of skis, poles, and rubber ski straps.

There is no doubt in my mind, that had we maintained our position and waited for SAR to arrive with a backboard, I would have bled out and died. I arrived at Harborview a little

over three hours after the accident and my pulses were barely palpable, meaning my blood pressure was dangerously low.

I seriously doubt that a normal, recreational group would have been able to pull off this rescue. They might not have continued above the trees either.

Lastly, I want to address the role of luck in this incident. Skier 2 and I were both wrapped around trees not 1 foot apart. She suffered some bruising to her ribs and had some difficulty breathing, but was physically able to be 100% involved in the rescue. I was unlucky, she was lucky. There is no way to predict the outcome if someone is caught in a slide.

I was incredibly lucky we had cell coverage, we had two cell phones, we brought ski straps and a bivy sack (gear we normally don't carry on recreational trips), a guide was in the area with his client and offered to assist, the helicopter could fly (they almost couldn't because of the weather) and that we were in such close proximity to Seattle.
Rant is done. Back to nursing school applications.
Dan

Figure 1. Kendall Peak avalanche slide runout below the trees that the victims were standing when overtaken by the slide.

Figure 2. Fracture line on the west-southwest ridge of Kendall Peak that ran through the tree stand onto the slope below.