

## 2014/12/31 - Colorado - Kelso Mountain

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### Avalanche Details

- Location: Kelso Mountain
- State: Colorado
- Date: 2014/12/31
- Time: 10:02 AM
- Summary Description: One climber, traveling on snowshoes, caught, buried, and killed
- Primary Activity: Climber
- Primary Travel Mode: Snowshoe
- Location Setting: Backcountry

| Number   | Avalanche  | Site  |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Caught: 1</li> </ul>  | <ul style="list-style-type: none"> <li>• Type: HS</li> </ul>   | <ul style="list-style-type: none"> <li>• Slope Aspect: E</li> </ul>                                     |
| <ul style="list-style-type: none"> <li>• Partially Buried, Non-Critical: 0</li> <li>• Partially Buried, Critical: 0</li> </ul> | <ul style="list-style-type: none"> <li>• Trigger: AI - Snowshoer</li> <li>• Trigger (subcode): u -An unintentional</li> </ul>  | <ul style="list-style-type: none"> <li>• Site Elevation: 12200 ft</li> <li>• Slope Angle: 39</li> </ul> |
| <ul style="list-style-type: none"> <li>• Fully Buried: 1</li> <li>• Injured: 0</li> <li>• Killed: 1</li> </ul>                 | <ul style="list-style-type: none"> <li>• release</li> <li>• Size - Relative to Path: R2</li> <li>• Size - Destructive Force: D2</li> <li>• Sliding Surface: 0 - Within Old Snow</li> </ul> | <ul style="list-style-type: none"> <li>• Slope Characteristic: --</li> </ul>                            |

### Avalanche Comments

This accident involved a hard slab avalanche, triggered by a person on snowshoes, small relative to the path, large enough to kill a person, that broke into old snow layers (HS-AI-R2D2-O). The avalanche broke at the top of a layer of 2-4 mm depth hoar grains, less than 30 cm above the ground. The slab averaged 50 cm deep across the crown, with a maximum depth of 100 cm, and was 35 m wide. The top of the avalanche was near a rock outcrop, and slope angles were 39 to 41 degrees. The avalanche ran 200 vertical feet, and the alpha angle for this avalanche was 28°. At its widest, the avalanche was 72 m. The debris was typically 130 to 150 cm deep, with maximum depths around 200 cm. The slope was an east aspect above treeline. This was a Persistent Slab avalanche, with the slab composed of snow drifted by cross-slope winds.

### Weather Summary

A two-week period of dry weather ended on December 13th. Sustained snowfall continued through December 28th. The last snowfall before the accident was 5 inches falling on December 28th. During this 16-day period, the Snow Water Equivalent (SWE) at the Grizzly Peak SNOTEL site increased by 3.9 inches, an increase of 70%. On December 31st, there was 9.3 inches SWE, 124% of the daily median for 1981-2010. The nearby Loveland Pass CAIC weather station reported southwest winds in the 15 to 25 mph range, with gusts up to 42 mph, for the two days preceding the accident. Temperatures were in the single digits on the morning of December 31st. There was no new snow. Winds were consistently out of the southwest to south at 15 to 25 mph, with gusts up to 48 mph. CAIC investigators reached the avalanche about 24 hours after the accident. Southwest winds had drifted considerable snow over the crown and southern flank of the avalanche.

## Snowpack Summary

Snowfall in late October survived dry weather in early November and formed layers of weak faceted snow (depth hoar) on high elevation, shady slopes. In the snow profile CAIC investigators observed on January 1st, the bottom 20 cm of the snowpack was depth hoar that formed during this period.

There were two stormy periods in mid and late November. Winds scoured and drifted the snow above treeline, leaving snow covered areas separated by bare, snow-free ground. The weather was dry and mild for the first two weeks of December. Above treeline, the snow near the surface continued to facet and form a weak layer.

Snowfall returned on December 13th and continued for over two weeks. The winter storms that brought snow to the area also produced strong winds and thick wind drifts. This progression formed very hard (P hardness), strong layers of snow covering the weak, faceted snow.

From December 14th to December 29th, the CAIC recorded 65 avalanches between the two Front Range and Vail and Summit County zones. Thirty-four of the avalanches were above treeline, on north, northeast, east, and southeast aspects. The avalanches increased in size through the period, with all the avalanches recorded after December 21st large enough to bury a person.

## Events Leading to the Avalanche

A party of two climbers met at the base of the Steven's Gulch road near the Bakerville exit on 1-70. The two were acquainted through an Internet forum (14ers.com), but had never met in person. Their goal was to climb Torreys Peak via the Kelso Ridge route. At the trailhead they met a solo climber with a similar goal. They decided to form a group of three. They left the parking area at about 7:20 AM, traveling up the Steven's Gulch road. All three traveled on snowshoes and carried some winter climbing equipment. Climbers 1 and 2 each had an avalanche beacon, avalanche probe, and shovel. Climber 3 was not carrying any avalanche rescue equipment.

At the summer trailhead they crossed the footbridge and began following an existing skin track (an ascending track packed by a person on skis, using climbing skins). Climber 3 had seen a group of skiers leaving the trailhead in the dark and assumed they packed the track, but they did not know if the track was packed that morning. The skin track followed the summer trail and an old road. Although initially it led through low-angle rolling terrain, it moved closer to the steep flanks of Kelso Mountain and under a series of avalanche path as it wrapped around the southeast side.

Climbers 1 and 2 traveled a few hundred feet ahead of Climber 3 as they followed the skin track. Both had completed avalanche training and they discussed their discomfort with the route the skin track took. They discussed leaving the track for the low-angle terrain to the east, but were concerned about the shallow snowpack and deep willows in the middle of the drainage. This could be difficult traveling on snowshoes and they were moving quickly on the skin track as they headed for the saddle between Torreys Peak and Kelso Mountain to begin their climb.

## Accident Summary

Climbers 1 and 2 stopped on the track to discuss their plan immediately before the track led directly under a steep, crossloaded gully. They were increasing uncomfortable with their route and decided to cross the gully one at a time. Climber 1 used the skin track to pass under the avalanche path into a shallow area of snow on the far side. She turned around to spot Climber 2, who had already started to cross the path. Climber 2 was about a third of the way across the path when the avalanche released. Climber 1 watched as Climber 2 was washed downhill in the avalanche. Initially Climber 2 was on top of the debris, but then disappeared from view. He was wearing a large backpack (in excess of 60 lbs) and once the snow was in motion it would have been very difficult for him to get out of harm's way.

## Rescue Summary

Climber 1 turned her avalanche beacon to receive and began searching for Climber 2. She moved to the last place Climber 2 was visible. She yelled to Climber 3, who was about 300 feet away on the trail. Climber 1 followed the radio signal with her rescue beacon, but could not get a reading below 4.9 m. Climbers 1 and 3 cleared some of the loose blocks of snow away from surface and continued searching. They used one shovel, probe pole, and their snowshoes to find Climber 2's arm and from there his head. They performed rescue breaths, but could not revive him. They called 911 (one bar of cell signal) and relayed the details of the accident along with the location to the dispatcher. They left the accident site, breaking a new trail into the lowangle terrain below Kelso Mountain. On the way out, they saw a Flight-for-Life helicopter fly up the Steven's Gulch drainage.

The 911 call center alerted the Clear Creek County Sheriff's Office, who activated the Flight For Life and the Alpine Rescue Team. As part of Flight For Life's Avalanche Deployment Program, the aircraft picked up an avalanche rescue dog, dog handler, and avalanche technician from the Arapahoe Basin Ski Area. The team flew into Steven's Gulch and surveyed the area. The pilot landed in a low-angle area below the avalanche. The search team began searching the debris with the avalanche dog, rescue beacons, and a Recco detector. They found Climber 2 partially excavated and continued to search for other victims. Searchers from the Alpine Rescue Team arrived at the site after speaking with Climbers 1 and 3. With the knowledge that there was only one victim, the search was called off and the search and rescuers focused on extricating

12/20/22, 9:50 PM

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Climber 2 from the debris.