February 19th, 2021 - Idaho - Smiley Creek, Smoky Mountains

Published by the USFS Sawtooth Avalanche Center

Location:

Place	Smiley Creek Drainage, Smoky Mountains
State	Idaho
Date	2/19/2021
Time	Approximately 11:00 AM
Summary	1 snowmobiler caught and killed

Number:

Caught	1
Fully Buried	0
Injured	0
Killed	1

Avalanche Details:

Type	HS
Trigger	AM
Subcode	u
Size - Relative	R3
Size - D Scale	D2.5
Weak Layer	Facets on a melt-freeze crust, buried 1/27/21
Sliding Surface	O - Within Old Snow
Aspect	S
Elevation	9100 feet
Slope Angle	35-38 degree start zone (estimated from mapping program); 25 degree alpha angle
Width	Approximately 600 feet
Depth	3-4 feet
Vertical	1000 feet
Terrain	Planar start zone becoming confined in the track; deep gully in runout zone

Incident Summary:

On Friday, February 19th, a group of 25 experienced snowmobilers met at the Smiley Creek Lodge for a day of riding. The group was visiting from out of state, and this was their first day of riding in the area this season. Several members of the group had ridden in the same area in previous years. The group carried avalanche rescue gear, and some were wearing airbags. The riders stated that some members of their group had checked the forecast that morning and believed the danger was rated MODERATE (Level 2 out of 5). The avalanche danger was actually rated CONSIDERABLE (Level 3 out of 5) on upper elevation slopes where they were riding.

The group left the parking lot around 9:00 AM and rode up the Smiley Creek drainage toward their destination. They spent some time riding in the open meadows along the way but were focused on

riding towards the back of the drainage. After arriving at the base of the area where they intended to ride, some members of the group began climbing higher up onto the slopes above. They climbed to a high bench at 8,300' and were highmarking a small slope above this bench (Figs. 1 and 2).
One rider continued beyond this slope, climbing upwards and across the slope to his left, riding below a line of mature trees. The rider's track continued past this line of trees into more open, steeper terrain where he triggered a very large avalanche (Figs. 2-4). The other members of his group did not see him trigger the avalanche, but one of them saw the avalanche running and alerted the other members of the party via radio.

The victim deployed his airbag and was carried at least 400 vertical feet downslope. He was visually located on top of the debris (Fig. 8) by his riding partners. They were able to reach him within minutes. His partners determined that he died as a result of trauma incurred during the avalanche and did not attempt resuscitation.

Avalanche and Terrain:
The Smiley Creek drainage in central Idaho's Smoky Mountains is a popular snowmobiling area accessed by riding 8 miles up a summer road from the Smiley Creek Lodge parking area (Fig. 1). The incident occurred in a defined avalanche path that faces south through east in sparsely-treed, subalpine terrain. The top of the path is an exposed ridge crest that is regularly wind-loaded. The path feeds into a deep gully that eventually intersects with the summer road. There have been no other recorded avalanche fatalities in the Smiley Creek drainage.

The persistent slab avalanche was classified as HS-AMu-D2.5-O. It released on the looker's right, south-facing portion of the starting zone at 9100' in elevation, fractured 3-4 feet deep and approximately 600 feet wide, and ran 1000 vertical feet (Fig. 3). We did not access the top of the starting zone to measure slope angle, but it is estimated to be 35-38 degrees based on mapping tools. The starting zone is an open, relatively planar slope, covered in grass, sage, and talus (Fig. 5). There are a few trees in the center of the starting zone, and the slope angle increases immediately below as the path feeds into a deep gully.

The debris piled up in the gully to an estimated 20-30 feet deep over a length of at least 700 feet (Fig. 6). The victim was located on the surface of the avalanche debris. Unfortunately, the victim was carried into trees along the edge of the gully, resulting in traumatic injuries. His helmet was pulled off during the avalanche and was not recovered. The victim's sled could not be located and is assumed to be completely buried.

The afternoon of the incident, USFS Sawtooth Avalanche Center staff visited the site. A summary of this initial visit can be viewed on YouTube.

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Snowpack and Weather:

On January 12th and 13th, a strong storm brought heavy snow and warming temperatures to the western Smokys. Sunny skies and warm temperatures from January 14th-16th created crusts on south-facing slopes. The following 10 days were cold and dry with the exception of a small storm (0.2" SWE) on January 21st. This small amount of snow faceted, forming the persistent weak layer on which this avalanche failed.

This crust/facet layer was buried on January 27th, and storms from this day through February 7th dropped an estimated 40" of snow (3.3" SWE) at the Vienna Mine SNOTEL (located 1 mile SW of the accident at 8,960') (Fig. 9). A few natural avalanches on solar aspects that likely failed on this crust/facet layer were reported on January 30th and February 16th, but natural and human-triggered slides were more common on shadier aspects where the January 27th interface consisted of surface hoar and/or near surface facets.

Starting February 11th, a moist northwest flow brought light to moderate wind and steady snowfall to the area. Snowfall was recorded on each of the 8 days prior to the accident, totaling 2.8" SWE over the period. The Upper Vienna station (located 1.5 miles SW of the accident at 9,600') recorded wind speeds averaging 5-15 mph from the NW-W-SW with gusts between 25 and 50 mph. The strongest recorded wind blew from the SW-WSW-W. A small storm arrived the afternoon before the accident. The wind blew 14-18 mph gusting 20-35 mph from the W-S-SSE, and the Vienna Mine SNOTEL recorded 0.3" of SWE. On the morning of the accident, snowfall had diminished, the wind blew lightly from the W, and temperatures were in the low 20s F. Squally weather brought a mix of mostly cloudy and obscured skies with periods of light snowfall.

The very top of the avalanche accident start zone was a defined ridge crest that had been loaded by the wind events in February. Evidence of more subtle cross-loading lower in the start zone can be seen in the photos. During the site investigation, the surface conditions consisted of low-density new snow that was relatively unaffected by the wind.

Sawtooth Avalanche Center staff performed a crown profile in the lower flank of the avalanche, approximately 700 vertical feet below the highest point of the crown (Fig. 10). Although portions of the crown appeared thicker near the top and under cliffs, we believe the fracture layer is the same as where we performed the profile. We found the January 27th crust/facet layer buried beneath a 3-foot thick slab ranging in hardness from F at the top to harder than 1F above the weak layer (Fig. 11).

Discussion:

All of the fatal avalanche accidents we investigate are tragic events. We do our best to describe each one to help both the people involved and the community as a whole to better understand them. We offer these comments in the hope that it will help people avoid future avalanche accidents. We do not

intend to place any blame on the involved parties or to imply that any particular action or decision caused or would have prevented this tragic event.

- **Avalanche Forecast**: The Forecast rated the Avalanche Danger as CONSIDERABLE (Level 3 out of 5) for the upper elevation terrain where the incident took place. The *Bottom Line* read: *"Continued snowfall and moderate winds have created dangerous conditions. Human-triggered avalanches and sensitive cornices are likely at upper elevations. You can reduce your risk by steering clear of steep slopes with drifts or stiff snow near the surface."* The party stated they checked the forecast but thought the danger was rated MODERATE (Level 2 out of 5).
- **Terrain:** Skilled motorized users can move through different types of terrain very quickly. In the span of less than a minute, the victim moved from low-angle, sheltered terrain to a large, upper elevation, wind-affected starting zone above highly consequential terrain. Intentional terrain selection is important during periods of elevated avalanche hazard, particularly when dealing with persistent slab instabilities. The terrain in the track and runout zone of this particular avalanche path is unforgiving; the avalanche moved through trees at a high rate of speed, and the deeply inset gully collected 20-30 feet of debris in the terrain trap. We encourage riders and skiers to recreate in "high stakes" avalanche paths like this *only when the avalanche danger is minimal.*
- **Group Management:** Managing a very large group in the backcountry is difficult at best. Critical components of backcountry safety—such as planning, communication, and terrain management—can easily break down. In this accident, it remains unclear whether the victim discussed climbing to the top of that slope before doing so.
- **Airbags:** The victim deployed their airbag and was found on the surface even though this was a very large avalanche that carried him into a gully where debris piled up 20-30 feet deep. His snowmobile remains missing as of February 24th, 2021. This incident supports the concepts that airbags may reduce the chances of burial or burial depth but are not reliably effective at preventing trauma due to striking trees or rocks.

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Attachments:

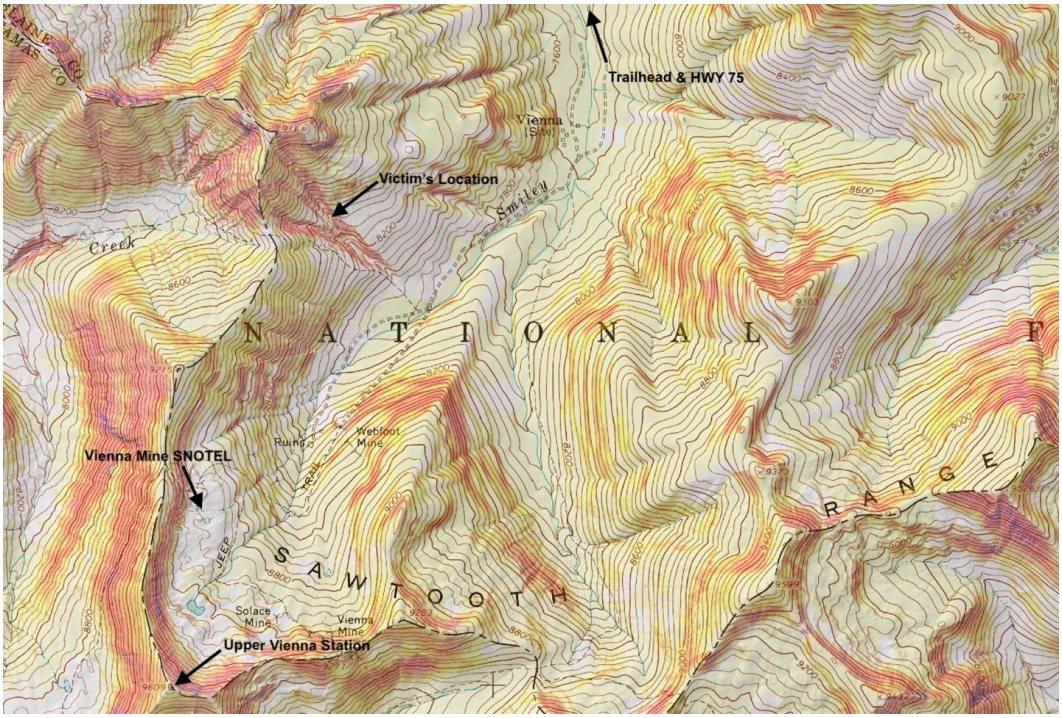


Figure 1. *Avalanche fatality site location in the Smiley Creek drainage. Despite the "Sawtooth Range" label on the map, this area is usually considered part of the Smoky Mtns.*

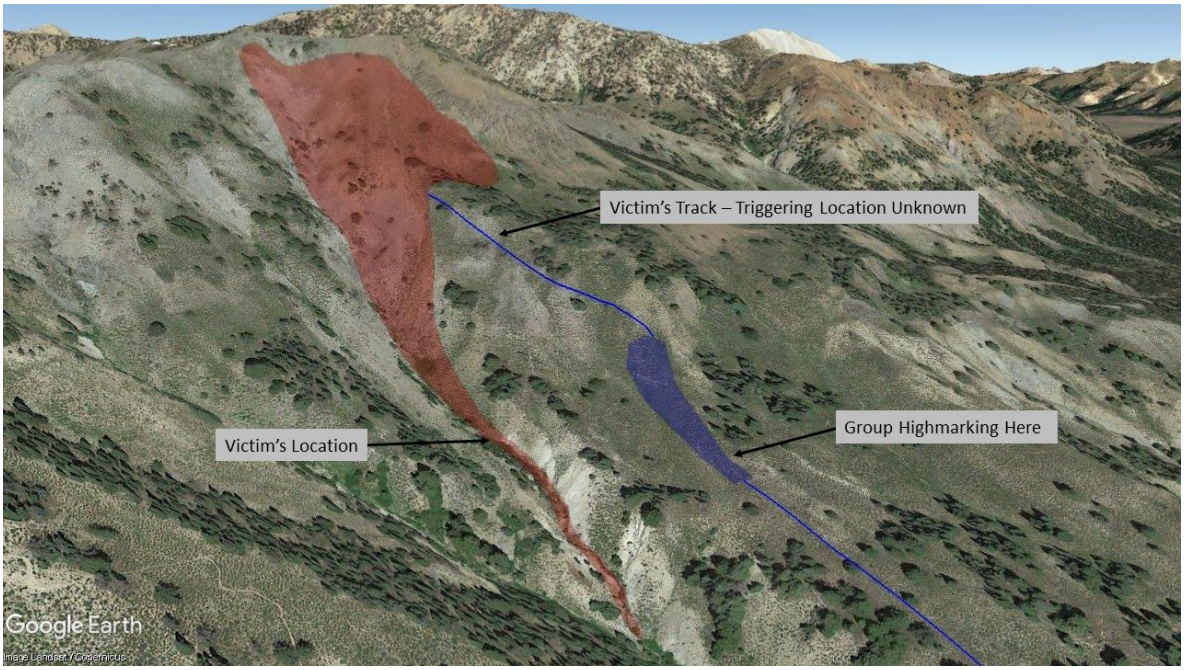


Figure 2. *Google Earth overview of avalanche and victim's location.*

Figure 3. *Overview of avalanche showing initial play area, entrance track, and the victim's eventual location.*

Figure 4. *View of avalanche starting zone and entrance track.*

Figure 5. *Looking up to the starting zone from the gully. Sections of the gully sidewall also avalanched. Crown profile was performed in the rightmost section of the lower crown/flank.*

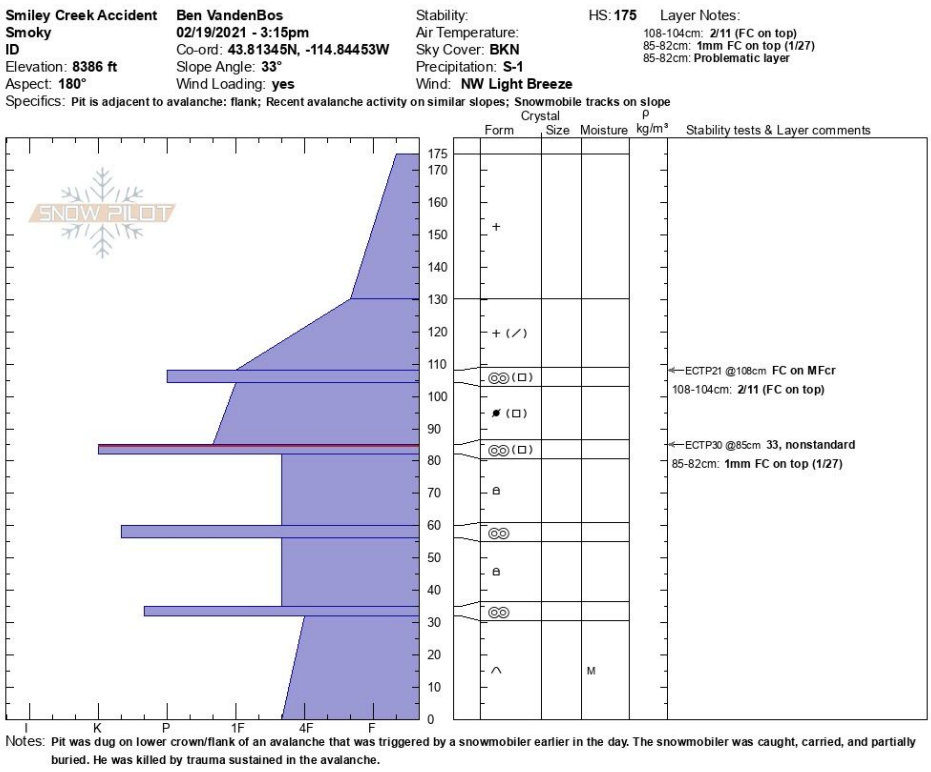
Figure 6. *Avalanche debris piled up in the gully to an estimated depth of 20-30 feet.*

Figure 7. *Looking down the path from the start zone.*

Figure 8. *The victim's final location.*

Figure 9. *Weather data prior to the accident (taken from the Vienna Mine SNOTEL and Upper Vienna stations).*

Figure 10. *The crown at the lower flank was 3 feet thick. The crown profile was performed at this location, approximately 700 vertical feet below the top of the avalanche.*



Figures 11. *Crown profile performed several hours after the incident.*