



AAC Publications

Deeply Buried Weak Layer – Familiarity Heuristic

Colorado, Park Range, North Fork of Fish Creek

On March 19, 2022, two backcountry skiers planned a trip to an area locally known as the Dome in the North Fork of Fish Creek, about eight miles east of the town of Steamboat Springs. Skier 1 arrived at the Dry Lake trailhead around 8:30 a.m. While he waited for Skier 2, he read the Colorado Avalanche Information Center (CAIC) forecast and noted that it listed a persistent slab avalanche problem in all elevation bands on northwest, north, northeast, and east-facing aspects. He then made a quick ski run on a low-angle, west-facing slope near the parking lot. He felt the snow was stable in this area.

When Skier 2 arrived, the two unloaded snowmobiles and rode east up County Road 38 for about 11 miles to Buffalo Pass, then continued toward the Dome and parked their snowmobiles. Skier 2 had been in the area many times and took the lead as they skinned across three small knobs to reach the spot where Skier 2 planned to descend into the North Fork of Fish Creek.

Starting first, Skier 2 descended 100 to 200 vertical feet on a treed slope and waited for Skier 1. They did not see any cracking in the snow or hear any whumping. The two traversed eastward until they were above a steeper, sparsely treed part of the slope. During the traverse, Skier 1 pushed with his downhill ski to see if he “could get snow to move.” He saw no indications of unstable snow.

Skier 2 headed down into the steeper, more open area while Skier 1 waited. After Skier 2 made one turn, the whole slope dropped, making a large whumpf. Cracks shot out around Skier 2 as the avalanche broke two to three feet above him. The moving snow swept him down the hill and out of sight.

Skier 1 turned his transceiver to receive before the avalanche came to a stop. He could see rocks in the spot where Skier 2 triggered the slide, and he picked his way down through them and over a rollover until he could see Skier 2 pinned against a tree with his back facing uphill. Snow had piled up behind him, and he was not moving.

After clearing snow out of Skier 2’s mouth, Skier 1 gave him rescue breaths, but the patient did not respond. Skier 1 called 911, cleared the avalanche debris from Skier 2’s back to create a flat spot, and began CPR, which he continued for about an hour without success. Routt County Search and Rescue and Classic Air Medical responded, and Skier 1 was evacuated by air. Skier 2’s body was recovered the following day.

ANALYSIS

This was a soft slab avalanche, small relative to the size of the path, that released on a 40° northwest-facing slope. The avalanche broke on a persistent weak layer of faceted crystals buried 18 to 28 inches deep, in the middle of the snowpack. Snow layers this weak are not common in the Park Range, and it is especially unusual to see a layer this weak—this deep in the snowpack—and still reactive in mid-March. However, the danger posed by this layer was well documented in the avalanche forecasts and reports of avalanche activity in the Steamboat and Flat Tops zone; one week earlier, a snowmobiler triggered an avalanche that broke on the same weak layer, 40 miles to the north, with fatal consequences.

Skier 2 had many years of experience in the Park Range and skied in and around the Fish Creek drainage with some regularity. We will never know his decision-making process on the day of the accident. However, people's tendency to rely on familiar places and situations to help them make decisions is well documented (Herbert, 2010). When we are accustomed to behaving in a certain way in a certain area, it can be very difficult to recognize unusual conditions and change our approach.

Modern avalanche safety courses teach a trip-planning process that includes using the avalanche forecast to determine the type of terrain you want to avoid, then reviewing your route to ensure it keeps you away from the dangerous areas. On the day of the accident, the two skiers did not discuss the avalanche forecast or the details of their plan before departing the trailhead. Skier 1 knew the forecast warned of persistent slab avalanches on northerly slopes; however, although he knew the general destination for the day, he did not know the terrain well enough to match it with the information in the forecast and decide in advance if their route was appropriate.

Persistent slab avalanches are difficult to predict and are especially dangerous when they do not provide the feedback we expect, like cracking and collapsing in the snow. The best strategy during these periods is to use the avalanche forecast to identify terrain features where this type of avalanche is possible and avoid them. (Source: Colorado Avalanche Information Center.)

Read the complete avalanche center report.

Images



Aerial image of avalanche start zone in the North Fork of Fish Creek, Colorado. Arrow indicates the track of Skier 2. The circle is where Skier 2 likely triggered the avalanche

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