

Mount Jumbo Avalanche Accident
Missoula, Montana

Date: 2014-02-28

Submitted By: Steve Karkanen, Director, West Central Montana Avalanche Center (WCMAC)

Location: Mount Jumbo, City of Missoula Conservation District Open Space Land (inside Missoula City Limits)

State: MT

Country: USA

Fatalities: 1

Injuries: 2

Summary: 1 snowboarder caught and self arrested, 1 child caught and partially buried, 1 child caught and fully buried, recovered with injuries, 2 residents fully buried and recovered with injuries, 1 later died from injuries.

Classification: HS-ARu-D3.5-R4-S,O

Coordinates: N 46.8739 X W -113.9639 (at mid-crown)

*** FULL REPORT FROM THE WCMAC ***

View report and photos online at: www.missoulaavalanche.org

SYNOPSIS

On February 28, 2014 at approximately 1615 hrs, a snowboarder triggered a hard slab avalanche on a west facing, 35 degree slope of Mount Jumbo, located within the Missoula City limits on Missoula Conservation District land.

The snowboarder was caught by the avalanche but able to self arrest by digging in with the edge of his board and using his arms and fingers to grab the bed surface as the snow passed by.

The avalanche entrained most of the available snow in the fetch zone and accelerated as it advanced over a terrain convexity halfway down the track.

At the base of the ravine, the avalanche caught two children, Phoenix and Coral Scoles-Coburn, ages 8 and 10, who were playing in their backyard as it slammed into and destroyed a two story wood frame home. The two residents of the home, Fred Allendorf, 66, and his wife Michel Colville, 68, were inside the house when it was hit.

The two children saw and heard the avalanche coming down the ravine and ran downslope toward their home. Both were caught and carried several feet before coming to rest next to their home. Coral was partially buried, up to her armpits, and was able to dig herself out quickly. Phoenix was completely buried next to the house about 3 feet deep.

Fred and Michel were together in their home and were also completely buried under several feet of snow and debris from their destroyed home.

At 1618, Missoula City Fire, Police, Missoula County Sheriff, MT Highway Patrol units and local EMS teams were dispatched. A large contingent of well equipped neighbors with avalanche rescue gear soon began arriving on scene.

Rescue coordination was complicated by live power lines, broken natural gas lines and the very real possibility of another avalanche. The crown was not visible from the valley floor due to the mid-slope convexity and extreme weather that blocked visibility.

Spot probing began and a probe line formed near the home just below Phoenix's last seen point. Phoenix described being in the dark and unable to move his arms after being buried. He stated that he tried eating and chewing away at the snow until he became so tired that he fell asleep.

He was located 3-4 feet deep by a probe strike after approximately 55 minutes at 1709 hrs. When extricated from the snow, he was unresponsive. Rescue breaths were given and he was immediately transported by ground ambulance to Saint Patrick Hospital's Emergency Department.

Rescue efforts then concentrated on spot probing and digging in areas directly below the last known location of Allendorf and Colville. A neighbor showed rescue teams the probable location on the remaining foundation of where the couple may have been on a Friday afternoon.

Probe teams were directed to concentrate on possible catchment features on the fall line below this area of the house. A probe strike was confirmed and Allendorf was located at 1758 hrs in a cavity under a brick chimney and a wall or roof partition approximately 4 feet deep. He was responsive and able to inform rescuers that his wife was 3 feet from him when the house was hit.

He was extricated and transported by ground ambulance to Saint Patrick Hospital's Emergency Department.

At 1907 hrs, Colville was located by a responding neighbor with a probe. An earlier probe detected a soft spot where a sofa was removed. This location was re-probed after a few minutes and a probe strike confirmed as Colville. She was approximately 25 feet below her husband's location 2-3 feet deep.

Colville was breathing but unresponsive. Extricated at 1914 hrs, she was transported to Saint Patrick Hospital's Emergency Department in critical condition. She died on March 3 from traumatic injuries.

Three other homes, several vehicles and an apartment building were also damaged by the avalanche.

Events leading up to the avalanche

4 friends, ages 13-27, wanting to take advantage of a rare day when schools were closed, decided to snowboard or ski the untracked west face of Mount Jumbo. Earlier storms had deposited enough snow on the low elevation terrain in the mountains surrounding Missoula to allow for unique skiing and riding opportunities within walking distance of many residents. Near record snowfall was recorded by NOAA Weather Service Missoula Office at the Missoula airport during February. Mount Sentinel, above the University of Montana and south of Mount Jumbo, had been skied and ridden earlier in the week and was heavily tracked.

The friends met at a home in the lower Rattlesnake and opted to hike Jumbo since Sentinel had already been tracked up. 1 person had a snowboard available, the others took small plastic sleds. Their intention was to hike to the summit, ride down the untracked west face, walk back to the same home where they planned to take a shuttle vehicle to the trailhead to retrieve their first vehicle.

None of the group has any previous avalanche training or carried rescue equipment and have no applicable winter backcountry travel experience beyond in-bounds skiing and riding at the local resorts. They carried a small shovel with them in case one of their vehicles got stuck.

They parked at the Poplar Street trailhead and initially followed the trail system part way up the mountain until they lost the trail in the new snow. The snowboarder described having to break through several drifts where the historic shoreline created small lee zones but no signs of instability such as collapse noise or fracture propagations. They made their way up the southwest face, avoiding the deeper pockets of snow and eventually found bare ground making it easier to hike.



Google Earth View of Mount Jumbo

The wind was making travel difficult with the snowboard acting like a sail so at about the halfway point, the group split with the 3 sledders continuing toward the summit. (see figure 1)

The sledders planned to hike to the summit and meet the snowboarder at the base of the mountain. They all described the wind as severe at the ridge top with poor visibility from the blowing and drifting snow. The snowboarder was several hundred feet behind the sledders when they began their descent next to a large group of trees. (**Note:** The actual descent route of the sledders has not been confirmed as of 5/13/14. The information shown on the map is based on a personal conversation with the snowboarder and a telephone conversation with one of the sledders.)

The snowboarder reached a point above the slide path and opted not to push toward the summit as the wind was making travel difficult at best. He strapped on his board, entered the slide path at the highest point where there was adequate snow, and immediately fell. He got back up and noticed movement in his peripheral vision and realized he was being carried downslope by an avalanche. He was at the top of the slab and able to self arrest by digging in with the edge of his board and using his arms and fingers to grab the bed surface as the snow passed by. A terrain convexity prevented him from seeing where the avalanche stopped.

The sledders were near the base of the mountain to the north of the slide path. At least one of them saw a powder cloud and heard the avalanche slam into the home. They immediately went to the site and began digging for the buried child. Shortly after this the snowboarder walked down

the slide path and also assisted with the initial rescue effort. All 4 left the scene after talking with responding police officers and were later interviewed by Missoula City Police detectives at the Police Department.

Avalanche Classification: HS-ARu-D3.5-R4-S,O

Description:

HS: A hard slab avalanche.

ARu: Triggered unintentionally by a snowboarder.

D3.5: The destructive force (D) destroyed a house, several cars and damaged several other structures.

R4: The avalanche was large but did not involve the maximum area.

S,O: A surface wind slab initially released at the recent storm snow interface and stepped down to the ice crust at ground level.

Avalanche dimensions

Coordinates: N 46.8739 X W -113.9639 (mid-crown)

Aspect: 294 degrees

Crown elevation: 4480 feet

Terminus: 3280 feet

Vertical drop: 1200 feet

Crown width: 658 feet

Depth: 2.5 feet, Max: 4 feet

Average depth: 3 feet

Slope steepness at crown: 38+ degrees

Average: 35

Distance from crown to terminus: 2200 feet

Average slope steepness: 35 degrees

Maximum steepness at convexity: Estimated at 40 degrees

Alpha Angle at terminus: 30 degrees

Weather and Snowpack

Near record snowfall amounts were recorded in the Missoula Valley during the week before the avalanche. On February 24 and 25, skies cleared and temperatures moderated.

Temperatures above freezing and several hours of sun melted down most of the mountain's snow which then froze hard as temperatures plummeted with the arrival of an arctic air mass.

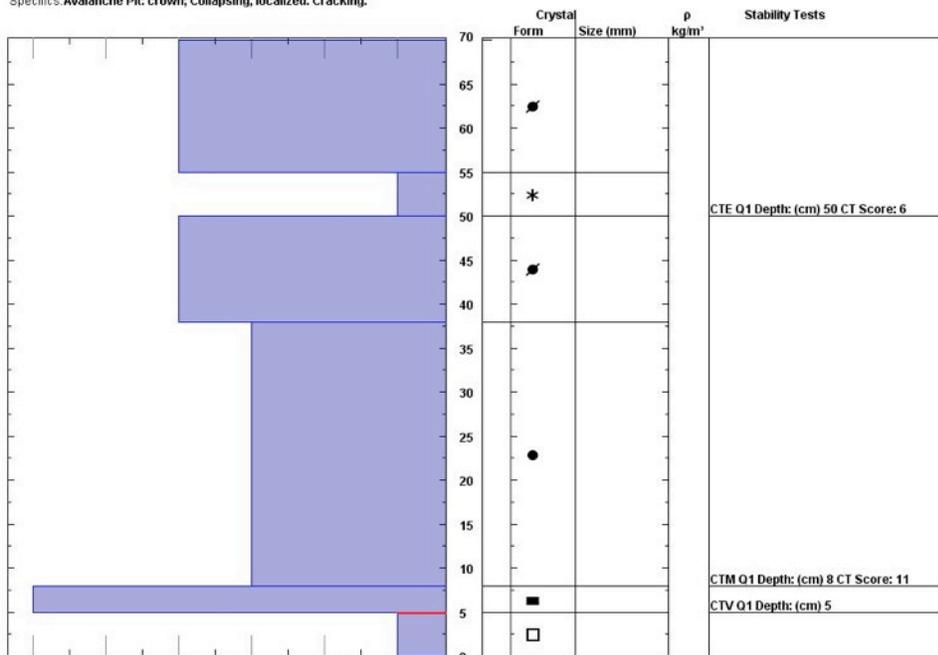
A rare blizzard warning was issued for Missoula with several inches of snow and high east winds forecast for the area. By the afternoon of February 28, the area received several inches of snow and strong east winds loaded fetch zones high on the mountain. Turbulent winds also heavily cross loaded the ravines leading to the valley floor. The high wind formed sensitive wind slabs on what under normal conditions is a wind scoured slope.

On Sunday, March 2, avalanche specialists Dudley Improta and David Williams, from the West Central Montana Avalanche Center in Missoula were given special permission to enter the Mount Jumbo closure area to conduct a stability assessment of the avalanche path and adjacent terrain.

As they travelled to the site, they reported localized collapsing, whoomping and fracture propagations in pockets of wind drifted snow. They were careful not to cross any snowfield that connected to steeper terrain. They were able to walk on bare ground for much of their tour.

At the crown, they found a weak snow structure (see profile) with a pencil hard wind slab overlying a fist hard layer of cold snow sandwiched between the hard surface layer and a pencil to 1 finger hard slab on top of the ice layer that formed during the sunny warm days earlier in the week. Large facets were at ground level.

Snow Pit Profile Observer: **Dudley Improta** Stability on similar slopes: **Poor** Stability Test Notes: Layer notes:
Mt Jumbo **Sun Mar 02 12:00:00 MST 2014** Air Temperature: **-10 C** **5: Separate test** **0-5: Problematic Layer**
Rattlesnakes, MT Co-ord: **46.52387 N 113.57908 W** Sky Cover: **sky 8/8 covered**
Elevation (ft) **4400** Slope: **30** Precipitation: **Snow < 0.5 cm/hr**
Aspect: **308** Wind loading: **yes** Wind: **NE Moderate**
Specifics: **Avalanche Pit: crown: Collapsing, localized. Cracking.**



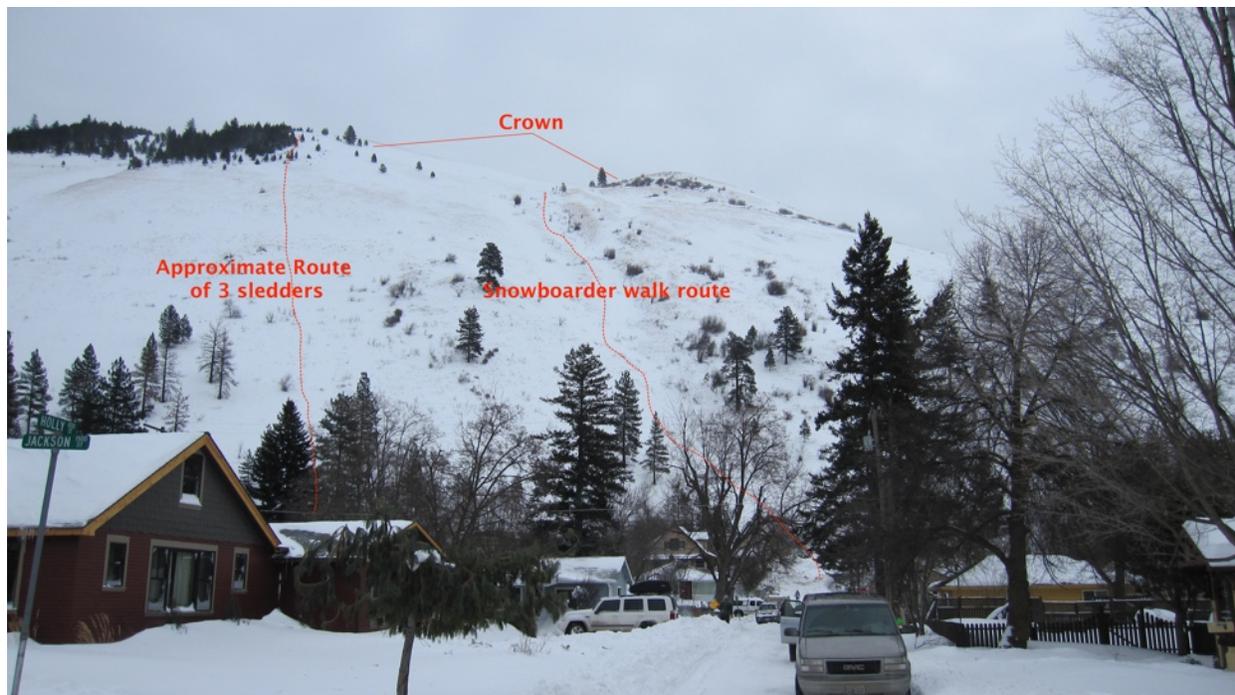
Notes: Pit dug in very left (looking down the path) edge of crown of the Mt Jumbo avalanche in Missoula that took place Feb. 28.

Snow Pit Profile (crown profile) March 2, 2014

Considering the crown profile, the description of how the avalanche was triggered and other observations made by Improta and Williams, we believe the snow initially failed on the pencil hard wind slab then stepped down to involve the remaining slab to the ground facets/ice layer.

This is a complex accident investigation involving multiple agencies and witnesses.

The American Avalanche Association's Avalanche Accident Report Long Form will be submitted to the National Avalanche Center and Colorado Avalanche Information Center once our findings are complete. Please direct any questions to info@missoulaavalanche.org.



View from Jackson and Holly Street Intersection



View of the starting zone



View of the crown and upper path



Looking downslope from the foundation of the destroyed home



Terminus of the path at the Intersection of Holly and Van Buren



Dudley Improta conducting crown profile on March 2



View of fetch areas and ravines on Mt Jumbo