Dude Mountain Avalanche – Accident Report
Ketchikan, Southeast Alaska

Location: Dude Mountain NW Bowl (5 ½ miles due north of Ketchikan, Alaska)
Lat/Long: 55.41862° N, -131.61829° W (WGS84) – burial site

Date: February 25th 2018
Time: 12:15-12:20pm

Report By: Mike Janes (SEADOGS) with Shawn McAllister & Ian Clarke (Ketchikan Volunteer Rescue Squad) and Pat Dryer (Juneau Mtn Rescue), with invaluable help from Rider 2.

Contact: Mike Janes michael.janes@aelp.com

Synopsis
Two snowboarders were caught in an avalanche on the NW aspect of Dude Mountain (5 ½ miles due north of Ketchikan, Alaska); Rider 1 was fully buried and Rider 2 was caught but able to ride out of the slide. Rider 1 descended the slope and stopped approximately 400 vertical feet out of view of Rider 2 below a convex rollover. After at least one minute, Rider 2 descended behind Rider 1. While descending, Rider 2 saw the slide release around and above him. He was caught but remained upright and was able to ride out of the side. Rider 1 was buried 110-130cm deep and around a tree. It is unclear if the slide was triggered by Rider 1 while stepping out of his splitboard (found 400’ below burial site and still in ride mode) or by...
Rider 2 while descending the slope. Rider 2 conducted a beacon search and was able to get a signal but after 1-1.5hrs of digging was unable to locate Rider 1. Search efforts were hampered by elevated avalanche hazard and weather. When the weather improved on March 1st, the body of Rider 1 was located and recovered by a rescue team (KVRS, JMR, SEADOGS) at ~3:45pm.

**Avalanche Details**

*Photos of the avalanche and snow profile are at the end of this report.*

**Avalanche Code**

SS-ARu-R2-D2-O

**Trigger**

Unknown; either by Rider 1 stepping out of his board or Rider 2 descending.

**Aspect**

Northwest

**Angles**

- Runout Angle – 38° (*estimated w/ Google/topo*)
- Runout Angle to burial site – 34° (*measured*)
- Start Zone Angle Avg – 40° (*measured*)
- Start Zone Angle Max – 43° (*measured*)

**Elevations**

- Crown – 2200’ (*measured*)
Burial location – 1800’ (measured)
Debris toe -- ~1400’ (estimated from Google/topo)

Avalanche Dimensions

- Crown width -- ~350’ (estimated with Google)
- Crown depth -- 40cm avg, max 60cm (from Rider 2- crown filled in on 3/1)
- Vertical runout (rise) – 900’ (estimated from Google)
- Horizontal run – 1138’ (estimated from Google)

Weak Layer – Near surface facets

Debris Depth – 120-160cm at burial location (HS in undisturbed snow was 180-200cm). Debris plus snow totaled ~300cm at burial site.

Accident Summary

On February 25th one splitboarder (Rider 1) and one solid boarder w/ Verts (Rider 2) accessed Dude Mountain via Revilla Rd (vehicle access) to Brown Mountain Road (snowmachine access). Riders 1 & 2 used snowmachines to access the Dude Mountain summer trailhead via Brown Mountain Road. From the summer trailhead Rider 1 travelled on a splitboard and Rider 2 travelled with Verts up Dude Mountain. The winter access is similar to the summer trail access with the goal of gaining the north ridge of Dude Mountain. Both riders ascended together until reaching the “Lunch Tree” where they took a break. The Riders then made their way up the ridge to near the summit where they dug a snow pit to check snow conditions. Here they found ~10-15cm of soft wind affected snow on top of a hard crust. No significant shears were noted while conducting an AK Block (non-cutback) test.

After digging a pit near the summit the Riders took a break because the clouds, wind, and snow were moving in and out reducing visibility. After a 20 minute wait for the clouds to clear and visibility to improve, both Riders took their first run. The Riders descended one at a time from near the summit of Dude Mountain, following a subtle terrain feature that crosses the bowl in a skier’s right traverse. They then stopped and met up almost fall line from the “Lunch Tree” and took their own respective uptracks back to the Lunch Tree. From the Lunch Tree they both took their original uptrack to the top of Dude Mountain again.

The second run took them fall line from the summit to an island of trees where they met up before continuing the descent. The snow on the first leg of the second run was shallow wind affected snow on top of a crust; Rider 2 later noted that on some turns he could feel the crust. From the island of trees they discussed that Rider 1 would descend while Rider 2 gave him a 40 second count before descending. After Rider 1 dropped in, Rider 2 gave him a solid 1 minute count before dropping in.
When Rider 2 was descending the convex rollover, he observed shallow cracks out in front of him and heard Rider 1 shout something. Rider 2 was quickly engulfed in moving debris up to his knees. Debris released not only in front of him but also above him (and well behind him). He kept his speed up and with difficulty was able to ride out of the avalanche on the skiers left flank between some stands of trees. He watched as the slide continued for 5-10 seconds churning and jumping into the air off terrain features. At this point Rider 2 called for Rider 1 repeatedly but heard no reply.

Both riders had 13-15 years of backcountry experience in avalanche terrain and were advanced snowboarders. Both Riders had taken a Recreational Level 1 avalanche training in the past. Rider 2 also had taken additional refresher courses. There is not an avalanche center nearby so there was not an avalanche forecast to check (or alpine weather stations) before heading into the backcountry. Rider 2 had previously lived in Colorado and while there, utilized backcountry avalanche forecasts for information. Both riders were equipped with avalanche beacons (both turned on), probes and shovels. This was the second time these two riders toured in the backcountry together. Rider 1 was a long time local and spent a lot of time touring in the region. Rider 2 was newer to the area but had snowboarded and snowmachined all over North America including Alaska.
Rescue Summary

Feb 25th 12:15-12:20

Immediately following the avalanche Rider 2 checked that he did not have a cell signal (to call for help), then turned his beacon to search and began a signal search of the debris. He descended in search mode until he came to the edge of a 300’ cliff band. At the edge of the cliff Rider 2 reassessed the scene and began to ascend back up the slope searching further to the skiers right side of the debris. Not long after ascending he picked up a beacon signal from Rider 1. He followed this signal to a location near a tree and was able to pinpoint to 1.4-1.5 meters with his beacon. He had difficulty getting a probe strike so began to dig. Rider 2 dug 4 holes around the tree; one uphill, one downhill and two off to the side of the tree. While digging at the burial site the smallest beacon signal he noted was 1.1 meters. Rider 2 dug for between 1-1.5 hours and was unable to locate Rider 1. At this point Rider 2 began to suffer from severe cramping and was unable to dig any longer. Rider 2 then proceeded to hike up the bed surface (which he later noted as smooth and icy) to gain the north ridge of Dude Mountain and go for help. He exited the avalanche at the east flank, close to the crown, and noted that the flank depth was nearly up to his knee. It took him 1hr 30min – 1hr 40min to hike out and 15-20 minutes to snowmachine down the trail to his vehicle. Rider 2 arrived at the truck at approximately 4pm but kept riding the snowmachine back down the road to town and called for help. The State Troopers were notified at 4:18pm. Due to darkness and the time of day, Ketchikan Volunteer Rescue Squad was unable to respond that night.

Feb 26th

Ketchikan Volunteer Rescue Squad (KVRS) team members were dispatched in two groups via helicopter to the summer trailhead (8:41am and 9:05am). The rescue team was able to ascend the route but encountered heavy snowfall and strong winds (50mph) in the alpine. Just below the “Lunch Tree” on the fringe of the upper bowl the team of four dug a snow pit and noted poor test results within the newer storm snow as well as older persistent layers (all above the crust/bed surface). Shovel shear, compression test, and extended column tests all showed Q1 shears at the persistent interface. The team then determined it unsafe to descend the main bowl and instead attempted to work the lower angle terrain adjacent to the main bowl. They were able to descend a couple hundred feet further with the goal to try to get a beacon signal. A weak signal was heard, but later determined to be a “ghost” signal resulting from cell phone/radio interference. Due to poor visibility a crown from the avalanche was not located. At this point, due to safety concerns the KVRS team returned to the ridge and descended to the summer trailhead for snowmachine pickup (2:39pm) and returned to town. During their time in the alpine (~3 hrs) an additional 6-8” of new snow was noted in their skin track.
Feb 26th through Feb 28th

Poor weather forced KVRS to suspend flights or ground searches.

March 1st

Around 9am, a Temsco flight passing by Dude Mountain was able to locate Rider 1’s splitboard mid-slope on the cliff band in the avalanche path.

Two KVRS team members followed up with an aerial recon in an attempt to verify Rider 1 was not located with the snowboard. They also attempted to find Rider 2’s probe and shovel which he reported were left at the site. They were able to verify the snowboard was not attached to Rider 1 but are unable to locate the probe and shovel left by Rider 2 due to recent winds and snowfall.

On the morning of March 1st one SEADOGS member and one Juneau Mountain Rescue member arrived from Juneau with a helicopter-borne Long Range Receiver (LRR) in an attempt to locate Rider 1 if his beacon was still transmitting. At 12:20pm, within 15 minutes of departing the Temsco helicopter base the team acquired a signal (5 minutes of active searching with antenna deployed), and an additional 5 minutes of fine searching resulted in a GPS location and deployed LRR marker. Near the end of the fine search, the crew spotted the shovel and probe left by Rider 2 now visible near a tree, blown clear of snow by rotor wash.

With the approximate location of Rider 1 now known, the Juneau team joined with two KVRS team members on the ridge near the Lunch Tree to assess snowpack stability as well as to determine if the burial site could safely be accessed (terrain assessment). During the LRR flight the remnants of the crown were spotted in addition to numerous areas of recent wind scouring indicating low hangfire potential. After snowpack assessment (~1-2pm) the team made it to the burial site at 3pm. Rider 1 was located 130cm below the snow surface next to a tree near Rider 2’s probe and shovel. Rider 1 was recovered and flown off the mountain at ~4:15pm.

The joint rescue team exited by skinning back up to the north ridge of Dude Mountain and descending the normal winter route to the summer trailhead where two snowmachines towed them out to the road. They reached the plowed portion of road at 6:10pm, and were back in Ketchikan at 6:45pm.

Weather & Snowpack History

There is not an avalanche center near Ketchikan nor are there any Snotel or alpine weather stations anywhere in the immediate vicinity. KVRS member Shawn McAllister was invaluable in piecing together recent snow conditions and general weather patterns which allowed us to
figure out the weather conditions that led to the weak layer formation and subsequent avalanche.

Southeast Alaska in general started off the season with average snowfall amounts and the local Ketchikan skiers concurred that the mountains behind Ketchikan had good early season coverage and few wind events. Then, as happened all across Southeast Alaska, temperatures rose abruptly and heavy rain fell for periods in December and again in January. Some Southeast Alaska towns set record high temperatures during these events. After the rain/warming event in late January, stretches of clear and cold high pressure persisted locking down the snowpack creating frozen melt forms intermixed with facet layers and depth hoar in some shallow locations. A more detailed synopsis begins on February 10th:

- **Feb 10th 2018**
  A 2-3cm breakable melt-freeze crust is noted by local skiers. This crust started out thin and as cold persisted became more supportable. This layer appears to have become the bed surface in the avalanche.

- **Feb 12th - 15th 2018**
  Sometime during this week 4-6” of new, dry snow fell and made for shallow but good skiing.

- **Feb 17th 2018**
  Cold temperatures associated with high-pressure returned to SE Alaska. As with most high-pressure systems it brought moderate to strong NW winds to the region. It is assumed that this wind event scoured the new, dry snow off exposed ridges and alpine while leaving treeline and below with a mix of scoured pockets, but mostly intact new dry snow. During this cold spell it is likely the new snow not scoured by the wind began to facet becoming the weak layer for this avalanche.

- **Feb 18th-24th 2018**
  Sometime during this period, it is likely that the next precipitation started with freezing rain before snow fell. This was noted in Juneau and the snowpit also indicated that the melt-freeze crust that appeared to be freezing rain (@210cm in snowpit) was well bonded to the new snow but not to the facets below it. With the storm pattern relatively similar to Juneau (overrunning warm air with a very cold entrenched airmass at the ground) this seems a likely sequence. Local skiers noted skiing a very thin “zipper crust” with a dusting of snow on it before snowfall increased to build the slab and bury the thin crust.

- **Feb 25th 2018 AM**
  6-8” of new snow was present at the trailhead when Rider 1 & 2 departed. SW winds were across the bowl at 20mph prior to the accident. Light snow showers occurred throughout the day with ~ 3” of new snow during that day.

- **Feb 25th 2018 ~12:15-12:20** Avalanche occurs.

- **Feb 26th 2018** (KVRS Hasty Team)
6-8” of new snow fills their skin track between AM and afternoon and winds were peaking to 50mph.

- **Feb 27th -28th 2018**
  Light amounts of new snow fall with cloud cover and continued cool temps. A few breaks in the clouds occur but in the early AM and just before dark PM.

- **March 1st 2018**
  It was noted on March 1st that the whole lookers right portion of the upper bowl was stripped down to the icy bed surface (Feb 10th breakable crust). And this agrees with Rider 2’s memory of the snowpack in that location on February 25th; shallow wind affected snow on top of the hard, icy bed surface. While travelling down to the burial site, it was noted that some locations had very shallow snow on the crust bed surface while further down slope the crust was generally buried deeper.
Dude Mtn Avalanche SAMike Janes
Revillagigedo Island Thu Mar 1 13:30 2018
AK
Elevation: 2450 ft Slope Angle: 35°
Aspect: 300° Wind Loading: previous
Air Temperature: -6.5°C Sky Cover: OVC
Precipitation: NO Wind: N Light Breeze

Specifics: Pit is adjacent to avalanche: crown; Recent activity on similar slopes; Recent activity on different slopes

Crystal
Form | Size | Moisture | P | Stability Tests
-----|------|----------|---|------------------
#     | D    |          |   | CT16, RP @ 225 cm
#     | D    |          |   | CT16, RP @ 225 cm
#     | D    |          |   | PST @ 160 (End) @ 200 cm
#     | D    |          |   | CT17, RP @ 205 cm
#     | D    |          |   | RCT @ 200 cm, RP
0.5-1 D |          |          |   | ECTN @ 200 cm
0.5 D |          |          |   | CT19, RP @ 195 cm
0.5-1 D |          |          |   | CT19, RP @ 195 cm
0.5 D |          |          |   | CT19, RP @ 195 cm

Notes: Dude Mtn Avalanche SAR: Mike Janes (SEADOCS), Pat Dryer (Juneau Mtn Rescue), Shawn McAllister &; Ian Clarke (Ketchikan Volunteer Rescue Squad). Initial stability assessment prior to descending to burial site. This location is 20’ to the SW of the pit the hasty team dug on Feb 26th. On flight in there were natural avalanches on West - North- East aspects in the R2-3D2-2.5 size range. Test results were slightly improved from Monday results [ECTP14 Q1 &; CT20 Q1 down 40cm] mainly in terms of fracture character. Ground thawed.
Avalanche Hazard Factors

The nearest avalanche forecast is in Canada 70 miles to the east and is not representative of Revillagigedo Island conditions. However, talking to local skiers and observing the snowpack, terrain and other slopes yielded some useful information. There were debris piles and crowns from numerous other natural avalanches in the region on nearly all aspects. These slides were noted on March 1st and appeared to have released between 2/25 and 2/28. And, these slides would not have been visible to the KVRS team onsite on 2/26 due to very poor visibility. In addition, Rider 2 did not observe any recent avalanche activity on 2/25. The sizes ranged from R1D1 to R3D2.5. One slide, directly across the valley from the Dude Mtn Accident site was fairly wide and released in relatively low angle terrain.

The northwest bowl of Dude Mountain is particularly notable for a couple of terrain features. First, based on tree flagging, this path can release from the ridge in the upper bowl and run all the way through the track (where this slide released) and the middle bench treed section. After the bench, the slope again steepens into what is a cliff band in the summer. This path is an extremely high consequence terrain trap. The terrain below the upper bowl (where this slide was triggered), while visible from the road below the valley, is not easily visible from the ridge or in the bowl itself.

The middle portion of this path where the slide was triggered is a blind, convex rollover. Due to this type of terrain, Rider 2 was unable to see Rider 1 where he stopped.

As noted in the “Snowpack” section, the snowpack structure up on the ridge and upper bowl was markedly different from the snowpack structure at both the crown and track. Due to recent winds, scouring of new snow was strong above treeline but at and below treeline was not a significant factor.
Site Photos (March 1st 2018)

Dude Mountain Avalanche Accident
Revillagigedo Island near Ketchikan, Alaska
February 25th 2018 ~ 12:15-12:20
(photo date March 1st 2018)
**Media Reports**

https://www.adn.com/outdoors-adventure/2018/03/03/ketchikan-mans-body-recovered-from-avalanche/

https://www.ktoo.org/2018/03/02/body-snowboarder-caught-avalanche-recovered/