Seattle Creek Headwall – Near Miss Report
Turnagain Pass, Kenai Mountains, Alaska

**Location:** East end of the Seattle Creek Headwall
  Lat/Lon: N 60.79432 W 149.25408

**Date:** February 3rd, 2017, **Time:** ~13:15

**Report by:** Chugach National Forest Avalanche Center Staff

**Contact:** staff@chugachavalanche.org, website: cnfaic.org

**Synopsis:**
One snowmachiner triggered a large avalanche while hill climbing and was caught and carried. His avalanche airbag failed to deploy and he was fully buried except for his right hand breaking the surface. Two of his partners were watching from a safe zone and a third arrived just as the avalanche occurred. Two more riders from a separate group heard the avalanche and rode over to assist in the rescue. They immediately started a beacon search and one member of the second (separate) party saw the victim’s hand breaking the surface. The rescuers got to him within a few minutes and immediately uncovered his head to reach his airway. He was breathing, uninjured and fully uncovered within 15 minutes.

**Avalanche Details:**
*Photos of avalanche and snowpack profile are at the end of this report*
Avalanche Code: HS-AM-R3-D2-O
Trigger – Snowmachiner, triggered while hill climbing on descent
Aspect – NE
Angle – 36-42 degrees
Elevation - 3600’
Crown Depth – 2-4’, average 3’
Width – 250’
Vertical Runout – 800’
Weak Layer – Facets near ground
Debris depth – 10-15+’ (terrain trap)

**Accident Summary:**
On Friday, February 3, 2017 a group of five snowmachiners decided to head towards the “New World” from Seattle Creek drainage. Two members (Rider 2 and Rider 3) were stopped just below Seattle Ridge in a safe zone while Rider 1 ascended the steep slope on the far Eastern side of the Headwall, a Northeast facing slope (see map at end of document). Just before cresting the ridge Rider 1 pirouetted his machine turning to the left and back down the slope. At the point of his skis contacting the slope (facing downhill) a large crown propagated 5-10 feet
above him. Rider 1 saw the slab fracture and tried to outrun it by pinning the throttle. His machine made contact with rocks at which point he lost control and consciously “threw the sled”. He remembers attempting to deploy his airbag by pulling the trigger mechanism on the left shoulder strap of his backpack. During the avalanche Rider 1 describes the scene as going through a “washing machine” where he was able to catch glimpses of blue sky before everything going dark again. He tried “swimming using a breast stroke” motion to reach the surface and determine which way was up. As the avalanche began to slow down and finally stop rider 1 described the feeling as “being squeezed”. He described his whole body and chest cavity as so compressed that he was only physically able to take shallow breaths. Rider 1 felt that his right wrist was free and had broken the surface but could not move any of the rest of his body. When the debris came to a stop, Rider 4 had just arrived to the safe zone from Seattle Creek drainage. Shortly after, another party of two had arrived to help with the rescue.

**Rescue Summary:**

Everyone in the group had an avalanche beacon, probe, and shovel and was wearing an airbag. Rider 2, Rider 3 and Rider 4 immediately started a beacon search. A member of a 2nd party spotted Rider 1’s hand on the surface of the snow near the toe of the debris, not far from their safe zone. Being first on scene he announced “I got eyes on him!” and squeezed rider 1’s hand and was able to establish communication. Rider 4 was quick to follow and they began to dig him out. Rider 1 was wearing a full-face helmet and was buried in an upright (standing) position. They uncovered his head and were able to establish an airway within a few minutes of the debris coming to a stop. Rider 2 and Rider 3 arrived to help dig. They did an initial assessment to see if Rider 1 had any traumatic injuries. Rider 1 recalled all the events and didn’t complain of any head, neck or back pain, loss of consciousness or loss of feeling in his limbs. Rider 1 was physically uninjured. It took an additional 10 minutes for the group to dig him out, an estimated 15 minutes total from the time the debris stopped. Rider 5 arrived on scene around this time. Rider 1’s snowmachine was fully buried and as of this report, is still buried in the debris.

Rider 1’s airbag was a Pieps Jetforce backpack. The trigger was out of the sleeve and the battery fully charged, however the airbag did not deploy when he pulled the trigger. Upon interviewing rider 1 it was determined that the airbag was never turned on to the “Armed” position before the avalanche occurred.

No obvious signs of instability were observed by any of the party members. Post incident, Rider 2 commented, “There was a pretty good temperature inversion that day, about 9F at the parking lot, and significantly warmer at the top. While looking at the face, before ‘Rider 1’ headed up it, I wasn’t very comfortable. While there were no visible red flags, the slope was greater than 45 degrees, there was and had been quite a few temperature inversions, and the snowpack this season had been very odd.” Rider 2 also said there were about 3-4 snowmachine tracks and 3-4 snowboard/ski tracks on this specific slope before Rider 1 ascended.

All members of the group were expert riders with at least 15 years of snowmachining and backcountry snowboarding experience. They all had basic first aid and CPR training, and had
some formal avalanche education, at least a level 1. They had read the avalanche advisory for the day and “discussed the snowpack and wind loading both in the parking lot and at the top of the mountain.” They had been snowboarding earlier that day in Seattle Creek and decided to travel towards the New World zone, an area South of the Headwall to look for new places to ride away from the crowds. Post-accident, Rider 2 reflected on the significant increase in the number of snowmachiners in Turnagain Pass over the past 3 years including a rise in riders out to ski and snowboard. “It does start to get pretty crowded on days like Friday (sunny, good snow, safe conditions.) Some of the groups I see out there do make me a little nervous as far as their skill level. This issue is what made us decide to explore the New World.”

Rider 1 and Rider 2 did not have BCA radios, but the rest of the group did. Rider 2 said he will be purchasing a radio before he rides again. “It’s just safer if everyone can communicate fast and easily.”

**Snowpack and Weather History:**

The avalanche occurred on a sunny day with light and variable winds. Temperatures climbed during the night before to 32F at the Sunburst weather station (3,800’) and continued to warm to the mid 30’sF at the time of the avalanche. This was the third day of clear weather after a minor wind event, but was the warmest of those three days. The last snowfall was Jan 26th, 8 days prior, when a warm storm added ~3’ of new dense snow to the area and initiated a widespread natural avalanche cycle lasting through Jan 27th.

Before the Jan 26th storm, the snowpack in the Alpine zone of Turnagain Pass averaged 4-6’ thick and had a variety of faceted layers in the bottom 2’ that were showing signs of gaining strength and bonding. These layers were formed during cold and dry periods in December and early January. Since the natural avalanche cycle associated with the Jan 26th storm, no avalanche activity breaking in these older weak layers was seen at Turnagain Pass.

The dense warm snow from Jan 26th adhered to the pre-existing surface and created a hard slab between 2’ and 4’ thick on the slope that avalanched. Attached to the bottom of the slab was a thin 2mm crust and under this crust was a thin 1cm layer of 2mm rounding facets. This layer of rounding facets was the weak layer and it sat on a hard melt-freeze crust ~25cm thick that acted as the bed surface.

The avalanche was ~250’ wide and ran ~800’ vertical feet. Slope steepness was between 36 and 42 degrees. Around 100’ below the crown was a rock band, not visible before the avalanche, this is the likely trigger point while Rider 1 descended. It is possible the slab thickness here was thinner, ~2’, and the faceted layer was weaker and possibly thicker than found at the crown or flank. The rock bank also creates a terrain feature known as a convex roll and an unsupported slope, these features may have contributed to the instability. The bed surface looks to have ‘stepped down’ - but it is more likely the slab was so stiff it pulled off old layers of wind slab higher on the slope and on the flanks where the faceted snow below was stronger and did not fail.
**Avalanche Danger:**
The avalanche danger was rated MODERATE in the Alpine (elevation band of avalanche). The last sentence of the bottom line read: “Lastly, triggering a large avalanche breaking 2-4’ deep in weak snow deeper in the pack is unlikely but not out of the question.” Advisory link: http://www.cnfaic.org/advisories/current.php?id=1449

CNFAIC Director Wendy Wagner was in this same area earlier in the day and wrote the avalanche forecast that morning. Events and thoughts from her:

_Earlier in the day on Friday, February 3rd, my partner and I were riding snowmachines in the Seattle Creek drainage. We headed up into the East Headwall area and into the upper most bowl (sometimes referred to as ‘Toilet Bowl’). We were the first people in this area since the last storm a week prior. We grouped up in the same safe zone that the party used in this report. From here we assessed the snow conditions and terrain. I had been in the drainage the day before on a field day for the CNFAIC and dug a snow pit at a lower elevation of the Headwall at 2,400’. The snowpack was 185cm deep and we did not dig to the ground, though probe tests showed moderately weaker snow near the base of the pack, something the CNFAIC has been monitoring this season. No signs of instability were seen on either day._

_We were interested in riding up the slope (the one that avalanched) to take a look into the “New World” on the other side. There were three terrain features we were thinking about. First, a steeper section near the top of the slope where stresses may be concentrated. Second, the slope ended in a small bowl/terrain trap. Last, a small rocky section mid-slope that could be a thin spot. We knew the snowpack could have weak faceted snow near the ground under a hard slab. We also knew there had been no avalanche activity in these layers in the Turnagain Pass area for at least 7 days (Jan 26 natural cycle). Essentially, we knew this was a low probability high consequence situation. We chose to ride and ski the slope using safe travel practices. We were rescue ready, watched each other from a safe spot, avoided the rocks (known thin spot) and stuck to the looker’s right of the slope as the best we could to avoid the worst part of the terrain trap. After gaining the top we descended and left the area without incident._

_I was not expecting to hear that the slope avalanched a few hours later, a rider was fully buried but ok. My heart sank. I am so incredibly thankful everyone is ok, as well as our party and others in the area. I am also very grateful this group was knowledgeable and used safe travel practices. The positive outcome can be credited to the group being prepared, having rescue gear, exposing one person at a time and watching from a true safe zone._

_*We are very thankful for the riders involved in this near miss to share their story and experience for others to learn from._
Crown face at thickest portion, 125cm (49") [CNFAIC photo]

Looking up slide path [photo from group]
Avalanche, looking from safe zone [CNFAIC photo]
Note the rock band just below crown, likely trigger location [CNFAIC photo]

Looking down at toe of debris, burial at small black dot on left [photo from group]
Looking up from toe of debris, burial location in bottom right of photo [CNFAIC photo]
Snowpack and Crown Profile

Crown Profile: 2/6/17
Avalanche Date: 2/3/17
Loc: Seattle Creek Headwall, East side
Asp: NE  Elev: 3,600'
Snow depth: 145cm
Crown depth: 110cm at this location

Weak Layer:
1cm layer facets rounding (2mm)

East Seattle Headwall  Wendy Wagner
Kenai Mountains Mon Feb 6 13:00 2017
AK
Elevation 3600 ft
Aspect: NE
Wind Loading:
Specifics: Pit is adjacent to avalanche crown

Stability:
Air Temperature: 0°C
Sky Cover: CLR
Precipitation: NO
Wind: Calm

Layer Notes
33 institution: Problematic layer
0: No Failure

Crystal Form

| Size | Moisture | Density | Stability
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