

Qualification Documents for the AAA Pro 2 Course for Gabi Benel



To Whom It May Concern,

Gabi Benel has been a member of the Snowmass Ski Patrol since 2016. He takes an active role participating in and leading snow safety activities, including avalanche mitigation routes, snow stability evaluation, daily weather discussions and avalanche hazard evaluation.

The Snowmass Ski Area is located in the Elk Mountains on the western slope of Colorado. This location creates a continental snow climate with relatively shallow snowpack heights and generally cold winter temperatures. Average seasonal snowfall is approximately 300 inches. The ski area generally faces north, though the aspect of individual slopes can vary significantly due to terrain configuration. The dominant wind direction is west-southwest. The ski area ranges from 8,100' to over 12,500' in elevation, with tree line at approximately 11,500'. Ground cover consists of conifer and aspen forests, grassy meadows, alpine tundra, talus, boulders, and cliffs.

There are over 160 named avalanche control routes in the Snowmass Ski area. Gabi has participated in avalanche mitigation on all of these routes, whether using explosives, ski cutting or protective skiing measures. He makes recommendations on opening and closing terrain and deciding if additional measures are needed to reduce the avalanche risk to the public. He also classifies natural and artificially triggered avalanches according to SWAG standards.

Explosives mitigation techniques Gabi uses at Snowmass include both high and low explosives, hand thrown charges, aerial tramway explosives delivery systems, and air blasts using various other techniques.

Gabi is also a member of the bootpacking team on Snowmass which covers hundreds of acres of avalanche terrain on the ski area every year in the early season.

Avalanche rescue at the Snowmass Ski Area is conducted under the Incident Command System (ICS) and is performed by patrol personnel. Gabi has been actively training on a daily basis for avalanche rescue, including multiple burial scenarios with different search techniques (i.e. beacon, RECCO, avalanche rescue dog teams, and probe lines). Scenarios and training have included multi team rescue scenarios.

Gabi takes a lead role in training other ski patrollers in both snow science and avalanche rescue. I strongly recommend him for the AAA Pro 2 course.

Sincerely,



MARK FALENDER

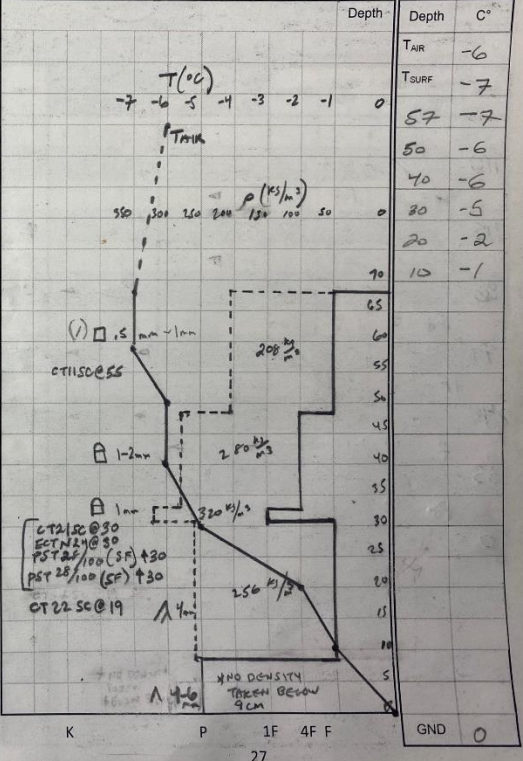
SNOW SAFETY DIRECTOR | SNOWMASS SKI PATROL ASPEN SKIING
COMPANY
AMERICAN AVALANCHE ASSOCIATION PROFESSIONAL MEMBER

Location: NEGAPIT ON CHALK CREEK
 Date: 2/18/11 Time: 11:05 Obs: GB, ET
 Elev: 11,300 Aspect: W 256° Slope: 16° Pit Type: FULL

Yellow Flag Criteria		Layer Properties:				Interface Properties:				Sum
Count of 5 or 6 Flags	Indication of Instability	Avg Grain Size > 1mm	Hardness < 1F	Persistent Grain Type (SH, FC, DH)	Diff in Grain Size > .5mm	Diff in Hardness > 1	Interface Depth 20-85cm			
67										
48										4
33										6
31										6
9										6
0										
* Got snow from above into lower half of hole										
		CT 22 @ 19 SC on □				PST 28/100 (SF) ↑ 30cm				
		CT 11 @ 55 SC				PST 38/100 (SF) ↑ 30cm				
		CT 21 @ 30 SC on □								
		ECT 12 @ 30								

26

Sky: SCT Precip: NO Wind Dir: W Wind Spd: L
 BloSnow: Ext NO Dir N/O Loc N/O Pen (Foot/Ski): F 1.5D HS: 67cm
 Notes: GLASSY AROUND COURSE



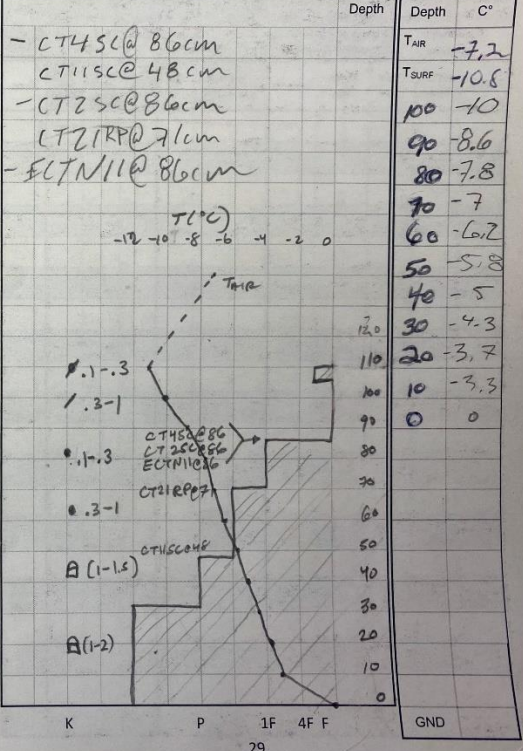
27

Location: MIREWOOD BOWL - MONARCH NE ATL
 Date: 3/29/17 Time: 14:18 Obs: NH, SGB
 Elev: 11,840 Aspect: NE Slope: 35° Pit Type: FULL

Yellow Flag Criteria		Layer Properties:				Interface Properties:				Sum
Count of 5 or 6 Flags	Indication of Instability	Avg Grain Size > 1mm	Hardness < 1F	Persistent Grain Type (SH, FC, DH)	Diff in Grain Size > .5mm	Diff in Hardness > 1	Interface Depth 20-85cm			
110										
105										2
86										3
71										2
48										4
33										4
0										

28

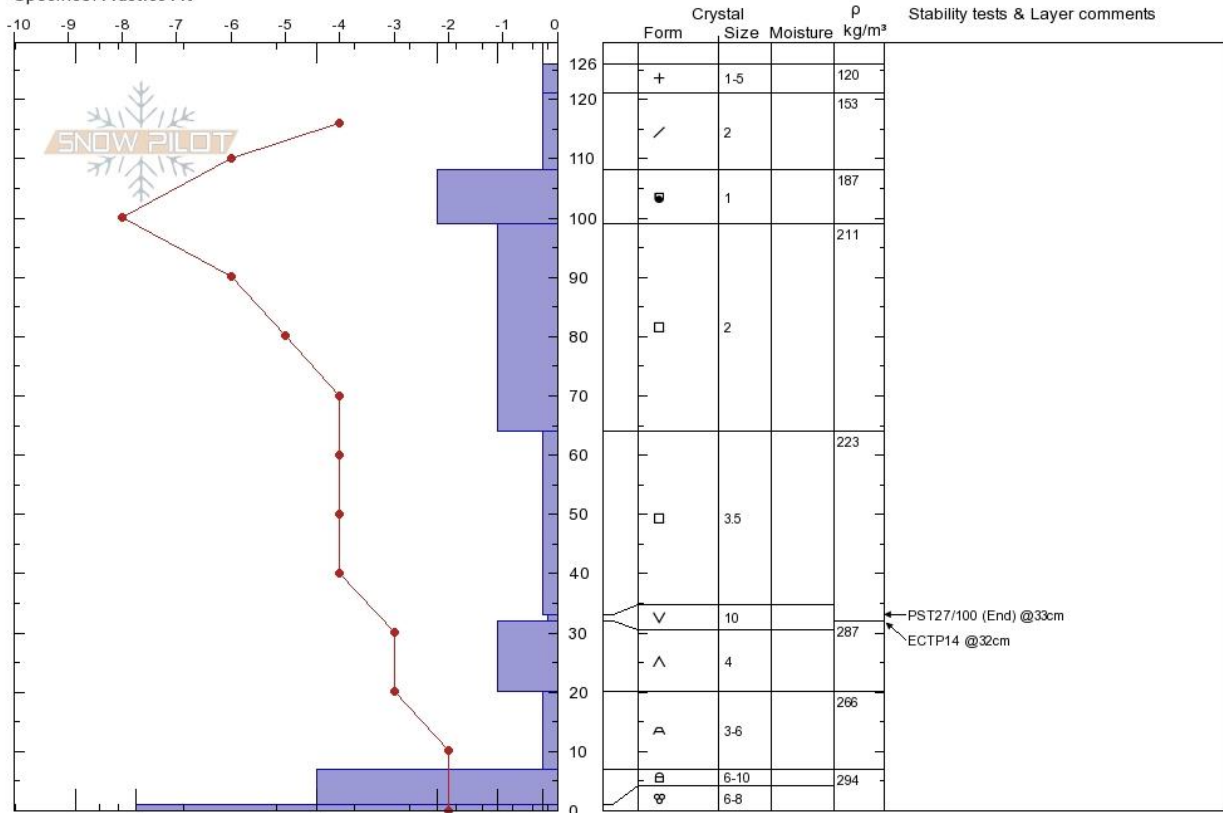
Sky: SCT Precip: NONE Wind Dir: W Wind Spd: L
 BloSnow: Ext NO Dir NO Loc NO Pen (Foot/Ski): N/A 1 1/2 HS: 110
 Notes: LAYERS WERE NOT CONSISTENT



29

GBenel_SAO264 PracPit
Gabi Benel
Vail/Summit County 12/14/2018 - 3:00pm
CO Co-ord:
 Elevation: 10241 ft Slope Angle: 11°
 Aspect: 90° Wind Loading: previous
 Specifics: Practice Pit

Stability:
 Air Temperature: -2°C HS:126 Layer Notes:
 Sky Cover: OVC PS:12
 Precipitation: S1
 Wind: W Light Breeze



Notes: NOTES MAY BE CUT OFF BELOW! - SEE SUBMITTED ASSIGNMENT FOR FULL NOTES!

Approximate time of year: Knowing that this pit was dug on the same day as pit 1, we can make some assumptions. The moderate HS of 126cm points to an earlier time of the season in this zone of CO. There is also not much snow over a mostly faceted snowpack, which could be the result of most of the early season snow being exposed to a large temperature gradient and not much snow since then to cover that up.

Approximate time of day: This snowpit was dug later in the day than snowpit 1. We can see the effects of short wave radiation affecting the upper 30cm's of the snowpack, with the classic "tail of the dog" wagging towards warmer temps. Also, there is new snow present in this snowpit that was not recorded in pit 1. With only very light winds in both locations on this day, we would have seen that snow in pit 1 if it had been dug after pit 2. That we see that new snow in pit 2 points to pit 2 being dug later than pit 1.

Estimated Aspect: This snowpit shows a deeper HS than pit 1, so it is less likely to have been stripped of snow by wind early in the season. The 1F slab 30cm's down from the surface could be from wind deposited snow that then rounded.

Also, the early season snow that came stuck around, leading to the deeper HS, versus the snow in pit 1 which maybe also could have melted away. The hard ice layer at the base of this pit shows that the area had a melt freeze cycle early in the season from strong sun exposure.

Elevation: The elevation is given as 10,241' which is BTL in this zone.

E. BONEL

Date: 20180227 Time: 0751 Field Location: Buckeye, Leadville

Weather Forecast		Snowpack and Avalanche Observations				
T 70-80 W 25-30 S CLR PASC 0	ZON E-15 F S-10SW WCA 0-1	FRONONT - NW BTL HS N-E1-DIS CLASS LOADED NEAR BUCKEY - E TL S-S-N-R2-D1 11400 CHANCE CREEK - L BTL HS-N-N-R3-D1 8 3-8 E ATL S-S-N-N-D1 S				
Snowpack Summary						
10-15cm of recent storm snow sits above a developing mid pack that is supportable but only 4% wet based. The lower 40cm units of 2-3mm hit hard facets and depth here. Overall the snowpack lacks a syndetic slab to be a concern in most areas. Slabter slabs from wind on NE-E						
Avalanche Danger	Problems	Type	Likelihood	Size	Distribution	
ATL MOD	1	PSa	Poss	S-L	NW-SE ^{4% W}	
NTL MOD	2	WSa	Poss	S	N-S ^{4% W}	
BTL MOD	3					
Notes:						
- Take Sangre Fork/other trail switchbacks from trailhead from take road						
Terrain to Avoid:						
- Wind loaded areas around thinner rocky areas - Steep terrain >30° - new sidehilling nut trail						
Open Runs/Areas:			Closed Runs/Areas:			
Zion trees, Gully of doom, Skin track area, Route out, Zion rollers - open for pits @ bottom			- Steep runs above highway ("below prospects") South top. - Sidehill nut trail near trailhead - Gully of doom - Zion rollers steep pit for skiing			
Fieldwork Needs:						
- Find PSa + WSA problem on N-SE slopes. Reduce uncertainty - Practice pit for Post Assessment.						
Emergency Response:						
- Self Eval to trailhead - other cmc groups - FRS radio 14, in reach - first aid kit, rescue sled. - B.G. - FA kit, Gait sled, Gavin - drugs,						

Field Weather Obs

Time	0943	1100	1455
Location	TRAILHEAD	ARBND	TRAILHEAD
Elev.	10,150	11,100	10,150
Aspect	SE	70°E	SE
Sky	CLR	CLR	FEW
Precip (type/rate)	NONE	NONE	NONE
HS	55cm	105cm	55cm
T _{AIR}	-4.2°C	-5°C	-1.3°C
T _{SURF}	-9.7°C	-6.4	-5.5°C
T ₂₀	-11.5°C	-12.3	-7°C
Surf. Form / Size	□ (P) .3	□ .3	□ .3
Pen Boot	35cm	20cm	25cm
Pen Ski	20cm	10cm	N/O
Wind (Speed/Dir)	LIGHT	LIGHT SW	LIGHT
Blowsnow	NONE	NONE	NONE

- Dug practice pit at base of Zion rollers
- worked up skiing mostly near skin track on way out.
- REMEMBER TO TAKE AIR TEMPS 1-1.2 m OFF SURFACE

Date: 20180301 Time: 0805 Field Location: VAIL PASS

Weather Forecast		Snowpack and Avalanche Observations				
T 70-80 W 25-30 S CLR PASC 0	ZON E-15 F S-10SW WCA 0-1	FRONONT - NW BTL HS N-E1-DIS CLASS LOADED NEAR BUCKEY - E TL S-S-N-R2-D1 11400 CHANCE CREEK - L BTL HS-N-N-R3-D1 8 20180227 ATL NB HS NR D1 20180227 NTL E HS NR D2 S				
Snowpack Summary						
Deep Persistent Slab problem. Lots came from Feb storm above stiffer slab (up to 5 ft) above very weak DA layer. Deeper in wind loaded areas. HS on S aspects BTL 100-125cm, MFC on surface, FC to ground						
Avalanche Danger	Problems	Type	Likelihood	Size	Distribution	
ATL MOD	1	DPS	Unlikely	Very Large	N-SE ^{4% W}	
NTL MOD	2					
BTL LOW	3					
Notes:						
- lookout for punching out melt freeze crust on S aspects						
Terrain to Avoid:						
>30° slopes, with slab over FC, DA N-SE - steepest aspects with slab forming over weak layer						
Open Runs/Areas:			Closed Runs/Areas:			
Dog Run/Hippo Trees (Slope S closed) The Loop The Burn Unera Bowl			Unera PK E. side			
Fieldwork Needs:						
- Demonstrate safe travel - 4 hr tour						
Emergency Response:						
- Self eval to trailhead. Contact other groups, FRS 14 - Rescue sled, in reach.						

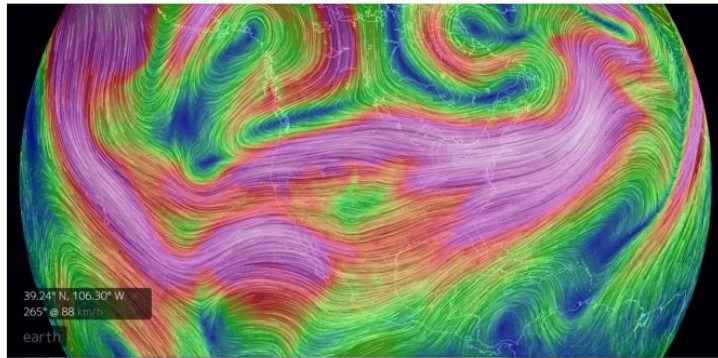
Field Weather Obs

Time	1105	1300	0653
Location	Zion's Korps	LYNX OBJECT	Vail Pass
Elev.	10,750	11,180'	10,025
Aspect	NE	SSW	None
Sky	FEW	FEW	CLR
Precip (type/rate)	NO	NO	NO
HS	105cm	75cm	60"
T _{AIR}	-3°C	-3.2°C	-9°C
T _{SURF}	-11.5°C	-5.0°	-14.5°C
T ₂₀	N/O	N/O	-8.5°C
Surf. Form / Size	□ .8cm	N/O	□ .5-1cm
Pen Boot	20cm	35cm	40cm
Pen Ski	10cm	10cm	N/O
Wind (Speed/Dir)	L SW	L S	4 / 130°
Blowsnow	NONE	NONE	None

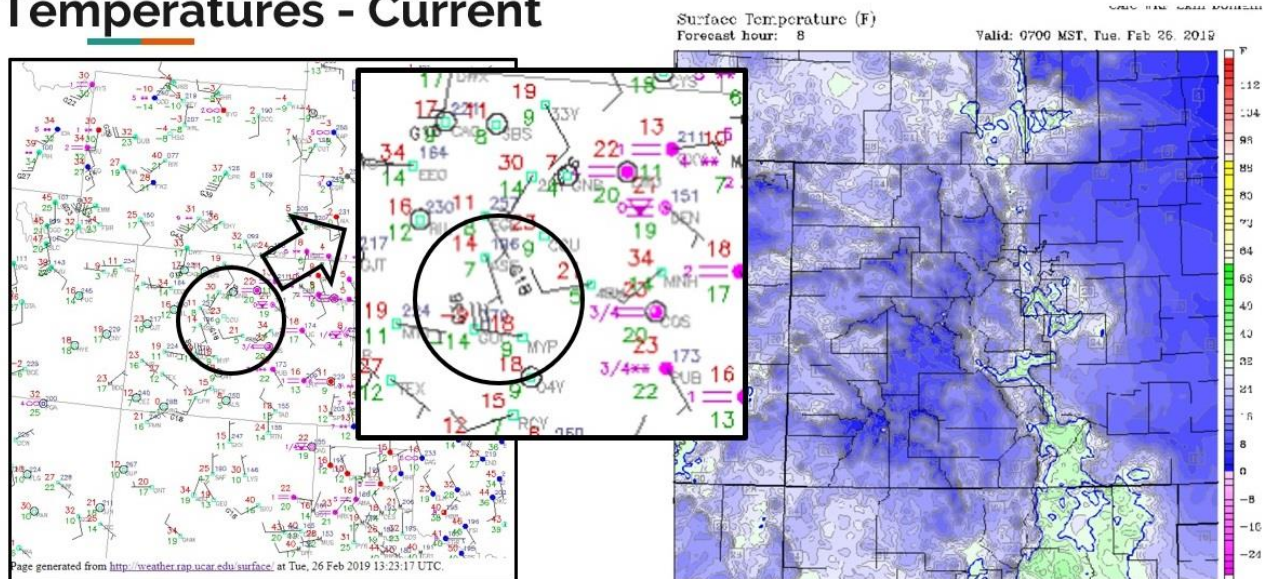
STARTING @ 1040
- INCREASINGLY CLOUDY CORN DURING DAY
- @ LYNX BENCH @ 1300
- BACK @ CAMP @ 12:25 PM
- S FACE OF LYNX ATL VERY WINDY AFFECTING
- SKIING IN TREES WAS GOOD.
- upper slopes wind scoured and bare
- large cornice formed on Unera Peak E. side

Sample excerpt from a weather presentation

Jet Stream



Temperatures - Current



Critical weather factors

- Moderate to strong west winds, look for snow transport
- There will be a sharp drop in the evening temps, with clear skies. Keep this in mind for how it will affect the snowpack in the future. (especially if cloudy wed)
 - Today's fairytale can be tomorrow's (or next week's) nightmare

What's coming up

Starting Wednesday eve, a series of storms arriving with strong westerly winds.

Sample Munter Method planning

Leg	Start/End Elevation (ft.)	ΔE (ft.)	Distance (Miles)	Bearing	Time (Estimated)	Notes and Nav. Strategies
1	11,300 ft 11,850 ft	560 ft 168 m	1.14 m 1.83 km	118	45 min may get slower	CAR TO STUDY PT 1.
2	11,850 12,300	450 ft 137 m	.29 mi .5 km	144	30 mins	STUDY PT 1 TO STUDY PT 2
3	12,300 11,800	-500 ft -152 m	.4 mi .6 km	310	20 mins INCLUDE TRANSMISSIONS	STUDY PT 2 TO STUDY PT 3
4	11,800 11,300	-500 ft -152 m	.42 mi .67 km	320	30 mins	STUDY PT 3 BACK TO CAR
					+0.5 TIME 3 mins + extra time	
					= 3 hr 15 mins	

2017/1/30

INDEPENDENCE PASS CAR

Leg	Start/End Elevation (ft.)	ΔE (ft.)	Distance (Miles)	Bearing	Time (Estimated)	Notes and Nav. Strategies
1	10,455 11,050	600 182 m	1.6 km	W	55 min	CAR TO PT ①
2	11,050 11,410	360 ft 110 m	800 m	W	30 min	PT ① TO PT ②
3	11,410 12,279	869 ft 265 m	913 m	SW	55 min	PT ② TO PT ③ (summit)
4	12,279 11,158	-1,121 ft -342 m	948 m	NE	30 min	PT ③ TO GULLY (SKI)
5	11,158 10,455	-703 ft -214 m	1.35 km	E	20 min	GULLY TO CAR
					190 min = 3 hr 20 min ADD ON TIME: + 1 hr = 4 hr 20 min	