

FOREST SERVICE AVALANCHE CENTER SAFETY: EXAMINING CURRENT PRACTICE

Simon A. Trautman^{1*}, Scott D. Savage² and Karl W. Birkeland¹

¹ USDA Forest Service National Avalanche Center, Bozeman, MT, USA

² Sawtooth Avalanche Center, Ketchum, ID, USA

ABSTRACT: In 2013 the Forest Service National Avalanche Center created guidelines designed to reduce worker risk at Forest Service (FS) backcountry avalanche forecasting operations. These guidelines establish context for field operations, define worker safety philosophy and responsibility, and suggest specific risk management practices. At the conclusion of the 2015-2016 season, we conducted a survey to examine current safety practices and how operations integrated the 2013 guidelines into their safety programs. The survey results illustrate field practices and safety management at FS avalanche centers, and provide insight into how these avalanche centers might further improve workplace safety.

KEYWORDS: safety, risk, avalanche center.

1. INTRODUCTION

There are 13 Forest Service (FS) avalanche centers in the United States. Individuals working at these operations (employees and volunteers) spend a significant amount of time in potentially adverse, wintertime backcountry environments. Although these centers operate independently across a large geographic area, they are all part of the FS Avalanche Information and Education Program and share responsibility and/or liability for worker related accidents.

In 2013 the Forest Service National Avalanche Center initiated a workplace safety effort intended to close potential gaps and build commonality in our safety programs (Trautman and Birkeland, 2014). Our effort resulted in a series of templates designed to provide guidance, stimulate critical thought and discussion, and increase consistency between operations.

In 2016 we conducted a follow-up survey to document current practices and depict how operations integrated the 2013 guidelines into their safety programs. This paper provides a snapshot of that survey. It also highlights areas where we believe further discussion will benefit the group.

Our ultimate goal is to improve worker safety by encouraging workers to think and act critically about managing risk prior to entering the field. This effort is - and will continue to be - an iterative, on-going process. As one avalanche center worker stated during the survey:

"First, we must acknowledge that the work we participate in is inherently risky ... then, we identify the risk we can mitigate to the best of our ability and determine the best course of action to complete this task. ... We make a point to review any potential close-calls or situations where we made a decision to deviate from our original plan ... Finally, we review the Operational Safety Plan as a team and modify as necessary."

2. SURVEY DESCRIPTION AND METHOD

During the spring of 2016 we used an online survey to document practices at 13 FS avalanche centers and the Colorado Avalanche Information Center. The survey is comprised of 45 questions that follow-up on a previous survey (Trautman and Birkeland, 2014). In this paper, we focus on safety related documentation, field practices, and safety equipment at FS avalanche centers.

* Corresponding author address:

Simon A. Trautman
FS National Avalanche Center
Bellingham, WA 98225
email: strautman@fs.fed.us

3. SURVEY RESULTS

3.1 Documentation

In 2013 the NAC produced and distributed templates for a Job Hazard Analysis (JHA), Daily Field Planning / Risk Reduction worksheet, and Operational Safety Plan. JHAs identify job related hazards and abatement actions. Daily field planning worksheets give avalanche workers a systematic method for assessing risk on a daily basis. The Operational Safety Plan brings it all together by providing critical analysis, planning, and documentation of work practices, procedures, and emergency response. The plans are living documents that are updated regularly/over time/as needed. In regard to the current use of these templates:

JHA:

- All operations use JHA's
- 11 of 13 used the template
- 9 of 13 document annual training

Daily Field Plan / Risk Reduction Worksheet:

- 11 of 13 use a daily planning / risk reduction worksheet
- 8 of 13 used the template
- 8 of 13 document annual training

Operational Safety Plan:

- 13 of 13 have a plan
- 11 of 13 used the template
- 8 of 13 significantly changed safety procedures since 2013
- 11 of 13 document annual training

Tbl. 1: 2015-2016 FS AVALANCHE CENTER FIELD PRACTICES																
Operation	Field time % time worked			Field time in avy terrain (per day)		Field time adjacent to avy terrain (per day)			Solo Travel Allowed?		Snowmobile used for fieldwork?			Volunteers working in avy terrain?		
By Number	>75%	>50%	>25%	< 1 hour	1-2 hours	< 1 hour	1-2 hours	2-5 hours	yes	no	yes	no	% used	yes	no	# volunteers
1	X			X		X			X		X		50	X		3
2		X			X		X			X	X		50	X		12
3	X			X				X		x	X		25		X	0
4		X			X			X		X	X		50	X		8
5		X			X		X			X	X		100	X		3
6		X		X				X	X		X		50	X		15
7	X			X				X	X		X		25	X		7
8		X			X			X	X		X		50	X		3
9		X		X			X		X		X		25	X		25
10		X			X			X		X	X		25	X		13
11	X			X				X		X	X		75	X		10
12			X		X		X		X		X		25	X		8
13		X			X		X		X		X		75	X		10

Tbl. 2: 2015-2016 FS AVALANCHE CENTER SAFETY EQUIPMENT REQUIREMENTS														
OPERATION	COMMUNICATIONS						PPE and MISC GEAR							
By number	Cell phone	Satelite Phone (at all times)	Sat Phone (optional or situational)	SPOT or InReach	Radio	Radio (situational)	Beacon, Shovel, & Probe	Bivy Sack	Extra Clothing or Insulation	Fire Starting Device	1st Aid Equipment	Airbag (required or situational)	Airbag (provided + optional)	Helmet (when backcountry skiing)
1	OP		OP			OP	W		W				OP	
2	OP		OP	OP	OP		OP			W	W		OP	
3	W		OP	OP		OP	W		W	W	W			
4	OP		OP	OP	OP		OP	OP	W	W	OP		OP	OP
5					OP		OP		W	W	OP			
6	OP			OP		OP	OP	OP	OP	OP	OP	OP		OP
7	W			OP	OP		OP	W	W	W	W		OP	
8	W			OP	OP		OP	OP	W	OP	OP		OP	
9	OP			OP			OP				W			
10	OP	OP				OP	OP		OP		OP			
11				OP	OP		OP	OP	W	W	OP		OP	
12	W			OP			W	W	W			OP		
13	OP			OP	OP		OP		OP		OP		OP	OP
LEGEND: W = provided by worker, OP = provided by operation														

3.2 Field Practices

FS avalanche centers vary in size and scope. In general, our survey indicates the following about field practices at FS avalanche centers (Tbl: 1):

- Most workers (92%) spend more than 50% of time worked in the field.
- All workers spend less than 2 hours in avalanche terrain on a typical field day.
- Most workers (92%) spend an additional 1-5 hours immediately adjacent to avalanche terrain on a typical field day.
- Solo travel is allowed at 7 operations, but is not allowed at the other 6 operations.
- All operations use snowmobiles.
- Almost all (92%) operations use volunteers in avalanche terrain.

3.3 Safety Equipment

Safety and personal protective equipment (PPE) requirements are integral parts of FS avalanche center operational safety programs. Highlights from the survey (Tbl. 2) include:

- All operations require avalanche transceivers (beacons), shovels, and probes.
- All operations require communication devices applicable to field locations.
- Almost all operations (92%) use redundant forms of communication.
- Survival gear (bivy sacks, extra clothing, fire starters, 1st aid supplies) is generally required.
- Although many (9) operations provide airbag packs, only two operations require their use.
- Helmets are required and provided when riding snowmobiles.
- Three operations (23%) require and provide helmets for backcountry work on skis.

4.0 DISCUSSION

The FS avalanche centers largely adopted the 2013 guidelines, chiefly because the NAC engaged each center in the development of the templates. As a result of the initiative, the majority (62%) of operations significantly changed safety procedures and most (77%) believe the changes improved worker safety. Essentially, the survey shows that our 2013 efforts have helped transform the way FS avalanche centers manage their operational safety.

Our survey did reveal some areas where inconsistencies exist between different avalanche centers, and where further discussions may be useful for our group. These include the following:

4.1 Documentation - Pre-trip Planning Worksheets

Although most operations adopted the use of daily planning / risk management worksheets, the group is evenly split between using digital worksheets versus hard copy formats. Additionally, it is not clear if all organizations require a peer review of an individual's trip plan. While completing a written pre-trip plan is a sound practice, peer approval of the plan may help encourage rigor by allowing the reviewer to question or raise objections. On the other hand, in some operations availability of another individual for this review might be limited. In the end, our group plans additional discussion on whether planning worksheets should be digital or hard copy and on the role of peer review in the trip planning process.

4.2 Field Practices – Working Alone

Working alone offers little margin for error. During our 2013 survey, 11 of 14 Avalanche Centers (79%) allowed employees to work alone under certain conditions. Interestingly, by 2016 this number had dropped to 7 of 13 operations (54%).

Seriously debating the risk associated with solo travel versus group travel is beyond the scope of this paper. It is plausible that the decision (for the group) is not as simple as “yes we allow it”, or “no we do not allow it”. Rather, we hope to encourage the group to pursue consensus around when working alone is acceptable or unacceptable.

4.3 Field Practices - Volunteers

Avalanche centers rely heavily on volunteers serving as field partners. Although this use is driven in part by budget constraints, it also serves the important purpose of engaging and educating the community in the avalanche center mission, as well as training community members to be valuable observers for the local avalanche center.

Volunteer workers are exposed to risk comparable to that of paid staff. Despite this risk equivalency, only half the operations require volunteers to carry the same safety equipment as paid staff. For example, a paid worker may be required to carry a helmet and an airbag, while a volunteer may not. Also, volunteer qualifications are quite variable within the group.

The strength of our volunteer programs lies in the fact that we have dedicated individuals who are willing to work for free, and that we can choose competent partners through local vetting processes. In this regard, we believe we should pursue consensus on the following questions:

1. Does the group consider volunteers to be avalanche workers?
2. If so, how should we treat volunteers in terms of qualifications and necessary equipment carried during field days?

4.4 Safety Equipment

Avalanche transceivers, shovels, and probes are universally required, but rules governing the use of other equipment are much more diverse. For example, just looking at non-motorized backcountry helmet and airbag use:

Helmets

- 31% require helmets while descending on skis, or climbing in areas with overhead hazard.
- 69% leave the decision to the individual.

Airbags

- 54% provide airbags.
- 23% require them all the time or in certain situations.
- 77% leave this decision to the individual.

PPE is any equipment worn to minimize the impact of a known hazard. The goal is not to rely

upon PPE as a life saving measure. However, when other systems fail, it may be the only line of defense preventing a serious injury or fatality. The US avalanche community in general, and the avalanche centers in particular, are openly debating whether items such as helmets, or airbags definitively improve workplace safety. As with working alone, the answer may not be a simple yes/no. It is still an open question whether these tools should be required every field day, required during specific conditions, or if decisions about their use should be left to individual forecasters. We plan to continue this debate within our group.

5. CONCLUSION

Avalanche center personnel work in complicated and potentially hazardous environments. In such environments, it is not possible to prevent all accidents, injuries, and/or fatalities. However, we can provide workers with a solid safety net by helping them minimize their risk. This workplace safety initiative is encouraging critical thought and producing positive results in our avalanche center operations. It is also providing a platform to assess, compare, and debate practices within the avalanche center community, and this is something of which we are proud and excited.

ACKNOWLEDGEMENTS

We thank the multitude of avalanche center personnel who spent valuable off-season time filling out our survey. We appreciate it!

REFERENCES

Trautman, S.A. and K.W. Birkeland, 2014: Developing operational guidelines to reduce worker risk at US avalanche centers. Proceedings of the *International Snow Science Workshop*, Banff, AB.