



# Accident causes and organizational culture among avalanche professionals



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## ABSTRACT

We report on a study of 392 avalanche professionals (AVPRO). We describe their demographics, organizational work environment, and the causes and incidence of accidents. We find evidence of strong and weak cultures of safety among AVPRO organizations and analyze differences between the two with respect to avalanche safety work procedures, personal work skills and attitudes, and causes of accidents. Demographics between the two groups are not different but the perceived causes for accidents were. Those organizations we classify as having a strong culture of safety are identified by their employees as having better avalanche training and reporting procedures and, more positive working behaviors. With respect to accident causes, we report that “operational pressures” and “management overriding personal judgement” during operations were reported by those in organizations with a weak culture of safety as contributing factors. Whereas we find value in large scale surveys of the AVPRO industry, we acknowledge that alternative methods of understanding of organizational culture AVPROs exist and should be utilized.

## MANAGEMENT IMPLICATIONS

- AVPRO organizations differ with respect to the culture of safety inherent in the organization. While we find no organization with no culture of safety, we can identify them as strong vs. weak.
- AVPRO managers should be cognizant that organizational culture may influence how AVPROs do their job and that causes of accidents may be correlated to a restrictive management culture.
- Communication and better personal decision making are encouraged where an organizational culture of safety exists.
- High risk workers have a high level of self-efficacy independent of management, indicating that their professional and personal skills can be enhanced where management recognizes and rewards independent behavior.
- Because of the dynamic conditions in which the AVPRO mountain community operates, accident causes are rarely simple and linear. They are more likely to be a combination of personal and organizational factors. As such, managers and members of the AVPRO community would benefit from greater understanding of the role of organizational culture in the workplace and could benefit from research in other risk oriented professions.

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## 1. Introduction

Members of the professional avalanche community (AVPRO)

often work in high-risk environments where on-the-job injury, or worse, is a day-to-day possibility. In the United States of America, since 1950, 59 avalanche workers have been killed by avalanches while at work and constitute 3.8% of the total avalanche deaths in North America (Greene, Jamieson, & Logan, 2014). Many more have been hurt on the job, some with career ending injury.

The AVPRO community has a long history of focusing on the

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physical aspects of managing avalanche hazard by utilizing well established technical manuals such as the *American Snow Weather, and Avalanches: Observational Guidelines* (SWAG) (Greene et al., 2010) and the *Canadian Observation Guidelines and Recording Standards for Weather, Snowpack and Avalanches* (OGRS) (CAA, 2014). Over the last decade, there has been an increasing awareness of the importance of human factors on avalanche safety and the number of studies on the human dimension of avalanche safety is steadily growing (e.g. McCammon, 2004; Haegeli, Haider, Longland & Beardmore, 2010:186). Whereas the majority of work in this emerging research field is focused on recreationists (e.g. Atkins, 2000; McCammon, 2004; Haegeli et al., 2010; Zweifel & Haegeli, 2014; Hendriks & Johnson, 2014), there are fewer studies specifically targeted toward avalanche professionals (e.g., Adams, 2005; Simenhois & Savage, 2010; Stewart-Patterson, 2014; Hendriks, Shelly, & Johnson, 2014). Existing studies (e.g. Adams, 2004) acknowledge the complex and multifaceted decision environment of avalanche professionals who must often strike a balance between personal safety and operational imperatives. This may include opening ski runs, guiding clients, or teaching courses in potential avalanche terrain. Studies of avalanche accidents often focus on the failure of individual decision expertise of while tending to neglect institutional influences that may play a role in the incidence of on the job accidents.

In this paper we investigate perceived differences in the organizational safety culture within the AVPRO community. Specifically, we examine the role of personal and organizational factors and the incidence of accidents. Using individual survey data from AVPROs we identify two types of organizations – those with a strong safety culture and those with a weak safety culture. We then examine perceived differences in the causes of accidents among members of the two types of organizations. We do not examine accidents rates, severity, or types of accidents.

### 1.1. Organizational culture

Organizational culture has a rich literature; far beyond the scope of this paper, but two foci are relevant here. First, how do we describe organizational culture and second, from which vantage point do we elucidate our discussion of safety and accidents.

Organizational culture is the behavior of humans within an organization and the meaning that people attach to those behaviors (Smircich, 1983). Schein (2010) refers to these as “norms and practices”. Organizational culture is described by Deal and Kennedy (2000) as “how work gets done”. Peters and Waterman (1982) consider innovativeness and productivity. Kotter and Heskett (1992) look to adaptive and unadaptive cultures where adaptive cultures are those who possess the capacity for organizational learning. Organizational culture can be studied from the point of view of management, employees, competitors, or customers. We follow Schein's (1996) examination of organizational culture from the standpoint of the observer within the organization. In our case it is the avalanche professional working in a setting where avalanche hazard exists.

Schein (2010:26–36) delineates three levels of cultural phenomena visible to the observer within the organization. Each adds to an understanding of organizational culture. *Artifacts* are the identifiable elements of the organization (i.e. uniforms, language). Artifacts provide personal identity to those in an out of the organization through the use of professional jargon, behaviors, and appearance. Myths built around the organization help define it for members and non-members alike (i.e. FBI as “crime busters”). *Espoused Values* are rules of behavior often expressed in official philosophies/policies and statements of identity such as professionalism and procedures. Values are often self-reinforcing for the organizational culture. As they come to define an organizational way of thinking, they may guide the organization through difficulty (i.e. after a severe accident). *Assumptions* are the deeply embedded, taken-for-granted behaviors, which are usually unconscious, but constitute the essence of culture. This level is so well integrated into organizational culture they are difficult to recognize even by those within. Organizational assumptions are the way the organization acts, thinks, and perceives their reality. In practice, Schein (2010) suggests these three levels combine to form a career anchor—one's self-concept of the organization, one's role in it, and one's perceptions of one's talents and abilities. In short, by examining the organizational culture from the insider's point of view we gain an understanding of how organizational culture affects work. During our survey design we sought to broadly integrate Schein's (2010) “Espoused Values” dimension of organizational culture through queries on ease and openness of communication, training,

**Table 1**  
Dimensions of organizational culture.

Question	Dimension	Valid responses	Never (1)	Rarely (2)	Sometimes (3)	Most of the time (4)	Always (5)	Not sure (6)	Median*	IQR*
Communication within my company is open and easy.	organizational communication	392	1%	4%	16%	45%	34%	<1%	4	4-5
My organisation understands the risks taken at the personal level rapidly translate into risks assumed by the team, and/or the public and so they would never ask me to take unnecessary personal risk.	reflexivity on accidents	391	<1%	4%	12%	26%	56%	2%	5	4-5
If I see a potentially dangerous situation, I am confident I can ask operations to stop and reassess.	procedures	392	0%	1%	5%	17%	76%	1%	5	5-5
When I start a control mission, I understand exactly what I am trying to do or am expected to accomplish.	organizational norms	370	<1%	<1%	4%	28%	64%	4%	5	4-5

\* does not includes 'Not sure'

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