

SURVEY OF AVALANCHE PROFESSIONALS: AN INSTITUTIONAL AND
PERSONAL ANALYSIS OF ACCIDENT CAUSES

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ABSTRACT: Avalanche professionals routinely work in high-risk environments where avalanche involvements are a day-to-day possibility. Despite best efforts to prevent such involvements, accidents occur and on-the-job injuries and even fatalities are a tragic reality of our community. The goal of this presentation is to provide a new perspective on workplace avalanche accidents and close calls that examines the role of organizational culture as a contributing factor.

KEYWORDS: avalanche professionals, accident causes, institutional factors

1. INTRODUCTION

The skills of the avalanche professional are called on after storm events, during the stress of accidents, while guiding clients, and educating the public in potentially high-risk environments. Given the setting in which they operate, on-the-job injury, or worse, is a real day-to-day possibility. Despite best efforts to prevent such involvements, accidents occur and workplace injuries and even fatalities are a tragic reality of our community. In the last 5 years, 10 avalanche workers have been killed by avalanches while at work (Greene *et al.*, 2014).

The professional avalanche community (AVPRO) has a long history of focusing on the physical aspects of managing avalanche hazard. Well established technical standard, such as the American SWAG (AAA, 2010) and the Canadian OGRS (CAA, 2007) are clear manifestations of this approach. However, 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. Whereas the majority of projects in this emerging research field are focused on recreationists, there are few studies that have looked at avalanche professionals in more detail (e.g., Adams, 2005; Stewart-Patterson, 2014). While existing studies

acknowledge the complex and multifaceted decision environment of avalanche professionals, they primarily focus on the development of the decision expertise of individuals. However, management leadership literature identifies, along with several other factors, a “virtuous cycle” of employee perceptions of the safety system being related to management’s commitment to safety, which, in turn, appear to be related to injury rates.

The goal of our study is to expand our understanding of factors affecting avalanche safety in workplace settings by employing an institutional perspective where organizational culture is examined as an associational element in the incident of accidents.

2. DATA AND METHODS

Comprehensive global surveys of the AVPRO profession are rarely being conducted. To fill this void, we developed a detailed online survey to a) better understand the demographics of the AVPRO community; b) examine the institutional settings in which they work; and c) study the relationship between organizational culture and employee avalanche safety practices.

While Guldenmund (2000) suggests there is no satisfactory model of a safety culture, he and Schein (2010) agree that attributes like communications, training, procedures, and accident culture form the basis of any examination of organizational culture. Each of these elements is a building block for a culture where safety is paramount in a highly variable environment.

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Survey development followed a three-part process. First, the initial survey was designed based on similar work in the industrial safety literature and standard demographic surveys. Second, it was subjected to testing and comment at the International Snow Science Workshop in Anchorage, Alaska in 2012 by members of the avalanche education and research community. Approximately 35 respondents provided input on the survey. Third, the revised survey was sent out to a panel of expert reviewers for further input.

The final version of the survey consisted of a total of 37 questions, which covered organizational culture from several perspectives including communications, training, procedures, and accident culture. The completion of the survey required approximately 15 to 20 minutes.

We employed a modified convenience sample, as there is no single professional organization of the potential respondent pool. The survey was administered electronically with the help of multiple international organizations including professional ski patrols, several professional avalanche education organizations, ski and mountain guide certification programs, membership listserves. Each of the participating organizations elicited survey participants by sending emails with a hyperlink to the survey to their membership lists or posting the survey link in their electronic newsletter. We also encouraged respondents to forward the survey link to their personal contacts (i.e., snowball sampling) to further increase participation.

The survey was posted for several months between September 2012 and February 2013 to provide ample time for dissemination and completion. The relatively long duration for administration was also required in order to capture the winter season in both the northern and southern hemispheres and to allow ample time for seasonal workers to respond to requests.

The survey was confidential and anonymous, and no IP addresses were collected.

3. SAMPLE CHARACTERISTICS

A total of 392 participants completed the survey and answered the questions necessary for the analysis. Participants are primarily from North America (95%), but the sample also includes respondents from Europe, New Zealand, and South America. Since there is no accurate knowledge of the total population of potential respondents, it is impossible to determine a response rate for the survey.

Multiple job descriptions populate the AVPRO community. This includes those who teach avalanche awareness classes to recreationalists; avalanche forecasters for commercial ski resorts; avalanche controllers for departments of transportation, and railroads; commercial mountain and ski guides; and professional ski patrol. Avalanche educator (46%), guide (44%) and professional ski patrollers (32%) are the most common occupations among survey participants.

Slightly more than half of respondents (58%) self identify working in more than one job description. As a result of the complexity of the employment matrix, differences among the various job descriptions are less insightful than it might appear. In fact, there are likely more similarities between job descriptions than differences. One aspect of the job they all have in common is they operate in an environment where risk of avalanches is very real and accidents frequently have high consequences.

The survey sample represents a well-experienced segment of the AVPRO community. The median age of participants is 41 years, 9% of the sample is female and 43% of the survey sample have children. Sixty-nine percent of participants have a undergraduate or graduate university degree. The length of participants' avalanche career ranges from 1 to 50 years with a median of 13 years. The median tenure at their primary current position is 6.5 years.

The majority of survey participants (69%) work for privately owned companies. Nineteen percent work for either a federal and state government agency. Most of these organizations (61%) are well established and have been in existence for more than 30 years. The sizes of the avalanche safety teams employed of these organizations range from small (1-3; 21%), to medium (4-10; 33%), large (11-20; 20%) and very large (>20; 26%).

4. OUTLOOK

Based on a preliminary analysis, it appears that we are able to identify a relationship between the perceived management's commitment to safety and certain aspects of employees' avalanche safety skills and practices on the job. At the same time, it appears that personal decision-making errors and loss of situational awareness are the primary associational factors with accidents and near misses. These findings are juxtaposed with the self-assessed strong decision-making skills expressed by respondents.

A more detailed examination of these relationships will provide important insights about the ultimate causes of workplace avalanche accidents. We hope that the results of this research will help to improve the safety of avalanche workers by offering useful information for the development of effective workplace avalanche safety initiatives.

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