

Mountain safety in snow surveys

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The first aim of Fondazione Montagna sicura (www.fondazionemontagnasicura.org) is the mountain safety improvement. Fondazione employs a pool of experts working on the western Italian Alps to collect data on snow cover and on glaciers in order to issue the avalanche Bulletin of the Valle d'Aosta Region, to update the glaciers and avalanche cadasters, but also to disseminate a safe approach to mountain activities.

The first step is ensuring the employees safety by assessing hazards related to the field surveys. For this reason Fondazione Montagna sicura drew up the 'Risk Assessment Document', which screens the different outdoor working activities, the related hazards, the preventive measures taken to reduce possible damages.

This document outlines the different steps for each survey planning, which begins the day before a survey analysing in details the terrain and the specific hazards (e.g., the choice of the itinerary, the area for the snow/glacier surveys, the specific skills of the people involved), the meteorological conditions, the personal safety equipment (Artva, shovel, probe, abs, avalung, crampons etc). All these data are collected in a specific form and are validated by the office supervisor. In case of avalanche danger level 4 or 5 (on the basis of the snow and avalanche Bulletin) specific behaviors are taken in account: heli-surveys with mountain guides.

Every year Fondazione Montagna sicura organizes for its employees training courses on first aid, avalanche safety, ski-mountaineering, glacier hiking, off-road driving. Moreover, last year Fondazione became the referent institution for the mountain safety training courses of the Valle d'Aosta Region.

KEYWORDS: hazards, safety, field surveys, Risk Assessment Document, PPE (Personal Protective Equipment).

INTRODUCTION

The first aim of Fondazione Montagna sicura (www.fondazionemontagnasicura.org) is the mountain safety improvement. Fondazione employs a pool of experts working on the western Italian Alps to collect data on snow cover and on glaciers in order to issue the avalanche Bulletin of the Valle d'Aosta Region, to update the glaciers and avalanche cadasters, but also to disseminate a safe approach to mountain activities.

DESCRIPTION

In Italy the health and safety at work are regulated by the Legislative Decree n.81 of April 9th 2008, which introduced several rules. The employer must provide particular rules to improve health and safety at work. First of all he has to assess risks for health and safety at work (providing the Risk Assessment Document),

to eliminate them and, if it's not possible, to reduce them; he also has to provide the health monitoring of his employees etc.... Specific training for hazards at work had been introduced by the Lgs 81/08. Regulations on the field work and the necessary PPE (Personal Protective Equipment) for an Avalanche Center do not exist in Italy so Fondazione tried to find out preventive measures and rules for the management of its activities together with a team of experts, and tried to build training courses to mitigate risks. Fondazione drew up its 'Risk Assessment Document' (Fig. 1), which screens the different outdoor working activities, the related hazards, the preventive measures that have to be taken to reduce possible injuries. This document outlines the different steps for each survey planning, which begins the day before with a detailed analysis of the terrain and the specific hazards, the choice of the itinerary, the site for the snowpack/glacier surveys, the specific skills of the people involved), the weather conditions, the personal protective equipment (ARTVA, shovel, probe, abs air-bag, avalung, crampons etc). All these data are collected in a specific form and are validated by the office supervisor.

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N°	ACTIVITY	HAZARDS	HAZARDS REDUCTION
C9	<p><u>Snowpack observations:</u> information on the structure and stability of the snowpack to assess current and future avalanche conditions. Snow profiles, snowpack properties and snow stability tests.</p> <p><u>Tools:</u> ski-touring equipment, ARTVA, gps, probe, shovel, pipe corer. Snowpack observation kit: thermometer, lens, plate, snow board tube, dynamometer, probe, lanyard, snow saw, camera</p>	<ul style="list-style-type: none"> - Avalanche hazard; - accidental fall; - fall of tools from the top of the snow-pit - slip on steep slopes; - trauma, shock, impact, abrasion; - injuries caused by the use of tools; - hazards due to extreme weather conditions eg. frostbite; - fatigue/ difficulty and dehydration; - eye injuries and burns from UV exposure; - loads handling (movimentazione manuale dei carichi). 	<p>Training courses: Loads handling; ski-touring; Progressione su ghiacciaio; trekking; ARTVA use.</p> <p>PPE (Personal Protective equipment): Use of appropriate equipment depending on the site and on weather expected. Medical package, radio and/or mobile phone, whistle, sunglasses, sun cream;</p> <p>ARTVA, shovel and probe;</p> <p>Depending on the snowpack conditions: helmet, Avalung or ABS air-bag; on a glacier: glacier rope, piolet/ice axe, crampons, harness, daisy chain, carabiners, slings, belay device, ice screws.</p> <p>In case of avalanche danger 4 or 5: only heli surveys with a mountain guide.</p>

Figure 1. Extract from the Risk Document Assessment related to the C9 activity (Snowpack observation).

In case of avalanche danger level 4 or 5 (based on the snow and avalanche Bulletin) specific rules are provided: only heli-surveys with mountain guides are allowed.

Fondazione also provides for its team training on safety and general risks at work, fire-prevention, first-aid, off-road driving, medical and mountain medicine examinations for the team that works at high altitude specific. Training courses on avalanche safety, ski-mountaineering (Fig.2, 3), glacier hiking are provided. Moreover, last year Fondazione became the referent institution for the mountain safety training courses of the Valle d'Aosta Region and these trainings were opened to people from other companies. Test on ARTVA use and ski skills are also done to assess individual abilities and improvements thanks to the training sessions. Periodic controls on the equipment are carried on to ensure its perfect working. Moreover, in order to minimize further the risks, a protocol reporting few important guide lines for the snow surveys will be issued for the beginning of winter 2014/15. Some rules for the site selection for study plots, study slopes, stability tests and snow profiles will be proposed such as the followings. All sites should be safe, geographically representative of the snowpack and of the avalanche terrain in exam, and undisturbed. The study slope should be relatively uniform in aspect and slope angle. The worse is the snowpack condition the shorter should be the slope. Depressions such as gullies or other terrain traps should be avoided, as very wide and open slopes, abrupt slope changes and slope inclination over 35°. The site should be reached from the top in order to have a wider and better view of the slope. To gain information about a wind-loaded slope, a safe part of a similarly loaded slope for the test should be found.



Figure 2. The alpine guide shows some technical aspect of ski-mountaineering during a Fondazione training course.

Possible ways out should be considered in the choice of a site. The Abs air-bag should be kept on during the survey. Heli-ski areas and crowded slopes should be avoided. Radio and satellite telephone is available for the team, and are always tested before every survey.



Figure 3. Descent from a gully during a training course

At the end of each survey remarks, from the site selection to any kind of remarkable comment, are registered in a specific form in order to improve continuously the knowledge and the assessment of the risks. The aim of Fondazione is to improve safety in its activities with a better management of the field work, that's why provides also a team of alpine guides, specialized on snow and avalanche terrain, who gets specific training also on safety every year.

To ensure an adequate safety level in field works done together with other companies, Fondazione has provided a disciplinary protocol to rule these interferences. The aim of this document is to regulate the procedures related to Legislative Decree 81/2008 for all employees of other companies when involved in field activity with Fondazione workers in order to ensure mutual safety. Same PPE, same training courses, medical examinations and specific conditions, such as the commitment of safety management to an alpine guide for particular activities, are

required and reported in the disciplinary document.

CONCLUSIONS

Much has been done in the last years to assess and improve safety at work. The scientific progress, the optimization of the PPE, the continuous training and medical examinations will help Fondazione to improve safety and health in all its activities. The next winter season will add new elements and data to improve furtherly the procedures during snow surveys, and will help to find other sites properly, in term of safety, for the observation of snowpack and the and study of slopes. The Risk Assessment Document will continuously be updated to assess a better management of all Fondazione activities.

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Figure 4. The Avalanche Warning Service team during a ski-mountaineering course on Monte Rosa

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