

Total safety in mountain passes

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ABSTRACT: We describe the procedure we follow to keep the Flüela Pass open in early winter and to re-open the road in the spring.

KEYWORDS: avalanche protection, avalanche control

1 INTRODUCTION

Since the opening of the Vereina railway tunnel, the Flüela Pass (which connects Davos with the Engadine valley) is closed during the winter (Fig. 1). The Association Pro Flüela tries to keep the pass open in early winter (until the end of December) and to re-open it early in spring, i.e. from 1 May on.

2 PROCEDURE

Our vision is to provide total safety to road users, our workforce and to have zero impact on the environment. We analyse the factors given in Table 1.

Table 1:

Item	What	Where from
Snow	Temperature, amount	- Weather reports
Avalanche forecasts	5 Danger levels	- Snow profile
History	Previous experiences	- IMIS
Wind	Direction/strength	- Personal observations
Recent activity throughout area	Recent experiences	- Helicopter reconnaissance
Danger zones	Recent activity, expected frequency	- SLF

Two primary decisions must be made:

1. To continue with work/open the road.
2. To close the road and/or prevent further work.

Secondary decisions involve

1. What work should be carried out and when.
2. What further reviews are necessary before further work is committed to.

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A detailed risk assessment is continually carried out blending all elements of the analysis above and then assessed against a classic grid of suitability, acceptability and feasibility (Table 2).

Table 2:

Suitability:	Would the action make a safe opening of the road more likely
Acceptability	Against a criteria of total safety is any proposed action financially viable
Feasibility:	Can a potential action be carried out e.g. are the equipment/skills available

Having decided what we want to do we then carry out the necessary actions in an environment of total safety. Inevitably this means a continued process of further analysis and choosing. Implementation naturally involves substantial training.



Fig. 1: View to the top of Flüela Pass from the Engadin side.