

EXPERT ASSESSMENT OF AVALANCHE RISK FOR LOCAL AVALANCHE PREDICTION AND CRISIS MANAGEMENT

THE EXPERIENCE OF THE RTM¹ DEPARTMENT

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INTRODUCTION

Living in the mountain environment requires managing the risk of avalanches by adapting to the areas of exposure. However, it is clear that hiking trails, ski resorts, villages, and roads cannot be managed identically. These areas require very different approaches in terms of the data to be gathered, the predictions to be made, and the decisions to be made when confronted with such risk. The search for a continuous operational structure for mountain infrastructures, access to ski resorts, transit itineraries, as well as permanent and seasonal dwellings is increasingly urgent.

Whether the stakes be high (with two major management restrictions: the greatest continuity of service possible and maintenance of the highest level of safety) or less consequential, the need for reliable expert assessment finds its full meaning in the avalanche risk expert's intervention. However, this work is complex. Can the expert provide a precise assessment of the level of risk? How should the dangers be expressed? Are there residual risks that are acceptable or manageable? How far does the expert's role extend in decision making?

Given their implantation in mountain areas and their experience in the field of avalanches, the RTM department is frequently called on for this type of mission as support for mountain area management. They have recently clarified how their experts will provide consulting services, in light of two approaches:

- local prediction of avalanche risk missions (PLRA, prévision localisée du risque avalanche),
- consultation for ill-prepared crisis situations.

The following outlines the essential points and methodological aspects.

PLRA: OBJECTIVES, REINFORCED KNOWLEDGE OF COULOIRS, A DETAILED PREDICTION BULLETIN

An operational example is the safety reinforcement of the national Pyrenees road network, strategic for access to Cerdagne (DIRSO –RTM convention), which has set up four main phases:

- following snow and meteorological conditions contributing to avalanche risk, notably through monitoring indicators;
- the expert assessment phase when the indicators surpass preestablished limit values, with assessment of risk levels;
- possible activation of preventive snow release in equipped avalanche couloirs;
- finally, under the guidance of the road network manager and if necessary, the restriction of road traffic conditions.

An indispensable precondition is excellent knowledge of the couloirs involved. This is the objective of the monographs, developing the knowledge of local experts. Then the method adopted for analysis and decision making is organized around three essential steps: in-depth analysis of weather and avalanche risk prevention bulletins for each massif, produced by Météo-France; specific data collection in the environment of each couloir endangering roads; and finally, diagnosis, a rigorous qualitative comparison of the factors that are likely to aggravate or attenuate the risk. This mode of expert assessment was designed to be carried out within a team. It concludes in a final written report that is

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regularly updated. It was designed to provide the transparency and traceability of the assessment and serves as the vector of communication with avalanche risk managers.

INTERVENTIONS IN ILL-PREPARED CRISIS SITUATIONS : THREE SUCCESSIVE PHASES

First and foremost, through data collected by the expert himself as well as developing all other data provided, the expert can establish an opinion, expressed in a clear, precise, and global communication, based on a selection of information that is useful to decision makers.

Then the expert must take on a guidance role: specify and communicate his expertise (evaluation of the danger). In general, this will be an assessment of the probability that a particular structure be damaged by an avalanche in the upcoming hours (or days). This evaluation combines the probability of an avalanche release and its runout reaching important structures. The expert should provide an assessment of the danger for each avalanche couloir (or for each group of similar couloirs).

Finally, these evaluations must result in operational decisions. They are the responsibility of the decision maker (village mayor, prefect, etc.). The expert justifiably participates in these debates but without substituting for the decision maker (who must consider many other constraints that do not concern the avalanche expert: constraints related to confinement or evacuation solutions, alternative solutions, economic constraints, rescue operation organization, etc.).

Multi-couloir expert assessment: although an expert assessment of each couloir is indispensable, prior grouping of the couloirs presenting topographical or morphological similarities can be valuable:

- *type A*: grouped by similar modes of functioning (altitude, exposure, etc.)
- *type B*: grouped by distance from structures: structures easily reached, structures reached by a major avalanche (but already known), structures reached by an avalanche surpassing known events (runout farther downstream, wider runout, trajectory change, etc.).

This reasoning is complex, but, roughly, *type A* avalanches should be of particular assistance in evaluating the need to release avalanches and *type B* should assist in evaluating the probabilities of runoff reaching important structures.

The EXPERT is responsible for : being able to explain the reasons supporting the assessment, instituting constructive dialogue, attending to being clearly understood, taking initiatives

Although these situations are often emergencies, the expert must remain capable of presenting the essential information that he has selected, explaining the reasons behind the assessment, and if need be dialoguing with other experts (as well as sharing conclusions that will be communicated to the decision maker). His opinions are regularly updated and presented in written form. The bulletin reviews the major information and then states the expert's opinion – i.e., the assessment of the danger – and finally he can proceed to proposing operational decisions. The more explicit he is, the more he will facilitate feedback, progress, and improvement.

In emergency situations, the expert must also take initiatives. Confronted with human pressures, the expert must stick to his method. He should not respond to inappropriate questions or accept all requests from overly hurried leaders in the crisis situation. He should also raise important issues that have not yet been treated (unexamined avalanche couloirs, hamlets or roads that have not been evoked by the emergency committee, etc.).

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