ICAR AND ITS IMPORTANCE IN AVALANCHE RESCUE

Hans-Jürg Etter*, Roland Meister* and Dale Atkins**

*Swiss Federal Institute for Snow and Avalanche Research (SLF)
Davos Dorf, Switzerland

**Colorado Avalanche Information Center (CAIC)
Boulder, Colorado, USA

ABSTRACT: The International Commission for Alpine Rescue (ICAR, http://www.icar-cisa.org/) was founded 1948 by influential representatives of the alpine rescue organizations in Austria, France, Germany, Italy and Switzerland. From the beginning of the partnership, the aim was to coordinate materials, techniques, strategies and information for alpine rescue-actions.
At present, 33 organizations representing 22 countries (in Europe and Northern America) are associated in the ICAR. At the annual meetings, four sub-commissions deal with the different tasks of alpine rescue. Beside climbing, glacier or cave accidents, snow avalanches are of eminent interest.
Recommendations for safety measures in outdoor equipments are a strong tradition in the avalanche section of ICAR. We mention the harmonization of the frequency for avalanche beacons in 1989, which, after intense discussions, was fixed worldwide to 457 kHz after ICAR's intervention. Also 1993, when the avalanche warning services coordinated the avalanche danger scale, ICAR played a dominant role in the harmonization.
Overall statistics for the last 20 years prove an annual mean of 106 avalanche fatalities in the alpine countries and 138 after adding those in Northern America. Most persons died in avalanches during 'Back- country' touring, but important (and with a gentle positive trend) are also those caught during off-piste skiing/boarding or snowmobiling.
In analyzing the questionnaires of the rescue teams and the characteristics of the snow cover progress during winter, detailed information on avalanche accidents can be found and should stay a main focus.
Today, efforts are necessary to merge the practical work of the alpine rescuers, avalanche forecasters and educators. Special efforts are also necessary to reduce the risk of the rescuers themselves.

KEYWORDS: mountaineering accidents, mountain rescue, prevention, emergency systems, avalanche accident trends

1. INTRODUCTION

Mountain rescue associations are linked together by the International Commission for Alpine Rescue (ICAR). ICAR was founded in 1948, as a result of meetings between mountain rescuers from the Alpine countries.
ICAR aims to offer mountaineers in difficulties the best possible assistance and to prevent mountaineering accidents. ICAR currently has 33 member associations representing 22 countries in Europe and North America. ICAR is divided into four commissions:

* *Corresponding author address:* Etter H.-J., Swiss Federal Institute for Snow and Avalanche Research (SLF), Flüelastrasse 11, CH-7260 Davos Dorf, Switzerland, tel: +41 417 01 24; fax: +41 417 01 10; email: etter@slf.ch

a) MOUNTAIN EMERGENCY MEDICINE

The International Commission for Mountain Emergency Medicine ICAR MEDCOM was founded with the aim to improve medical treatment of casualties in the mountains.
To date ICAR MEDCOM has a membership of 52 active emergency physicians working in mountainous areas, from 22 European and North American countries, Nepal, Argentina and South Africa. The main goal of the Committee is the elaboration of recommendations and guidelines dealing with scientific and practical aspects of mountain rescue and emergency treatment of casualties in mountainous terrain. The papers are intended for emergency physicians, paramedics and first responders.

Important achievements for example have been the 'Consensus guidelines on mountain emergency medicine and risk reduction', (Elsensohn, F., 2001) or "First aid on mountains", (Beikircher et al., 2003).

b) TERRESTRIAL RESCUE

The main objectives of ICAR's Commission for Terrestrial Rescue are to constantly improve the safety of rescuers and to assist accident victims as efficiently and as safely as possible. Its tasks include presenting new techniques and methods, facilitating the exchange of experiences regarding rescue operations, presenting organizations and deployment strategies for catastrophes, offering mutual support for the development of rescue organizations in other countries, and being involved in the design and further development of rescue equipment.

c) AIR RESCUE

The ICAR Flight Rescue Commission is consisting of experts, pilots, Helicopter Emergency Medical Service-crew members (HEMS) and hoist operators from all ICAR member nations. The Commission is a platform to exchange experience and a possibility to learn from each other, as well as to prevent incidents.

d) AVALANCHE RESCUE

The ICAR Avalanche Commission is to provide a platform to present avalanche search and rescue systems. The exchange of experience and the discussions at the meetings help to gain new insights and to transfer the knowledge to the practice. A main task of the commission is to issue recommendations on safety measures to minimise avalanche accidents even to rescue teams.

During ICAR's early years there was a clear need for improved help for people who got into difficulties in winter. Special attention in this regard was paid to avalanche accidents because locating a buried avalanche victim quickly is even more urgent than locating victims of other types of mountain accidents. Consequently, search methods and location devices had to be developed and improved systematically (e.g. searches with eye and ear, using avalanche dogs, search beacons and electronic transceivers, etc.). Data recorded and calculated over many years has shown that out of every ten snow-sport enthusiasts caught up in an avalanche, at least nine triggered the avalanche themselves.

Two key factors (inappropriate behavior and lack of knowledge) in mountain rescue have always especially been deemed important: accident prevention and the collection of avalanche accident information. Consequently, as early as the 1950s, the SLF (Swiss Federal Institute for Snow and Avalanche Research) was welcomed as an extraordinary member of ICAR. Other organizations benefiting from the same member status include France's ANENA (French Association for Snow and Avalanche Study), which has been a member for the past 30 years, Italy's AINEVA (Italian Association for Snow and Avalanche Study), and Norway's NGI (Norwegian Geotechnical Institute), both of which have been members for approximately 20 years. These institutions are not responsible for performing actual rescues in the respective countries, but rather play a key role in coordination, research and training.

2. MEASURES, RECOMMENDATIONS AND ICAR'S INFLUENCE

In 1990, an ICAR working group started developing a comprehensive multilingual glossary to determine the frequently required and widely used specialist terms in the various languages of its member countries. This working group received substantial material support by the international foundation 'Vanni Eigenmann'. In 1994, the dictionary was available in electronic form in English, French, German, Italian and Spanish. In 1995, Slovenian translations were added to the reference work (Segula, 1995). One characteristic feature of this dictionary is its focus on specialized avalanche vocabulary.

The following internationally adopted recommendations also apply in the area covered by the Commission for Avalanche Rescue:

- REC L 0001 - 'Requirement to avalanche dogs and their masters'
- REC L 0002 - 'ICAR Recommendation about Avalanche Beacons'
- REC L 0003 - 'Regarding the Marking of Locations on an Avalanche' and

- REC L 0004 - 'Regarding Avalanche Search Training with Buried People'
are under preparation.
When institutional avalanche warnings were first introduced in individual countries (from 1945 in Switzerland, 1953 in Vorarlberg, 1960 in Tyrol, 1970 in France, 1977 in Trentino, Veneto and South Tyrol, and at around the same time in the United States, Canada, former Czechoslovakia, Scotland and Spain), each country developed its own avalanche warning systems and hazard ratings. These hazard ratings were difficult to compare with those of other countries due to the considerable variation in the terms used and their interpretation.
It took unrelenting pressure from ICAR to standardize the hazard ratings with the five-level European Avalanche Hazard Scale published in 1993 comprising corresponding written guidelines on interpretation. Two years later, the United States and Canada also adopted this avalanche hazard rating scale. Accordingly, avalanche hazards are given one of the following five ratings: 1. LOW; 2. MODERATE; 3. CONSIDERABLE; 4. HIGH; 5. VERY HIGH / EXTREM. These ratings are defined on the basis of snowpack stability and the likelihood of triggering an avalanche. In addition to these individual ratings, some countries offer advice on the possible impact on exposed roads and buildings, and issue recommendations on the conduct of snow sports enthusiasts outside protected snow sports areas. Detailed interpretation guides have now been produced (see Meister 1998, Stoffel and Meister, this issue or SLF, 2004), available in French, German and Italian, http://www.slf.ch/info). No actual bans are issued. Instead, avalanche bulletins contain general advice on particular elevation or aspects 'at risk'. However, the decision to venture onto a steep slope in a 'Freeride' or 'Backcountry' area is still the responsibility of the individual involved.

3. ICAR AND EMERGENCY SYSTEMS

Today everyone knows that it is a wise precaution to carry devices that could prevent burial in an avalanche or lead to the swifter discovery of buried victims.
The first electronic rescue beacons (e.g. Skadi, Pieps, Barryvox, ARVA, Ortovox, Vitre, etc.) originally operated on different frequencies. This meant they were sometimes incompatible. Consequently, in 1989 ICAR recommended the standardization of transmission frequencies for rescue beacons. After several years of negotiations, an agreement was reached with the manufacturers under the patronage of the international foundation 'Vanni Eigenmann', Italy, to set the transmission frequency at 457 kHz.
The new digital rescue beacons with optical search devices now meet the minimum requirements for this type of device after a few initial (operating) problems, thanks to advice provided by ICAR, amongst others. Confident handling of these devices is still a prerequisite for their rapid, effective deployment in an emergency situation. Detailed findings and results emerged from tests conducted in France (Sivardière, 2000). An optimum balance needs to be met between reliable handling and the width of the search strip, which the user must know. The important factor would seem to be placing the main emphasis on the time factor.
The rapid development on the device market, with beacons, RECCO, ABS, Avalung and Avalanche ball, prompted ICAR to adopt a clear position once again in 1999. A resolution was drawn up to highlight the fact that emergency systems are only one of many resources used to prevent people from becoming avalanche victims. The resolution went on to offer content and advice on the following issues: consulting avalanche bulletins; avoiding triggering avalanches; personal experience and an indication that people must be totally familiar and able to operate with the various devices used in rescues. In this regard, comprehensive studies on operating methods for rescue devices also provided an additional theoretical basis (Kern, 2000) as well as offering a range of practical hints for manufacturers.

4. ICAR AND AVALANCHE RESCUE

Avalanche accidents used to be associated with the idea of a stolid rescue column making its way up the mountain. However, we now know that every minute counts when rescuing buried victims. Careful organization and swift assistance are therefore crucial, with helicopters, radios, sometimes handys, satellite telephones and occasionally also GPS (Global Positioning System) playing a vital role. The most up-to-date rescue equipment, well-trained avalanche dog

Picture 1: Example of a Rescue mission with beacon, avalanche dog, Recco and probe. February 2001, Zinal, Switzerland

teams and well-drilled rescuers should also be used whenever possible.

In flyable weather conditions, any area in the central Alpine region can be reached by air within around 15 minutes. In the United States and Canada, flight times are around 30 minutes but in many places can be 1 to 2 hours. Helicopters cannot be used for rescue during storms. This situation needs to be taken into account. The safety of the rescuers whilst reaching the victim and on the accident site also needs to be considered, since rescue action by their nature often take place in situation with increased avalanche hazard.

Alarm systems and rescue organizations have developed differently depending on the region, starting out in most cases as associations of rescue volunteers. The Alpine Associations, the Red Cross, the military, and the emergency services have all helped to rescue victims buried by avalanches. The different individual methods deployed have now been harmonized. Particular emphasis has been placed on firm management with a rescue coordination center and accident site commander. The current trend in Europe is towards the use of smaller, more professional rescue teams, which may be supported or led by police agencies. A coordinated effort of terrestrial (ground-based) rescue and helicopter rescue teams provides the best basis for success.

As mentioned above, ICAR was a pioneer in the domain of terrestrial rescue and especially in winter mountain rescue. Thus, for example, the first rescue of a living victim using a trained avalanche dog, which took place in 1954, was thanks to ICAR. Right from the outset, the focus has always been on finding and using optimal search strategies.

However, despite all the efforts made to improve such techniques, it is important to remember that the lives of people buried by an avalanche are still at risk.

Records (Weymann 1999; SLF, Meister, unpublished data from 1981/1982 to 2000/2001) confirm that mechanical injuries cause more than 20% of avalanche fatalities. Accordingly, when the avalanche comes to a stop, two in ten victims are either already dead or too badly injured to survive.

Summing up, the following conclusion can be drawn:

To minimize the number of avalanche victims, it is essential to pay proper attention to the following three areas:

a) Awareness-raising & public relations work;
b) prevention & warning;
c) optimal rescue work.

Operation protocols and experience both show that every rescue operation is conducted differently. In other words, situational actions are extremely important. However, lessons can be learned from experiences (at home and abroad). Over time, a number of key points arise, which will lead to improved implementation and therefore greater success with rescue operations.

Comprehensive accident analyses based on precise statements and exchange of experience need to be performed before any general rules can be developed. Not only should the time be taken for the rescue operation to be recorded, but notes should also be made on anything that went wrong.

Atkins (2003) noted the following frequent errors (amongst others) in organized search and rescue operations:

- Poor control over access to accident site
- Landing zone / Staging area on debris
- Not probing the entire debris field
- Not probing the toe of the debris
- Not probing / digging where dogs alert
- Contamination of avalanche debris by rescuers

An important consequence from it is:

- Develop and practice a written rescue plan.

The plan describes:

. procedures
. personnel
. leadership
. communications
. equipment
. resources

5. ICAR AND DATA COLLECTION

ICAR is also the best platform for collecting data from the individual countries. Transnational trends can be pinpointed. Inappropriate behavior by certain groups of people can be shown. Corresponding preventive measures are to be developed in conjunction with these findings. Table 1 shows avalanche accident data for 20 years (1983/84* to 2002/03) from several ICAR member countries.

* 1983/84 means the hydrologic year from 1 October 1983 – 30 September 1984

	France	Austria	Switzerland	Italy	Germany	Slovenia	Liechtenstein	Poland	Slovakia	Czechoslovakia	Bulgaria	Croatia	Rumania	Norway	Great Britain	Sweden	Ireland	Spain	Andorre	USA	Canada	Total
1984	28	41	41	20	6	0	0	6	0	5	6	-	-	0	2	-	-	5	2	12	4	178
1985	45	40	55	33	7	2	1	5	0	13	0	-	-	4	0	-	-	8	-	13	8	234
1986	40	43	34	27	2	7	0	1	0	0	0	-	-	22	4	-	-	4	-	17	9	210
1987	20	31	15	16	3	1	0	4	-	-	0	-	-	7	2	-	-	1	-	21	12	133
1988	24	37	24	38	0	0	0	5	0	4	1	-	-	4	0	-	-	-	-	8	7	152
1989	17	14	16	11	0	0	0	0	0	0	0	-	-	4	0	-	-	7	-	6	6	81
1990	22	12	28	14	1	0	0	0	0	0	0	-	-	3	0	-	-	4	-	8	9	101
1991	47	20	38	38	8	1	0	0	0	1	0	-	-	1	1	-	-	21	-	8	12	196
1992	28	9	13	10	1	0	0	1	0	0	1	-	-	4	0	-	-	6	-	24	6	103
1993	23	23	28	24	3	0	0	1	0	4	1	-	-	1	0	-	-	2	-	29	12	151
1994	23	13	21	24	1	3	0	0	0	0	0	0	-	5	1	-	-	-	-	13	8	112
1995	23	24	20	12	1	1	0	0	4	0	0	3	-	3	0	-	-	6	-	28	15	140
1996	44	37	17	9	3	6	0	5	4	0	2	0	-	2	0	-	-	2	-	30	10	171
1997	23	27	24	13	4	0	0	5	2	0	4	0	-	4	0	0	-	4	-	22	16	148
1998	35	11	13	14	0	1	0	2	5	2	2	0	-	6	-	0	-	0	0	26	21	138
1999	44	50	36	12	3	0	0	5	1	0	0	0	-	1	5	0	-	-	3	32	16	208
2000	28	39	20	16	0	0	0	0	2	0	2	0	0	6	-	2	-	0	0	22	10	147
2001	28	22	32	29	1	1	0	1	5	0	0	0	0	9	2	1	-	-	-	33	12	176
2002	29	17	24	7	3	0	2	2	5	-	-	-	-	4	2	-	-	-	-	35	13	143
2003	26	34	20	25	3	2	0	-	4	-	-	0	-	2	1	-	-	-	-	30	29	200
Total	597	544	519	392	50	25	3	43	32	≥29	≥19	≥3	≥0	92	≥20	≥3	-	≥70	≥5	417	235	3098

Table 1: Overview and total number of avalanche fatalities in the individual countries. Some data are missing (-).

Without looking at the individual countries in Figure 1, it is important to note that there has been a renewed upward trend in the number of avalanche victims in ICAR countries since around 1988-1989. The few missing data from individual countries will have little impact on this trend.

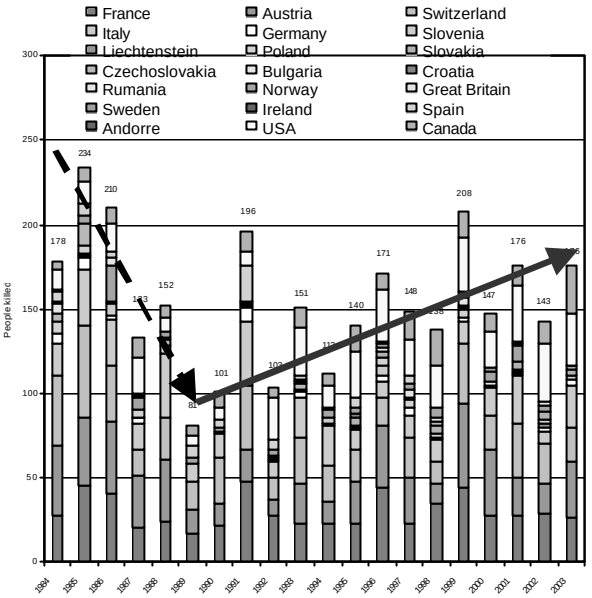


Figure 1: Avalanche Fatalities 1983/84 – 2002/03, 20 years. Visual trend overall countries

It is also clear that most of the avalanche victims were recorded by six countries where there were 2,704 fatalities over 20 years (France, Austria, Switzerland, USA, Italy and Canada). These are the same countries that have a significant winter tourism market.

In the following figures, we look solely at the countries with continuous records, so that our observations are based on uniform sets of data.

As indicated by Figure 2, with its columns providing annual totals and polynomial trends, experiences in the different countries have varied greatly. Following a marked downward trend (between 1984/85 and 1995/96), Austria and Switzerland have seen a clear rise in the number of victims in recent years. There are no clearly observable trends for France, Slovenia, Liechtenstein and Germany. In these countries, the number of victims remains either at a relatively high or relatively low level. By contrast, the numbers of victims in the United States and Canada is rising steadily.

Why has the number of victims increased since 1995/96? For Austria and Switzerland this can be explained by extraordinary winter 1998/99.

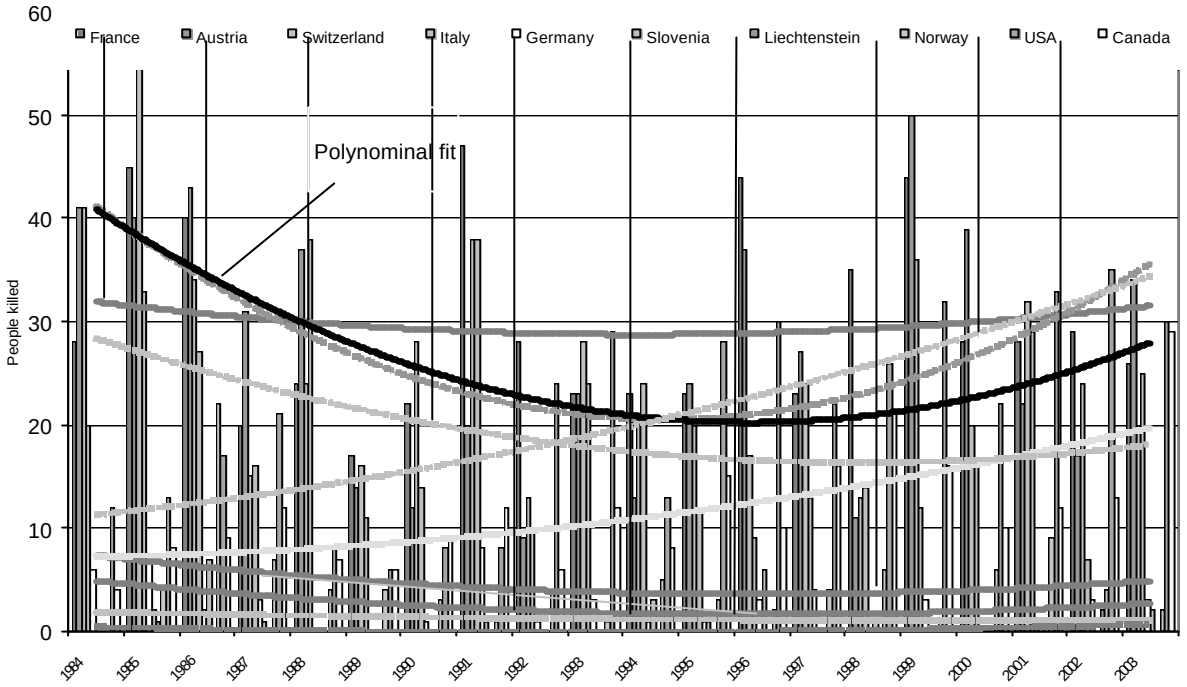


Figure 2 : Avalanche Fatalities, 1983/84 – 2002/03, 20 years in some ICAR countries with complete statistical series

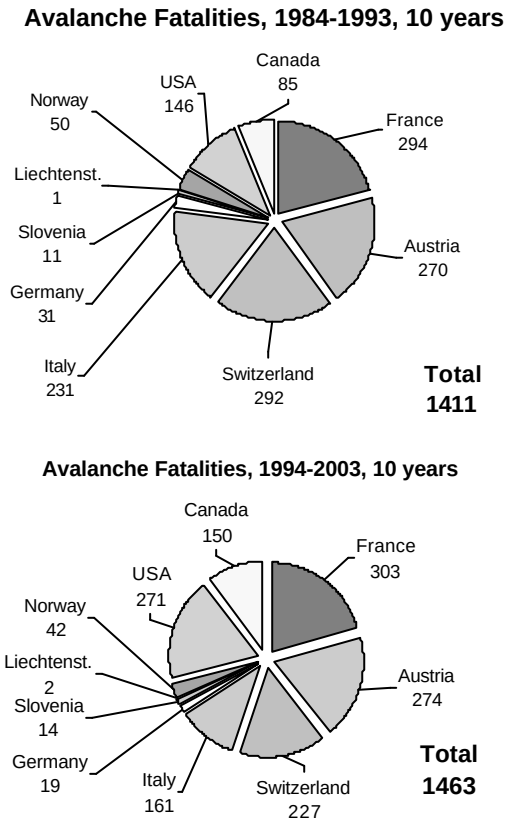


Figure 3 : Avalanche Fatalities, 1983/84 – 2002/03, two 10-year periods

Whereas for United States and Canada the development of new snow sport opportunities and trends all over should be taken into consideration.

Subsequent figures may provide a pointer to some possible causes.

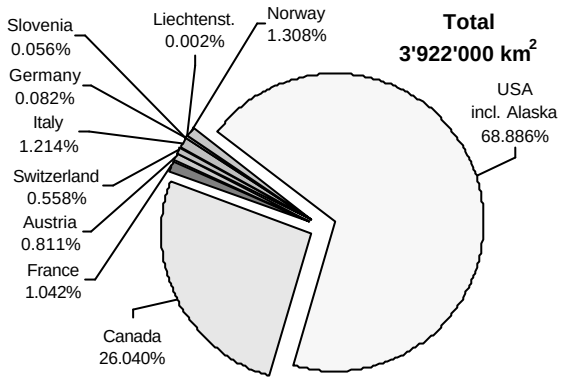
Firstly, on the left, let's look at the trend over the past 20 years, split into two 10-year periods.

Figure 3 shows that the number of victims in Central Europe, and therefore the Alps, has decreased over the past 20 years, while the percentage of victims from North America and Scandinavia has increased.

Another approach is to compare areas over 1000 m above sea level in the different countries and calculate the number of victims in relation to the surface area (Figure 4). Simply dividing up the surface area indicates that this may provide a very different picture, as confirmed by Figure 5, which is based on the average number of victims in each country per 1000 km^2 for the 20-year period in question. The results are surprising. The Principality of Liechtenstein, with its small surface area of 160 km^2 and 59 % above 1000 m, comes first, followed by Switzerland and Austria.

This presentation also very probably explains why avalanche accident statistics are viewed

differently in individual countries, especially by policymakers.
Consequently, it's not surprising that each country with similar numbers of victims has not developed similar or, in some cases, centralized institutions. It is essential that the different surface areas of mountainous terrain are taken into account.



[1]Alpine: defined on the *tourist view* (reference altitude 1000 m) by Werner Bätzing in 'DIE ALPEN', 2003

Figure 4 : Alpine[1] area in some ICAR countries

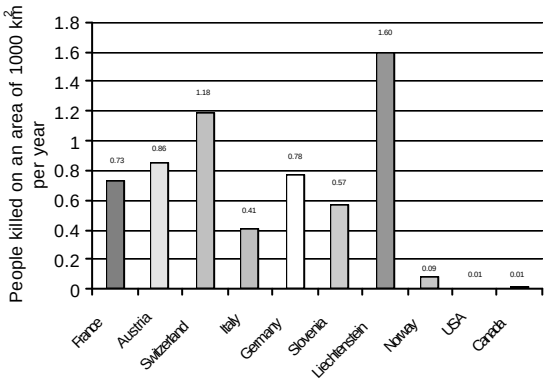


Figure 5 : Avalanche Fatalities on average to 20 years per 1000 km^2 in Alpine[1] area, 1983/83 – 2002/03

Under this approach, the latitude of North America and the European countries affected also needs to be taken into consideration.

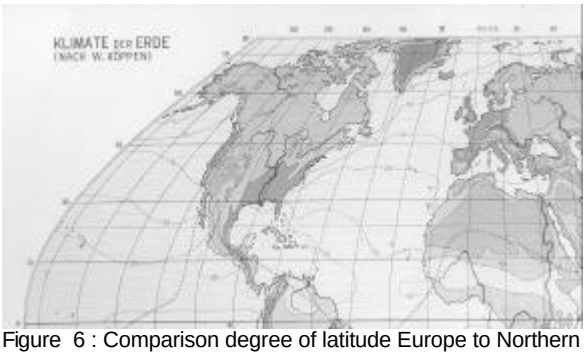


Figure 6 : Comparison degree of latitude Europe to Northern America

However, generally speaking, there are no clearly evident major differences (see Figure 6), which validates the observations made in Figure 5.

It is not only the number of victims rescued or to be rescued per country and/or region that is important to rescue organizations, but also their activity on the ground or, more precisely, the location of the victim at the time of the accident ('Backcountry', 'Freeride', 'On road', 'Buildings' etc.). See Table 2.

	Backcountry	Alpinist	Snowmobile	Freeride	On skirun	On road	Buildings	Other
1984	76	36	4	29	5	14	13	1
1985	102	34	4	73	2	19	0	0
1986	92	30	5	28	6	33	11	5
1987	56	15	2	44	5	0	1	10
1988	82	21	0	30	7	0	7	5
1989	31	12	1	26	1	1	4	5
1990	56	18	1	18	1	1	1	5
1991	84	29	2	49	13	2	0	17
1992	46	25	4	14	0	6	1	7
1993	57	44	5	24	8	3	1	9
1994	50	16	13	26	1	0	0	6
1995	57	28	12	29	1	3	4	6
1996	66	43	6	43	2	2	1	8
1997	64	38	8	22	4	3	0	9
1998	58	28	20	24	0	2	0	6
1999	41	22	13	38	4	7	76	7
2000	70	23	7	39	1	3	1	3
2001	60	30	26	46	1	5	0	8
2002	54	12	21	46	1	2	3	4
2003	96	18	23	35	1	1	0	2
sum	1298	522	177	683	64	107	124	123

Table 2: Overview and total avalanche fatalities by category. Some values are missing for certain years.

An initial overview affords an insight into the relationship between the individual categories and development over the period in question (see Figure 7). With the exception of the intense winter of 1998/99 in Europe, the 'Backcountry' (skiers and snowboarders) category always accounted for the largest part of avalanche fatalities.

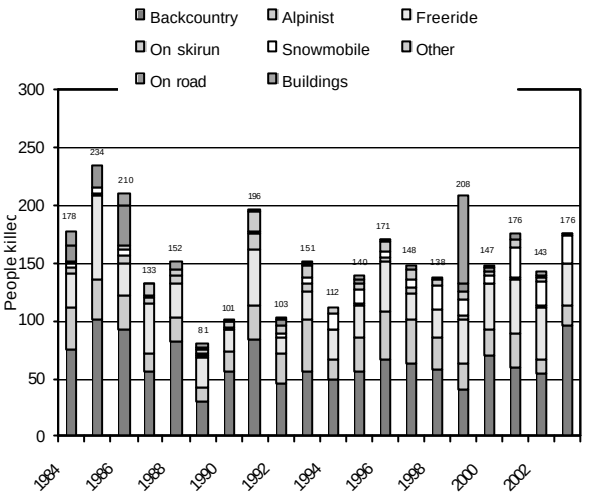


Figure 7 : Avalanche Fatalities 1983/84 – 2002/03, overall categories

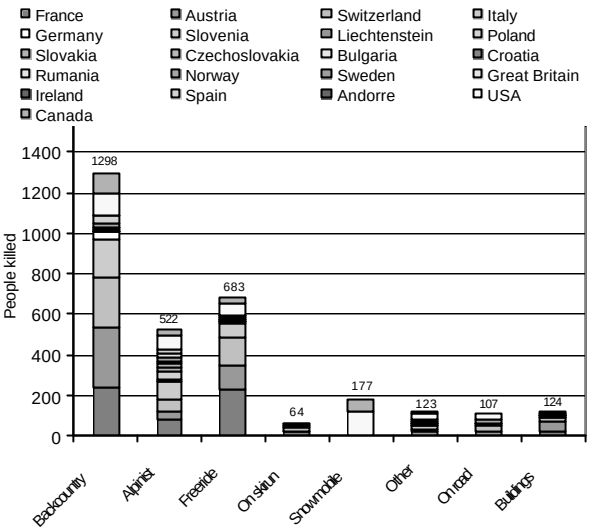


Figure 8 : Avalanche Fatalities 1983/84 – 2002/03, overall categories and member-countries ICAR

The individual category totals for the 20 years under investigation clarify the key areas for accident locations or activities, Figure 8. Only the 'Backcountry' category shows almost twice as many avalanche fatalities as the 'Freeride'. It should also be borne in mind that, at least in Europe, there are much more people taking part in 'Freeride' activities than in 'Backcountry' activities, but precise number are unfortunately still not available. Moreover, the figures in the 'On road' and 'Buildings' categories 'only' account for around 7% of all victims, with around 331 avalanche fatalities.

Figure 8 clearly suggests that the most endangered group of people are those who choose to enter potential avalanche areas to enjoy snow sports ('Backcountry', 'Alpinist', 'Freeride' and 'Snowmobile'). Conclusions can be drawn from this regarding how money can best be invested - in both preventive and rescue activities - to minimize the number of victims. Firstly, efforts need to be made to provide general explanations and information to all snow-sports and alpine sports participants. Furthermore it's important to promote devices that help save lives by preventing burial, or if buried will enable a speedy rescue.

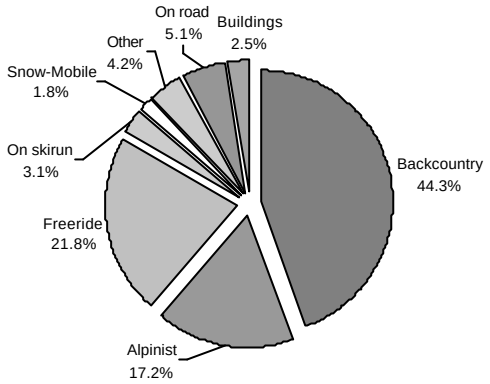
In addition, it is crucial that everyone involved (companions and rescuers) receive sound training in the use of the aforementioned devices and that rescuers are well trained to ensure that they act as quickly and safely as possible when deployed in 'Freeride' and 'Backcountry' areas.

For the latter issue, as already underlined several times, careful planning, use of the best devices available, and deploying the appropriate people can be of great help.

When rescuing people on roads and in buildings, the avalanche dog team is still most effective. The avalanche dog team be included in all aspects of training and planning of rescue operations. Moreover, the media and the general public have a far more intense, emotional reaction to avalanche victims in destroyed buildings and on roads than when victims in other categories are involved. This needs to be given special consideration when briefing the media. Media spokespersons need to be trained, and their deployment should be included in the planning of such case scenarios.

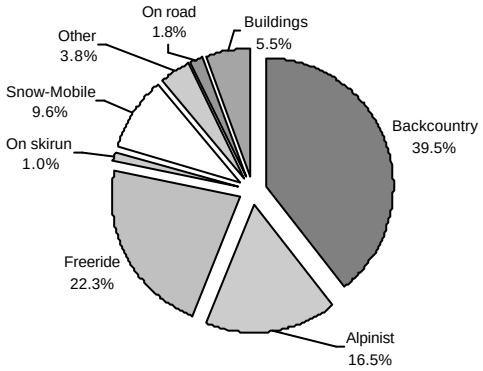
Looking back, the following question is often asked: 'Did the individual accident categories change over the past 20 years, and did the total number of victims increase or decrease? '

Figure 1 also raises the issue of the variations between the different years and countries.



Total: 1539

Figure 9: Avalanche Fatalities 1983/84 – 1992/93, 10-year, overall categories



Total: 1559

Figure 10: Avalanche Fatalities 1993/94 – 2002/03, 10-year, overall categories

Figures 9 and 10 show the variation within the categories in 10-year periods. Furthermore, they clearly show the total number of avalanche fatalities during both periods.

The difference in the total number of victims over both decades (**1,539** between 1983/84 and 1992/93 and **1,559** between 1993/94 and 2002/03) must be seen as incidental. No trend can be seen. However, there are interesting variations within the categories. In recent years, the number of fatal 'Snowmobile' accidents in North America and Scandinavia has increased substantially compared with the previous 10 years. In Europe, this is not (yet) a major category (only one avalanche fatality). Fatal 'Backcountry' accidents decreased by some 5%. This can be viewed as a slight, positive trend and is probably mainly due to intense and improved efforts at accident prevention. In addition, the digital improvements made with rescue beacons and swifter victim location using organized helicopter rescue teams have also helped to reduce the number of fatalities in individual countries. Nonetheless, there are marked differences between the 10-year periods in the 'Backcountry' category in the individual countries, with decreases recorded in France and Austria (decrease 4%), Switzerland (decrease 24%), Italy (decrease 16%) and Germany (decrease 18%), stable numbers at the same low level in Slovenia (0%) and Liechtenstein (0%), but a higher number of avalanche victims in this category in the United States (increase 10%) and Canada (increase 40%). Further, more detailed information can only be obtained via detailed surveys of the individual countries.

The remaining shifts tend to be marginal and coincidental. It is encouraging to see the lower percentage of accidents occurring on open roads and developed, open ski areas. The accidents in the 'Buildings' category are difficult to assess, but still mainly concern major single crises periods such as the extraordinary winter of 1998/99 in Austria, France and Switzerland.

5. PROSPECTS FOR THE FUTURE

It is important that ICAR focuses on the following key areas of responsibility.

ICAR should:

- provide a platform for the exchange of experiences and information. This is achieved by reporting on, discussing and learning from good or bad of rescue operations.

- help to promote detailed reports including questionnaire from mountain rescuers on operations e.g. with post-hoc analyses on what happened and on the scope of the accident. This information will help to improve search and rescue methods as well as medical care. In the future, experience-based reports should begin with a few keywords and tips, so that better targeted searches can be performed at a later date based on the associated topics and contents.

- welcome manufacturers to its annual meetings to exhibit their emergency/rescue systems and also to give a talk on new developments and innovations.

- continue to promote cross-border explanations of methods and their verification (for example warnings on general mountain hazards and avalanche hazard ratings in particular). ICAR can help particularly in this regard by coordinating activities and chairing meetings.

- offer opportunities for accident analyses carried out by individual countries to be presented and discussed. Comparisons with experience gained and work done in other countries may well lead to new 'transnational discoveries' on accident prevention or mountain rescue.

- continue to issue recommendations including common features for successful rescue operations or for prevention, which can be recognized as transnational applied, and make these recommendations available to all interested parties. There are many examples from the Commissions for Mountain Emergency Medicine, Air Rescue, Terrestrial Rescue and Avalanche Rescue. Others are under preparation.

- invite more overseas countries (for example Australia, China, Japan, New Zealand, South America) to cooperate and join ICAR. A written exchange of experiences could serve as a promising start. In this respect we are thinking of having more Corresponding Members.

- continue doing everything within its power in the future to help ensure that rescue operations can be carried out as safely as possible and with the rescuers facing as few risks as possible.
A priority in risk management must be the safety of helpers.
(Over the last 65 years in Switzerland a total of 18 mountain rescuers have died as a result of their involvement in avalanche rescue operations).

- offer its support for the cross-border development of optimal and improved data collection for search and rescue operations (both positive and negative data). It's known that such data could, in the future, help to trigger new developments regarding accident prevention or the optimization of rescue operations.

The Commission for Avalanche Rescue drew up proposals on the expansion and targeted improvement of data collection in summer 2004. These proposals should be discussed and adopted at the next conference from 13 to 17 October 2004 in Zakopane, Poland.

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