

Report on the meeting of the
AVALANCHE COMMISSION OF CISA-IKAR
(International Commission for Alpine Rescue)
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Business of the Avalanche Committee

With no elected commission chairman the IKAR president Mr. Toni Grab chaired the Avalanche Committee meeting. Approximately 30 people from about 13 countries representing avalanche forecasters, rescuers, educators, and equipment manufacturers attended the meeting. The Commission meeting's focus differed significantly from past years. This year the focus was to reestablish the importance of the Avalanche Commission by defining a clear purpose and direction.

The majority of the Commission's time and effort was spent on preparing for the future leaving less time for accident statistics and reports of interesting accidents. However, there were some interesting points learned about long burial survivals, transceivers, ground penetrating radar, and dealing with the news media. A joint session was also had with the Terrestrial Commission to review several avalanche accidents.

I was active in the meeting by presenting a United States report on accidents trends and the success and importance of avalanche education in Colorado. I also chaired a working group and was appointed to the planning group for the 2002 meeting. The following is a summary of the Avalanche Commission's meeting.

The Future of the Avalanche Commission

During the past year there has been serious discussion about breaking up the Avalanche Commission and merging some of its participants into the Terrestrial Commission. The Avalanche Commission is unique among the IKAR commissions in that its members are experts from many different disciplines. Unfortunately during the past 10 years the Avalanche Commission has become unproductive. To address the Commission's problems and its future the members of the Avalanche Commission divided into work groups based on the four principle disciplines represented within the Commission.

- A. Rescuers
- B. Dog Handlers
- C. Specialists (forecasters and researchers) and Educators
- D. Equipment Manufacturers

With an eye toward the future these four working groups identified problems, wants, and needs. It was also by a unanimous agreement that the Avalanche Commission not be divided and merged with the Terrestrial Commission. A principle reason for not dividing even though the Commission is so diverse is that on actual rescues all four disciplines come together and work together with the goal of finding avalanche victims quickly while keeping rescuers safe. In this context the disciplines should continue to work together.

I chaired the Specialists and Educators workgroup. The problems, needs and wants of the different workgroups were all quite similar. It was decided the Commission must do a better job of organizing and communicating the needs of the commission and do a better job of disseminating information to rescuers and to the public. There were four common topics that arose from the workgroups:

1. Accidents — Lessons Learned
2. Rescue Devices
3. Rescue Methods
4. Prevention

From these topics a common theme emerged: “integrate” and “interface.” Our common goal became to better improve the information, knowledge, and skills of rescuers and public. Our workgroup developed a model that the Commission will likely follow. The three core topics identified by the Commission are *Accidents, Rescue Devices, and Rescue Methods*. These topics will also be considered in relationship to prevention and safety for rescuers and the public.

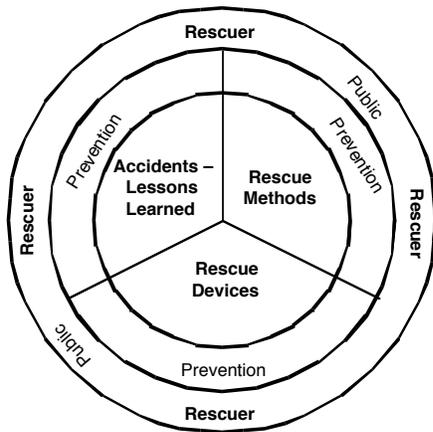


Figure 1. Diagram representing the perspective of the Avalanche Commission.

Each year the Commission may focus on a single topic and encourage the Commission members to prepare and present a high quality and meaningful papers and/or presentations. The chairman of each workgroup will plan and organize the Commission’s 2002 meeting. A preplanning meeting will be held this winter, mostly likely in the South Tyrol. The date and location will be announced sometime in the future.

Joint Session with the Terrestrial Commission

Several avalanche accidents during the 2000-2001 winter were of interest to both the Avalanche and Terrestrial Commissions. In two accidents (one in Germany and the other Austria) victims survived long burials of 10 and 20 hours. Both victims were extraordinarily lucky as fewer than about one in 100 survive this long. The important lesson learned from both of these accidents is that no rescue should be abandoned prematurely on the assumption that the victim could not possibly be alive. A small number of victims are found alive, and no avalanche victim should ever be denied this small chance at life.

This conclusion—mine—presents an interesting segue to another accident that was briefly discussed where two rescuers were buried and killed in a second avalanche.

Two Rescuers Killed

On February 3, 2001 at a popular ice climbing area near Zinal (Valais), Switzerland, one ice climber and two rescuers died in two separate avalanches from the same path. The first avalanche, a natural release buried an ice climber, and later during the rescue a second natural avalanche struck, burying and killing the two professional rescuers (ages 36 and 40). This accident raised an interesting moral/ethical question voiced by Urs Wiget MD: “When is it safe or not safe to effect a rescue?” Of course there is no clear answer to this question unless something goes wrong, and during this rescue something did go tragically wrong.

The ice climber standing at the bottom of the climb was caught and buried in a relatively small natural avalanche that swept down from the steep rocky area above the ice fall. The debris spread out in a fan-shaped area about 60-70 meters long by 40-50 meters across. The debris was not very deep. The first avalanche occurred during a time of moderate snow and wind and also late in the afternoon. Rescuers arrived and were confident—based on the configuration of the debris—that they had a good chance of finding the victim alive. Lights were brought in as darkness fell.

The storm continued and suddenly the lights failed. Two minutes after this failure a second avalanche swept down and caught six rescuers. Three were buried and two died.

I spoke with several prominent rescuers who all said they would have committed to doing the search in the same conditions. All of these men have experience finding buried victims alive. Something that very, very few American rescuers have ever experienced. Such an optimistic attitude may have lead the rescue leaders too close to the “danger line” by accepting too much risk. In any situation acceptable risk and where the “danger line” exists will always be debatable points, but there are two important lessons learned from this incident.

First, when something unexpected happens the operation (or the affected part) should be stopped and actions and decisions re-evaluated. In this incident the searchers should have immediately retreated to safe areas after the lights failed. The second lesson deals with natural avalanches. When a natural avalanche releases there is often a good chance of additional natural avalanches. This message is drilled into Colorado highway plow drivers where every serious highway accident has been the result of a second or third natural avalanche following typically an earlier small avalanche. When a natural avalanche occurs there may be a very significant chance of a second avalanche, especially if the starting zone is complex with multiple start

zones. Even if the entire path did release, additional releases from similar paths should also be anticipated. SAR operations dealing with natural releases must be treated with great respect and with the application of a large margin of safety. In some situations the prudent course of action may be to use explosives, and/or treat and wait until conditions are manageable. Fortunately most accidents in the backcountry are not result of a natural-triggered avalanche, but rather the result of a human-triggered avalanche. If there are no additional triggers on adjacent slopes rescuers can usually search with little risk of an additional avalanche.

The News Media

During the past couple of years the European news media has become much more aggressive about covering avalanche and mountaineering accidents. The relationship between the rescue services and news organizations is very adversarial and probably to an extent much worse than typically experienced in the United States. Our good relationship with the media was developed as US SAR teams often rely on news-media helicopters to assist in SAR operations. In Europe rescue teams have helicopters but until recently the news media did not. As a result of the adversarial relationship European teams use encrypted radio channels to communicate, much more than what I am aware of in the United States. Because of differences in cultures and attitudes and a not-so-obvious need for assistance by the news media, European teams and the news media will struggle to define their relationship. Many teams are just now adopting and implementing public information officers to smooth this agitated relationship.

Transceivers

Manuel Genswein a private engineering consultant from Switzerland gave an interesting presentation about the limitations of transceivers. During the field day he demonstrated his techniques for deep burial searches and also demonstrated a long-range external antenna that could aid rescue teams. Several years ago while serving in the Swiss military Genswein developed his "circle search" technique for pinpointing a buried beacon. The method works well but is no better than the practiced grid-search method, though it might be helpful for very deep burials. Genswein has more information about his technique at his web site: www.genswein.com.

His demonstration of an external antenna was most interesting. Using a larger external antenna significantly increases the range of an analog transceiver. He has worked with a Swiss company to develop two external antennas. One that can be used from ground-based searchers and a larger antenna that can be used from a helicopter. These antenna units significantly boost the receiving range up to 180m. This would allow a rescue team to very quickly search an avalanche very fast. When using this method on the ground the secondary or fine search (after detecting a signal) must be conducted using the tangent search method. This allows the rescuer to follow a flux line to the buried unit. Once the searcher is close a second transceiver can be used to pinpoint the buried unit. If the search is from a helicopter the fine search must be done using a grid search because the antenna hangs vertically under the aircraft.

In private conversations afterwards Genswein also offered some interesting and valuable advice. He stated that transceiver checks with digital units must be done at some far distance, especially when the receiving unit is a digital transceiver. The typical field-check method to ensure a unit is transmitting is to have individuals on transmit spread out slightly and walk past one person whose unit is on receive. A poorly transmitting unit may work okay at two meters but not be working at 10 meters. A better

method would be to have each person (one at a time) walk away from the receiving unit until they are out of range. This gives a better idea of the search range.

Accident Trends

Fabio Gheser from the Italian Avalanche Service (Italian Alpine Club) presented the results from a review of Italian avalanche accidents during the last 15 years. The statistics were similar to accident statistics that have been reported from both the United States and Switzerland. One new trend in the past few years was the significant increase in avalanche accidents involving ice climbers. This might be a trend to appear in the United States as climbing trends often start in Europe several years before making their way to the United States. In terms of rescue the study concluded that avalanche dogs have been the most effective way to find buried victims.

One surprise was the very high number (a significant majority) of victims in accidents whom had awareness of the avalanche danger bulletin. Most of the accidents occurred (60%) when the avalanche danger was rated “considerable” meaning human triggered avalanches were probable and natural avalanches were possible. The next highest was 25% at “moderate.” It is encouraging that so many people have access to the avalanche danger bulletins, yet at the same time these statistics imply that simply knowing the danger is not enough to be safe. One must act smartly with the information.

Albert Lunde reported about unusual snow and avalanche conditions experienced in Norway last winter. Lunde reported that parts of Norway were in severe drought with only 20-30% of normal snows while other parts of the country experienced snowfall of up to 300% of normal. In general terms the avalanche danger was higher than normal with shallow, weak snow in some areas to too much snow in others. Norway saw more avalanche deaths than normal, nine versus six. Lunde and others felt many involved in accidents had not adjusted their behaviors or actions to fit the changing avalanche and snow conditions. Perhaps these victims were complacent and/or overconfident.

A copy of my report to the Commission is attached at the end of this report.

Rescue Devices

Ground Penetrating Radar (GPR)

Also from Norway Krister was Krister Kristenson (Norwegian Geotechnical Institute) whom reported about the successful use of ground penetrating radar in two recoveries. The first incident involved a snowmobiler on Spitzbergen. Several days of probing had failed to find the victim when some nearby glaciologists using a large, very bulky, old-style UNIS radar unit to measure ice thickness volunteered their time and equipment. After a couple of days of searching the rider was found buried 3.5m.

About a week later a Swedish skier was buried near Chamonix, but just inside the Swiss border. A week of searching with dogs and probes failed to locate the victim, so the GPR unit was flown from Spitzbergen to Chamonix. Early on the second day the skier was found buried 4.5m.

Though the technology worked well it was difficult to use. Kristenson pointed out four problems. First was the logistical problem of transporting and using the large, old-style

unit to the avalanche site and working on the debris. The unit, almost the size of a small row boat was designed to be drug on smooth snow and ice, not on the jumbled snow of avalanche debris. Second was the importance of proper calibration. Since there is very little data available regarding the search for buried avalanche victims, there was some trial and error practices made to find the first victim. Once the unit was re-calibrated to look for the smaller target of a human it worked well. Third was the difficulty of interpreting the signal. Only a very trained person can recognize the different targets. And, fourth more user-friendly instruments are required for better use in rescue situations.

These recent successes have motivated the Norwegian Red Cross and the Norwegian Geotechnical Institute to further investigate GPR for avalanche rescue and they have found unit that addresses the problems encountered with the old-style unit. This winter both organizations will collaborate and test a very compact and portable Canadian unit call SnowScan™ (www.snowscan.com). This unit has received some very favorable comments from some tests done in Switzerland. Also proprietary software allows for much easier interpretation of targets. Recent discussions with the company will hopefully lead to some tests in Colorado this winter.

Swiss Airbag Test

Last March the Swiss Federal Institute for Snow and Avalanche Research undertook a simple and very small test of the different “airbag” systems. Roland Meister reported of some favorable results garnered in the tests. Thirteen dummies (12 CMC rescue mannequins and 1 Hybrid-III crash-test dummy) were placed onto a steep slope and explosives then triggered an avalanche. An important variable was to see which device kept the face free of snow.

Nos of Dummies	Device
1	ABS Monobag
3	ABS Twinbags
2	K2 Avalanche Ball
3	Avagear Life Vest
4	No device

Table 1. Devices and dummies used in SLF test.

Explosives resulted in a medium-sized soft-slab avalanche. The burial depths for the dummies ranged from 0.5 to 2.5m; however, several of the devices produced some interesting results. The most promising device is the Avagear Live Vest. This device is similar to PFD that is inflated by a pulled ripcord when the wearer triggers an avalanche. Also a large collar inflates around the victim’s head helping to protect the head and face. The device appears to keep the

Device	Face Exposed	Face Covered	Comments
ABS	1	3	All bags visible on surface
K2 Avalanche Ball	0	2	All bags visible on surface
Avagear Life Vest	3	0	Heads not covered
No device	1	3	3 dummies totally buried
Totals	5	8	- -

Table 2. Results from SLF test.

The crash-test dummy was instrumented with three strain gauges in the cervical area to measure shear stresses and forces. The results will be published in the future.

Accident Statistics

Because of other pressing business the gathering of avalanche fatality statistics were conducted after the conference. Provisional data has been collected and is presented below in table 3. The statistics might change slightly, but by all accounts it was not a good winter for avalanche deaths in both Europe and the United States. The 33 killed in the United States represents the most killed in nearly 80 years. The total of 176 reported fatalities is significantly above the 15-year average of 143 deaths. There were no single incidents that involved large number of victims, only numerous accidents involving small groups. In other parts of the world approximately 45 to 50 people died in the former Soviet republics, Asia, and Japan.

country	back-country	off area	ski area	climbers	residents	highways	snow-mobiles	misc.	total
Switzerland	13	9	0	7	0	1	0	2	32
France	8	13	0	8	0	0	0	1	30
Austria	10	7	1	0	0	4	0	0	22
Italy	14	9	0	4	0	0	1	1	29
Germany	0	1	0	0	0	0	0	0	1
Norway	1	2	0	4	0	0	2	0	9
Sweden	0	0	0	0	0	0	1	0	1
Slovenia	0	0	0	1	0	0	0	0	1
Slovakia	2	0	0	3	0	0	0	0	5
Poland	0	0	0	1	0	0	0	0	1
Canada	4	0	0	0	0	0	7	1	12
United States	7	5	0	4	0	0	15	2	33
TOTAL	59	46	1	32	0	5	26	7	176
%%	34%	26%	1%	18%	0%	3%	15%	4%	100%

Table 3. Avalanche Fatalities in IKAR-member Countries, 2000-01. (No avalanche fatalities were reported in Andorra, Bulgaria, Croatia, Czech Republic, Ireland, and Liechtenstein. No report from Spain.)

THE FUTURE

The reasons and objectives for continued involvement by the United States in IKAR have not changed. Avalanche accidents and deaths in the United States are increasing and IKAR is a very important forum for United States SAR personnel and avalanche workers. IKAR continues to be the key forum for the exchange of information and ideas regarding avalanche rescue. NASAR then becomes a key vehicle to disseminate this information to United States SAR personnel.

It is very important the United States be current on the latest developments in terms avalanche rescue, education, accidents, litigation, forecasting, etc. For years, avalanches have been generally thought of as a European problem. This is no longer

true. In four of the past eight winters the United States ranked either first or second of IKAR countries in terms of avalanche deaths. Last winter the United States ranked first.

Membership in IKAR gives the United States the opportunity to share information and to learn from other experts. IKAR is becoming a repository and also a clearinghouse for mountain-safety education materials. In terms of avalanche awareness materials (brochures, posters and booklets) targeted for the general public, the European and Scandinavian countries are much more productive than the United States.

I expect in the immediate future the Avalanche Commission will return back to its role as the leading authority in avalanche rescue. The new presidents of the Terrestrial (Bruno Jelk) and Medical Commissions (Herman Brugger MD) both have great interest in avalanche rescue and will encourage better communication on these matters between the commissions.

There are several issues that warrant continued United States involvement in the Avalanche Committee of IKAR, some specific objectives are also mentioned:

- Rescue equipment and techniques: IKAR is virtually the only venue for United States SAR personnel to learn of new techniques and equipment.
 - specific objective: Develop guidelines for the use of ground penetrating radar in avalanche rescue.
 - specific objective: Collect and compile “lessons learned” from rescue operations.
- Accident data collection: The continued collection of accident data is most important. Research ultimately aids in the prevention of accidents and offers improvements in rescue methods. In recent years the IKAR has been the focal point for the initial presentation of updated survival probabilities and the field triage and treatment of buried avalanche victims.
 - specific objective: Continue the data collection and the presentation of case reports at annual meetings. More data and research is needed as to the cause of death, position of victim, victim’s skill and knowledge levels,
- Avalanche education: since most victims cause their own avalanche, most accidents are preventable. Better education and training can help to reduce the number of accidents.
 - specific objective: Need to learn more about avalanche training programs in other countries.

ATTACHMENTS

- United States avalanche report to the 2001 IKAR-CISA meeting