

AVALANCHE RESCUE REPORT

International Commission for Alpine Rescue

Lawinenkommission • Commission d'avalanche • Avalanche Rescue Commission



IKAR-CISA

19 – 22 October 2011 — Åre, Sweden

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The following report is based on notes and commentary by Atkins. As of late November the official minutes of the Avalanche Rescue Commission had not yet been published. The minutes will eventually be posted on the IKAR website.

INTRODUCTION

The Avalanche Rescue Commission of IKAR at the Annual Meeting of the IKAR. In some years a special winter-skills meeting may be held. Within the Avalanche Rescue Commission is a sub-group of rescue dog handlers. These rescuers host typically a summer time meeting.

The Avalanche Rescue Commission is a comprehensive composite of the international avalanche community represented by national mountain rescue associations, avalanche research and forecast institutions, national alpine clubs, and avalanche-rescue equipment manufacturers. The Commission provides a forum for the discussion and exchange of ideas, skills and knowledge. This expertise helps mountain rescuers become more effective and efficient, which also helps those in need. The commission generates guidelines related to avalanche rescue that are typically adopted at national levels. Recommendations can be found on the IKAR website: www.ikar-cisa.org > Avalanche Rescue > Recommendations.

AVALANCHE COMMISSION MEETINGS

This year's congress was held in the incomparable ski resort town of Åre and hosted by the Swedish National Police Board, the Swedish National Environmental Protection Board and the Swedish Mountain Rescue Service. Commission president Mr. Hans-Jürge Etter (SLF, Davos, CH) chaired the daily meetings, but these were his last meetings as he retired at the end of the congress. Vice president Atkins assisted, and Mr. Manuel Genswein served as interpreter working breathlessly and seamlessly in German and English, and occasionally in French, too.

More than 70 rescuers from the following 14 countries participated: Austria, Bulgaria, Canada, Czech Republic, France, Germany, Iceland, Italy, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, and United States of America. The Avalanche Rescue Commission also joined the

Terrestrial Commission for a day to share presentations and experiences.

Pre-Conference Workshop

On a chilly, gray, damp and windswept day — called “nice” by Swedish mountain rescuers — the pre-conference workshop focused on prevention education and rescue. There was also an avalanche rescue component. More than 130 IKAR members participated along with another 80+ members of local Swedish and Norwegian mountain rescue teams. The day was an opportunity for avalanche-related equipment companies to show new equipment or techniques, and for rescuers to try out specialized equipment. All transceiver companies and RECCO were represented.



Figure 1. Dominik Hunziker of Swiss Alpine Rescue and RECCO discusses new detectors for Europe.

Summary of Avalanche Accidents, 2010/11

Accident case reports or season summaries were presented by nine member countries. Lessons learned were highlighted, and the theme of risk management was often heard. Before presenting reports from the various countries, some mention of the winter's weather is worth mentioning as the European weather conditions affected significantly the number of accidents and deaths.

Europe experienced an unusual winter with two distinct Jekyll- and Hyde-like phases. Winter started with record cold and abundant early season snow, especially in Scandinavia. Sweden had its coldest and snowiest start to winter in 100 years. The cold and snow surged southward in December. Germany experienced their coldest December since 1969 and their first white Christmas — nation wide — since 1981.

As the cold air pushed south over western Europe, it pushed warm air over eastern Europe. The Balkans experienced an extraordinary warm and wet December. Instead of snow, heavy rains resulted in major flooding, some of which was the worst in 50 years. Albania was hit especially hard.

Mild and warm conditions returned to Europe in January which was literally the end of the winter season. Very warm and dry conditions continued in March and April. The winter ended as one of the driest on record.

In Europe there were few avalanche accidents and deaths especially from lower-elevation countries. No snow meant no avalanches, so countries mainly in eastern Europe, experienced a very quiet avalanche winter. However, the high-alpine countries experienced just enough snow for plenty of weak layers followed by enough storms to produce serious avalanche dangers. Near average numbers of deaths occurred in France, Italy and Switzerland.

While Europe basked in sun and warmth, North America enjoyed an exceptionally snowy winter and spring. Most of the western US experienced the snowiest winter in 15 to 30 years. The thick snow cover did result in some large avalanches, but the steady arrival of storms limited the formation of persistent weak layers, so most regions had fewer accidents and deaths than what might have been expected.

Austria: A very dry winter — only three major storms — for this portion of the Alps resulted in very few avalanche accidents and deaths. Typically 26 people die in avalanches every winter — mostly in the the Vorarlberg and Tyrol states — but this winter only 3 died. (Last winter 33 died.) Of the 68 reported accidents, there was a relatively high number of injured people: 25, which was likely due to the shallow snow cover. **This is a good reminder for recreationists and rescuers: shallow snow conditions results in more injured people.**



Figure 2. Grand Paradis (FR), 6 February 2011. An injured backcountry skier caught in a small avalanche, but swept into rocks was typical of many European accidents in 2010-11. At the time of the accident it had been 8 days of mild, peaceful conditions. (Photo: Hagenmuller Jean-François, curtesy data-avalanche.org)

France: Though the winter was exceptionally mild and dry, the number of fatal accidents and deaths were just below average. With 30-year average of 22 fatal accidents and 32 deaths, France recorded 19 fatal accidents and 29 deaths. Unlike the winter of 2009-10 where many accidents occurred in areas and places not known to have had avalanche problems, the winter of 2010-11 saw most deaths happen in the high Alps.

Of the 29 killed, organized rescue recovered 16, companions, 11; and 2 were not buried. However, more important was that organized

rescue services found 6 (27%) people alive. Companions found 14 (56%). Also, reported was that of the 28 people found by transceivers, only 10 (36%) were found alive.

These results highlight three important points. *One, organized rescue does save lives. Second, while companion rescue is the best way to be found alive, survival is only about 50/50, and third, many more buried people with transceivers die than survive.*

Italy: Like the rest of Europe snowfall was light and temperatures were warm, but unlike other countries, Italy had more avalanche deaths (16) than average (13). Most of the deaths occurred in the Alps. Experts were not immune from avalanches as about 25% of the accidents involved professionals, and two-thirds of these accidents involved mountain guides.

Airbags were known to have been used on several occasions. In one incident the airbag was not or could not be deployed, and the user was buried. He was found alive by a transceiver. In another incident four people deployed their airbags. Three remained on the surface and one was partly buried. Also, an AvaLung user was buried and rescued alive by transceiver after a 20 minute burial.

Lastly, a large accident near Bielle on 6 March was briefly discussed because three groups of guided ski-mountaineers were caught on Monte Camino. In total, 20 of the 21 were caught and 8 buried. Of the buried, 6 were rescued alive but injured and hospitalized, and 2 were



Figure 3. Fatal avalanche Monte Camino, IT.

killed. Witnesses said a different group that travelled above the guided groups likely triggered the avalanche that was up to 200m across. However, this could not be confirmed. Figure 3 shows the avalanche released from a rocky area, and the day was very warm and experienced a very significant rise in temperatures. **A sad reminder is that when multiple burials occur, often someone dies.**



Figures 4 & 5. Monte Camino rescue, 6 March 2011.

Norway: For the second consecutive winter avalanche deaths (13) were far above the long-term average (5). Four victims were backcountry skiers, three were free-riders, two were snowmobilers, two others were snowplow operators, and two were residents. One of the snowplow operators was killed in a January slush flow avalanche, which is most unusual in mid winter. Exceptionally dry conditions in November and December resulted in a very shallow snow cover. Prior to the avalanche rain started to fall 3 days earlier and between 5 to 8cm of rain had already fallen at nearby weather stations. The plow driver was working alone and swept into the sea. He was found 4 days later inside his truck by ROV in 10m of water. A slush flow killed a couple when their house was struck. One victim was swept into the nearby river 300m below the house. The other was swept into the sea. Nearly 5.6cm of rain had already fallen in the day before the avalanche, and heavy rain was reported at the time of the evening-time avalanche. **An important lesson learned from slush flow events is that the traditional rules of terrain selection and management do not apply. Every and all approach routes are dangerous.**

Switzerland: Like the rest of the Alps Switzerland was very dry; however, the 26 killed was just above the longterm average of 25. Seventy-three percent of the victims were backcountry skiers. Of the 176 people caught in 110 reported accidents, 41 (24%) victims were injured. This high number likely reflected the shallow snow cover. Etter also remarked of a recent accident trend that is also occurring in the US. In years past riders would tackle steep, exposed terrain in the spring; however, in recent years riders are venturing onto this same terrain all winter long.



Figure 6. Fatal avalanche at Ängi, Waldnacht, Attinghausen, 5 February 2011.



Figure 7. Avalanche near Bourg St. Pierre (CH) that buried 10 and killed 5 on 26 March. The avalanche fell 300m vertical.

Etter asked the commission for advice regarding an accident that occurred near Attinghausen that claimed the life of a backcountry skier. While in Europe cell phone coverage is excellent, there are still holes in the networks and this was discovered by a pair of backcountry skiers outside Attinghausen. After the first skier was caught his partner triggered a second avalanche while trying to approach the original avalanche. From the bottom of the slope there was no cell service. The survivor used his transceiver to find his buried friend and did CPR for many hours before giving up in the early evening. Etter asked, “How long does one do CPR?”

Only Canada seemed to have a specific cut off: one hour. Elsewhere the answer is not as simple. In the US the 2010 American Heart Association CPR Guidelines for termination of resuscitation (TOR) do not explicitly state any specific time criteria under any circumstances. Instead, that AHA offers criteria that are not available to most people in the wilderness (e.g., advanced life support provider or automatic external defibrillator). Some experts say that 20–30 minutes is long enough in a not-hypothermic subject, but this *not* an official recommendation.

Etter also briefly described the season’s “worst accident of the winter” when a group of 11 French snowshoers and cross country skiers were caught in a relatively small avalanche that ended in a narrow, deep ravine. Ten were buried and five died. The snowshoers “didn’t plan to be there” but triggered the avalanche right after turning around. The rescue effort was monumental and swift once rescuers found the accident site. The survivor did not know her exact location and rescue helicopters had to search for the accident. The helicopters spotted three big avalanches in the general area before finding this relatively small avalanche in a narrow gorge. The mass casualty problems challenged rescuers, and also surprised experienced rescuers, too. The “biggest” surprise was that there really were 10 buried victims! For rescuers this incident revealed the major differences of rescue trainings versus the reality of a real life MCI. Please see pages 13 and 14 for more details and pictures.

Canada: Abundant snows fell on western Canada which had a major impact on roads and railways. Avalanches also claimed 11 lives. All victims were recreationalists: 5 skiers and 6 snowmobilers. All victims but 3 (from 2 accidents) were equipped with transceivers. Of the three buried, two had left their transceivers in cars. No transceivers “made the recoveries harder” but all three were eventually found: one by rescue dog, one by probe line, and one with visual clue. There was also the report of a “faulty” transceiver when a companion could not find a buried friend. Without using his transceiver the searcher spotted a foot sticking out of the snow. He quickly uncovered and revived victim one, but said his transceiver malfunctioned at the start of the search. Turns out the second victim was buried 2m below the first victim, and the searcher was standing directly on top of his buried friend. Tests of the transceiver showed it to be in good working order, so it appears to have been operator error. This incident highlights a problem that occurs in all countries — many people cannot use their transceivers, so training needs to be improved for both professionals and recreationalists. Also, for the first time a Canadian purchased an airbag over a transceiver. The man was later fully buried though part of his airbag remained visible on the surface. Lastly, Canada SAR

personal and avalanche professionals have been frustrated by confusion caused by police and others mistakenly referring to avalanche rescue transceivers as PLBs or SPOTs in the news media.

USA: The US also experienced a snowy winter which was reflected in the accident statistics. The 26 avalanche deaths was 2 below the 10-year average. More than half of the victims were skiers or snowboarders. Like past winters, avalanche transceivers were often carried but did not translate to many positive outcomes. Regarding buried people with transceivers, more are reported dead than found alive. Also rescue teams found more people with transceivers than companions did. **Perhaps this is another indication that organized rescue is getting faster.** Sadly, this fact also indicates that people cannot use their transceivers. In several accidents the victims carried AvaLungs but did not or could not insert the mouth piece when caught. The handout summarizing US accidents is offered at the end of this report.

Results From 2011 Workgroups

Information for Dog Handlers, Albert Lunde (Norwegian Red Cross, NO) — Under the leadership of Albert Lunde, the work group has translated the questionnaire into 5 languages. The questionnaire contains 63 questions divided into the following topics: General, avalanche-specific information, information regarding the dog handler, information regarding the dog, weather, terrain and vegetation, and rescue environment. The purpose is to identify success factors for avalanche rescue dogs. The questionnaire does not necessarily have to be filled in by a dog handler. A participating rescuer or researcher with detailed knowledge of the rescue may also complete the survey. A North American version of survey is available at: www.surveymonkey.com/s/ikar_dog_survey_2011_EN

Glossary, D. Atkins and M. Genswein: This multi-year project, is now up to 7 languages with more than 1700 snow- and avalanche-related terms. The glossary is available on the IKAR website (left side of blue navigation column). Search functionality will be improved and additional languages will be added as terms are compiled. No deadlines are set.

English	Deutsch	Français	Italiano	Español	Slovenščina	Hrvatski
ablation	Ablation; Abtrag	ablation	abblazione	abliación	ablácija	
abrasion	Abrasion	abrasion	abrasione	abrasion	abrazija	
access	Zugang	accès	accesso	acceso	dohiti	
access					dohti	
accident	Unfall	accident	incidente	accidente	nevaré	
accident	Unfall	accident	incidente	accidente	nevaré	
accident site	Unfallort; Unfallstelle	lieu de l'accident	luogo dell'incidente	lugar del accidente	mišto nevaré	
accident site	Unfallort; Unfallstelle	lieu de l'accident	luogo dell'incidente	lugar del accidente	kr? nevaré	
accumulation	Akkumulation; Ablagerung	accumulation	accumulazione	acumulación; depósito	akumulacija	
accuracy of location	Ortungsgenauigkeit	précision de localisation	precisione della localizzazione	precisión de la localización	natónenost dolóžanja nahajališča	
active identifying object; active object for location	aktives Merkmal	localisateur actif	identificatore attivo	elemento activo para localización	aktivno opredilj? localizacijski objekt	
additional load	Zusatzbelastung	surcharge; charge supplémentaire	sovraccarico; carico supplementare	carga adicional; carga suplementaria	dobitna obremenitev	

Figure 8. Screen shot of www.ikar-cisa.org glossary.

Avalanche Accident Statistics, 2010-11

The 135 reported avalanche deaths (table 1) from member countries were well below the long-term average (162). Avalanche fatalities are tallied over the hydrologic year from 1 October to 30 September.

Country	Backcountry skiing / snowboard	Freeride (off piste / out-of-area)	In Ski Area (piste)	Alpinist	Roads	Buildings	Snow-mobile	Other	Total
Andorra	–	–	–	–	–	–	–	–	NR
Austria	2	0	0	0	0	0	0	1	3
Bulgaria	0	1	0	0	0	0	0	0	1
Canada	5	0	0	0	0	0	6	0	11
Croatia	–	1	–	–	–	–	–	–	1
Czech	0	0	0	0	0	0	0	0	2
France	14	10	0	4	1	0	0	0	29
Germany	1	0	0	0	0	0	0	0	1
Great Britain*	0	0	0	1	0	0	0	0	1
Iceland	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0
Italy	3	5	0	0	0	0	1	7	16
Liechtenstein	0	0	0	0	0	0	0	0	0
Norway	4	3	0	0	1	2	2	1	13
Poland	3	0	0	0	0	0	0	0	3
Romania	–	–	–	–	–	–	–	–	NR
Switzerland	22	2	0	1	0	0	0	1	26
Slovakia	0	0	0	1	0	0	0	0	1
Slovenia	0	0	0	2	0	0	0	0	2
Spain & Cantalonia	0	0	0	1	0	0	0	0	1
Sweden	0	0	0	0	0	0	0	0	0
USA	12	4	0	4	0	0	4	2	26
Total	66	26	0	14	2	2	13	12	135
%%.%	49.3	19.4	0.0	10.4	1.5	1.5	9.7	9.0	100

Table 1. Avalanche deaths from IKAR countries, 2010/11.

* Fatality occurred in Scotland.

Probe Group

A busy winter and summer delayed significant progress on this project to establish the best practices for probing. Markus Hölzl of the Bergrettungsdienst im Alpenverein Südtirol will lead the project.

Rescue Compass

Etter presented the production version of this decision support tool created for rescuers and developed by the SLF with help from many IKAR members. The compass will be available in late fall 2011. The compass considers an avalanche rescue's composition to assist rescuers to make

- complexity
- environment
- terrain
- human resources

The compass provide a tendency from green/go to red/stop. Detailed information can be found at: www.ikar-cisa.org/ikar-cisa/documents/2010/ikar20101221000707.pdf

AVALANCHE COMMISSION PRESENTATIONS

Avalanche Accidents – Change of Perspective

Walter Würtl (AT – Österreichischer Alpenverein) presented a look at Austrian accident statistics and demonstrated that we should also look beyond just burials and deaths to include all caught and injured. Traumatic injuries are more prevalent than earlier thought. Some interesting general stats from Austria include:

- 3% of partly buried victims die
- 49% of buried victims die
- 7% of buried victims survived for longer than 2 hours

Certainly time is life for the buried victim and that to stay on top is key to survival. However, trauma is a big problem.

totally buried			buried but visible			partly buried			not
107 killed			10 killed			13 killed			13
72%	18%	10%	50%	40%	10%	8%	77%	15%	100%
asphyxia	trauma	uka	asphyxia	trauma	uka	asphyxia	trauma	uka	trauma

Table 2. Austria avalanche deaths from 2004/5 to 2009/2010, n=143.

Some of Würtl's conclusions:

- 32% were likely killed outright by trauma, therefore must stress prevention.
- severe trauma occurs in forests and rocky terrain, therefore terrain selection key.
- incident of trauma is greater when considering all caught, therefore body pro and helmet highly recommended.

Avalanche Forecasting For Large Mountain Areas

Mike Wiegele (CA) presented a summary of how his helicopter guiding operation forecasts for their ski operation — nearly 5000 km² (2000 square miles) — an area that is similar to the response area for many mountain rescue teams. Wiegele uses a 5-step check list.

1. Daily weather data
2. Cosmic and Solar Radiation
3. Dig Snowpits
4. Field Observations
5. Stability Rating and Ski Test

He also voiced concern about the confusion of the term “moderate” in current stability and danger ratings. Does moderate mean moderate good or moderate bad? This is a valid criticism.

Wiegele stressed the importance of developing a risk management plan to prevent losses which are often the results of human errors. This plan is important for both commercial operators and mountain rescue teams. An important part of this plan is to have a system that identifies warning signs, seeks early detection of problems and then acts to prevent problems. The bottom line is that when it comes to avalanches, Wiegele's operation “looks for avalanches all the time.”

JOINT SESSIONS — AVALANCHE AND TERRESTRIAL COMMISSIONS

Butterflies and Avalanches: Common Errors in Avalanche Rescue

Dale Atkins (US, MRA) presented results from a review of 500+ US avalanche rescues. His original aim was to identify accident types and accident rates, but during his review the aim changed to focus on human errors — why they happen and how to prevent. His justification was

that the same errors are being made over and over and have been for decades. He presented background information on human errors based on a model developed by James Reason that differentiates errors into unintentional and intentional actions. Atkins identified rescue errors and matched those errors with basic error types: slips, lapses, mistakes and violations.

Atkins suggested 7 steps to prevent or reduce human errors:

- Implement a risk management plan for loss prevention.
- Look for “why” errors happen
- ID basic error types: slips, lapses, mistakes and violations
- Seek “how” to prevent future incidents
- Nurture a strong “feeling of uneasiness”
- Use an *advocus diaboli* (devil’s advocate)

The connection of butterflies and avalanches relates to butterfly effect in chaos theory where small differences in initial conditions may result in very different outcomes. A typical condition in many mountain rescues.



Figure 9. Three important conclusions from Atkins’ talk about. The last point is especially important for rescuers.

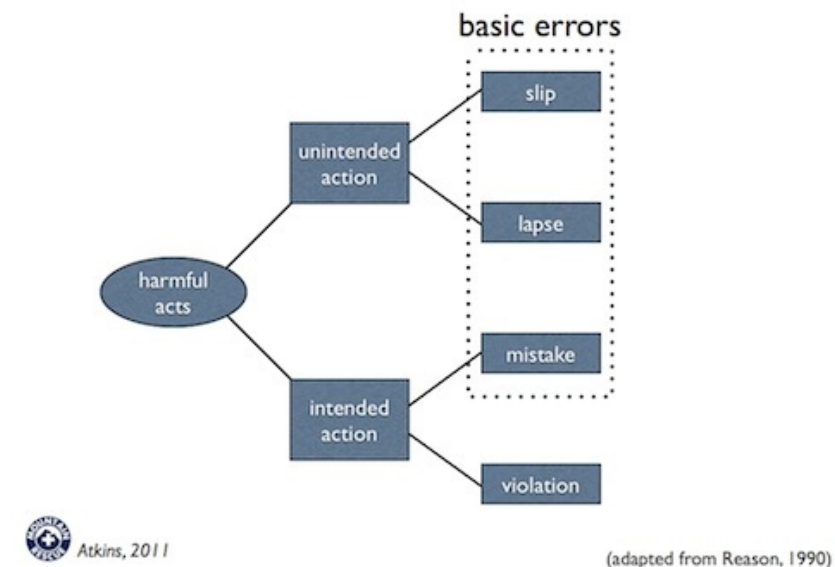


Figure 10. Human errors in avalanche rescues can be categorized into four basic error types.

Accidentologie et Prevention

Claude Jacot (FR, ENSA) described a comprehensive database — System National Observation de Sécurité en Montagne (SNOSM) www.institut-montagne.org to collect accident and rescue information involving all mountain sportsmen. The database and system were launched in 1996 to collect data from ski resorts and in 1999 was expanded to include all mountain incidents. With

an extensive record of accidents and rescues, preventive programs can be designed and targeted — an important aim of SNOSM — to different segments of users. Not only has SNOSM identified user groups, it also identifies where best — hotels, web/social networks, trailheads, etc. — to reach these users. Jacot stated that young people aged 10–14 is a great age group to target safety messages.

A couple of prevention videos as part of the SNOSM program can be seen on Youtube:

<http://www.youtube.com/watch?v=audhBEUFK3Q>

<http://www.youtube.com/watch?v=07b8mjCr7Rc>

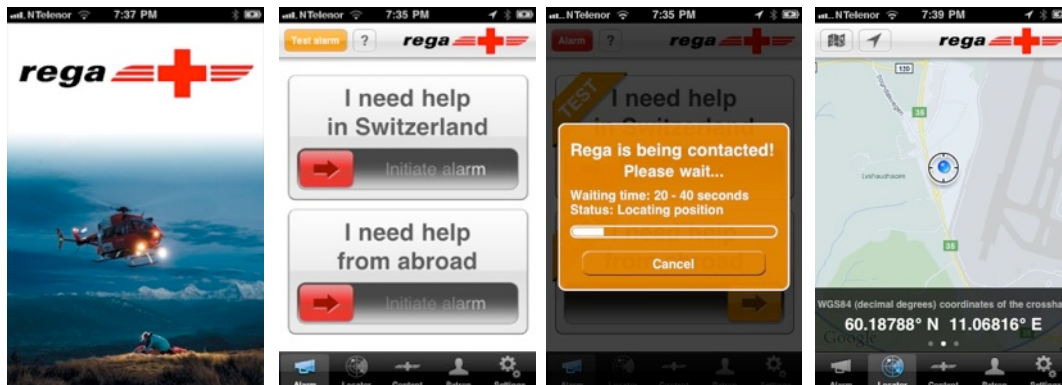
Avalanche Hazard Prevention and Control Above Highly Frequented Places and Settlements in Slovakia

Merek Biskupič (SK, Horská Služba) presented an overview of avalanche mitigation efforts for people, roads and structures. Interestingly, they use different blasting agents — plastic explosives — and techniques — electronic detonators than commonly used in the US. Biskupič also shared the history of the Slovakian avalanche prevention program that was started in 1972. In Slovakia the avalanche forecasting and education program is part of the mountain rescue service.

www.avalanches.sk

Prävention und Rettungsorganisation für öffentlich intensive genutzte Flächen - Lawinendienst Mattertal

Bruno Jelk (CH, Zermatt) presented the prevention and safety program for the town of Zermatt. When Nature delivers a harsh blow mountain rescue teams need to be ready to apply wilderness skills to an urban setting. Though Zermatt is thought to be a small mountain hamlet, during the busy tourist times more than 30,000 people inhabit the village. Jelk also showed the iRega iPhone app which allows one in need to quickly contact the Rega Operations Center and request rescue from anywhere in the world. Introduced in February 2011 the app has already been used more than 1500 times. Jelk reports that false alarms are “not a problem” because several steps/questions must be completed before the alert is made. Jelk remarked, “The future is here!” An important message is that not only are cell phones important but that smart phones can be even more helpful for backcountry travelers and rescuers.



Figures 11-14. Screen shots from iRega smart phone app for iPhone. Unfortunately, this app is available only on the Swiss iTunes store.

Boulder Mountain Avalanche – One Year Later

Ian Tomm (CA, Canadian Avalanche Association) described the political and social fallout from the large, multi-casualty incident that occurred in the Selkirk Mountains of British Columbia in March of 2010. Perhaps as many as 100 people were caught in a snowmobiler-triggered avalanche that crashed down into a large group of people parked at the bottom of the steep slope. Thirty-two people were injured and amazingly only two people died. (An excellent summary can be downloaded at www.ikar-cisa.org/ikar-cisa/documents/2010/ikar20101020000602.pdf).

Besides the sheer magnitude of this accident and rescue response, the incident was also remarkable on several fronts:

- RMCP launched a criminal investigation against:
 - organizers — criminal negligence causing death (no charges filed)
 - parents — child endangerment (no charges filed)
- Rescuers learned companion rescue works and organized rescue minimized harm.
- Coroner's report stated, "transceivers worthless" because there were so many people with transceivers and it was impossible to manage the chaos.
- Civil lawsuit is pending as an injured person — now a quadriplegic — is suing everyone involved including the estates of the deceased.

The Boulder Mountain accident was the tipping point to implement recommendations made by a 2009 Death Review Panel organized by the BC Coroners Service. Their report offered 15 suggestions to improve the safety of backcountry visitors — especially snowmobilers. Now a collaborative effort of recreationists, equipment suppliers, land managers and government are working together to greatly increase the reach of the Canadian Avalanche Center. Actions taken include:

- direct marketing of avalanche safety materials to snowmobilers
- government/land managers adopting a ski-area type model to backcountry avalanche terrain (signage, first aid, trail ratings, etc.)
- institute trip planning tool on CAC website to help people pick the terrain to match avalanche conditions
- expansion of forecast regions
- promote snowmobiling as safe and fun
- snowmobile brands pushing snowmobile safety

The avalanche forecasting and prevention programs in Canada will be growing tremendously over the next couple of years. Important lessons for the US will no doubt emerge.

Avalanche Protection — Davos

Hans-Jürge Etter (CH, SLF) presented the avalanche situation of Davos, the highest big city in Europe, and a city with significant avalanche dangers. With more than 11,000 permanent residents and 3 to 4 times that many in winter, the threats are significant and so too are the challenges of managing people, communications, transportation, and infrastructure become weighty. During big storms it is not uncommon for the city to be cut-off and for people to be locked-in for several days. In addition to controlling the movement of people from houses, roads, railroads, ski trails, and x-c trails, avalanche forecasters and city officials must also coordinate with supply trucks (like food) at least 4 to 12 hours in advance. Etter added, "**It's important to use the media.**" People know to listen to the media for emergency messages, but most people don't know where to go for avalanche information.

Skitourengehen im Südtirol

Markus Hölzl (IT, Bergrettungsdienst im Alpenverein Südtirol) presented some results of trailhead surveys in the Südtirol. When it comes to prevention education one of the biggest problems is that we as rescuers and educators don't know how many people are out and about and we know even less about their attitudes and knowledge. In 2010 on one single day the BAS surveyed 143 trailheads and 6010 people. Then in 2011 they modified their sampling technique to only 22 sites, but daily for 1 week, and surveyed 5700 people. Nearly two in three people were backcountry skiers, but one-third of people surveyed were snowshoers. Eight in ten skiers carried transceivers, probes and shovels. However, only about one in ten snowshoers were similarly equipped. When it came to knowing the avalanche danger from the bulletin, 75% said they knew the current danger, but only 53% knew the correct rating for the day.

Redundanzen – inwieweit sinnvoll und ab wann zu stark einschränkend?

Andres Bardill (CH, Alpine Rettung Schweiz) addressed the issue of **what is the appropriate amount of redundancy**. To find this answer involves having a solid risk management plan. He posed a question for rescuers to consider in our own operations, "Do we have enough redundancy to cover major events?" Bardill also offered several key bits of advice for training

mountain rescuers: “Training decision making right at the beginning” and “Do not suppress self responsibility.

Auto-Umschaltfunktion vom Empfangs- in den Sendmodus LVS (Search to Send)

Michael Rust (AT, Pieps) presented their solution to dealing with the issue of auto-revert-back-to-transmit when a searcher is struck by a second avalanche. Rust outlined the two methods that can be used to solve the problem: motion control with a sensor or time control with a timer. He also outlined the three scenarios in which the searcher can be affected by a second avalanche:

Situation A	Situation B	Situation C
searcher buried	searcher buried	searcher buried
transceiver “off”, others are searching	transceiver “on”, searcher actively searching	transceiver becomes detached, searcher loses transceiver in second avalanche
sensor or timer will not work	timer not good because of delay to initiating search	sensor or time will not help

Table 3. Three situations where a searcher can suffer tragic consequences if caught by a second avalanche.

The Pieps solution is the “Pieps Backup”. This mini 457kHz transmitter is basically a slave to your regular transceiver. If you are searching and become buried the Backup can detect the emergency. It uses motion sensors, and if there is no movement and no other transmitting beacons at close range the device begins to transmit. There is no delay of minutes (or longer) for the timer control to trigger the auto-revert function. The Backup works with all avalanche transceivers regardless of brand. However, many listening were not convinced that the problem is serious enough to warrant spending the \$150 for the Backup. Time will tell.

Switch-Over (Reversible) Antenna Technology, Consequences on Search Strip Width, Fighting the Worst Case

Franz Kröll (DE, Ortovox) described the problem that affects the search for ALL transmitting avalanche transceivers: the vertical orientation. When the antenna of the transmitting unit is vertical the range can be reduced by about 50%, which means 20–30m. To improve this situation Ortovox has developed a “smart antenna,” so that when the transmitting antenna is in the vertical or near vertical position, the transmitting signal is transferred to another antenna that emits the field in a horizontal or near horizontal plane. Testing showed that range only decreased by about 10%. What is very nice about this feature is that it potentially improves the range of any transceiver regardless of brand or model. The Ortovox S1+ and 3+ models incorporate this “smart antenna” technology.

Avalanche Transceiver Test 2011

Merek Biskupič (SK, Horská Služba) presented results of a major transceiver test performed in the spring of 2011. Testers, all experienced avalanche transceiver users, tested 14 models with at least 5 devices (and some models had more) per model for a



Figure 15. Merek Biskupič discussing the transceiver test.

total of 150 transceivers. The test measured and compared accuracy, direction, multiple burials (3 buried), and the affects of smart phones and radios. Direction and distance measurements were measured using differential GPS. Biskupič's conclusions:

- know your transceiver
- all had problems with multiple burials
- smart phone and radios can sometimes reduce range by 10–20%
- keep magnets away from transceivers that use magnetic switches
- **no clear winner!**

For this author the best transceiver is the one your friend knows how to use.

The ABC's (and D) of Digging: Avalanche Shoveling Distilled to the Basics

Bruce Edgerly (US, Backcountry Access) presented results of their “combat” avalanche rescue survey where they solicited information on avalanche rescues via social media. What they learned was that 40% of their cases rescues went unreported. Also that avalanche debris in companion rescue is often soft and sometimes very soft. Additional details can be learned from their website at:

<https://s3.amazonaws.com/BackcountryAccess/content/papers/EdgerlyUndertheRadar.pdf>

The ABCDs as reported by Edgerly is a simple nemonic to help when digging out a friend.

- Airway
- Burial depth
- Clear snow to sides
- Dig only once

Some debate followed as to **which is the best shoveling method** — strategic or v-shaped conveyor belt. It is this author's opinion (and who is one of the developers of the strategic method) that both methods work well. The strategic method was developed for companion rescue where typically one or two shovelers are available and the debris is often soft. The v-shaped conveyor belt was developed for use by a team in very hard snow conditions. Rescuers should be familiar with both methods.

JOINT SESSIONS — ALL COMMISSIONS

Bourg St.-Pierre / Avalanche with 10 Casualties

Pat Fauchère, (CH, Air-Glaciers), Dr. Greg Zenruffinen and Patrick Torrent (CH, KWRO/OCVS) presented a detail description of the mass casualty avalanche accident near Bourg St. Pierre (near the Great St. Bernard Pass). The avalanche swept the group of French hikers (9 snowshoers and 2 cross-country skiers) down a steep and very narrow gully. The group were experienced and also leaders of a local French alpine club. They realized they were off route as they traversed just above treeline and recognized the danger. Right after turning around they



Figure 16. Avalanche near Bourg St. Pierre (CH) that buried 10 and killed 5 on 26 March. The avalanche fell 300m vertical.



Figure 17. Flying into the accident site. The avalanche swept down from the right and spilled snow into the gorge. Rescuers accessed the site via the diagonal track through the tall brush.



Figure 18. Rescuers searching near the bottom of the avalanche outside of Bourg St.-Pierre. Five people died.

triggered the avalanche. The avalanche swept 10 members 300m down a narrow, 40m wide gully. The call for help was made at 12h36.

There were some language problems for the German speaking rescuers and French speaking victims, but the most serious problems were the numbers of buried and seriously injured, and that the reporting person did not know their exact location. The lead helicopter had to fly a large search pattern during which they spotted three very large avalanches that they surveyed. They finally found this small avalanche.

Once the lead pilot found the accident site, rescuers described it as a mouse trap. **Their greatest dangers were additional avalanches and air traffic (lots of helicopters in a very confined space).** Fortunately there were no mishaps. Initially rescuers were skeptical of the report of 10 missing, and were surprised to find that in deed 10 had been buried. Eleven helicopters ferried 20 rescuers from Zermatt and 20 rescuers from Entremont, plus 8 rescue dogs, and 6 emergency physicians. The first helicopter in saw one person standing alone and one wiggling foot protruding from the snow.

Of the 10 victims buried, 2 were able to free themselves before rescuers arrived. Of the other 8 buried, 7 were equipped with transceivers and quickly found under 80 to 150cm of snow. One person, however, had her transceiver turned off and inside her backpack. She was not found until eight weeks later. Three of the buried victims were found dead. A fourth person died later in the hospital. The five other buried victims were injured, including three severely. Doctors reported the injuries to all were significant and consisted of poly trauma to spine, internal organs, and extremities; all victims also suffered from hypothermia too. The injured were flown to hospitals in Sion and Martigny.

After searching the area with transceivers, Recco and dogs the search was suspended for the last missing person at sundown. The next day explosive mitigation work triggered a massive avalanche that added another layer of debris 15m deep. The site was checked once a week all spring before the last victim was found in mid May. Lesson's learned included:

- numerous victims in a confined area is very challenging.
- use a triage point to sort the evacuation of the injured.
- important to hold rescuers back to rescue rescuers, if needed.
- two operations going on simultaneously: ground and air.
- use a flight coordinator, aka "air boss".
- use separate radio channels for air and ground operations.

- when there is the threat of a second avalanche what the appropriate amount of risk to take?
Save a life / risk to your life.

Vorstellung der Ausbildung, Organisation und Arbeitsweise der Lawinenkommissionen in Tirol

Walter Würtl (AT, ÖAV) presented the avalanche observation and forecasting program for the state of Tirol, home to 710,000 people. Covering an area of 12,640.17 km² (4,880.4 sq mi) the area is very popular for skiing and mountain visits. In the winter time visitors spend more than 25 million nights and generate 1.5 billion euros for the Austrian economy. Locally 227 agencies with 1345 members deal specifically with avalanche rescue. The agencies can only advise local community/government leaders who make the decisions regarding closures and mitigation efforts. A reliable system of data collection and evaluation are key to protecting residents and visitors. Würtl demonstrated their on-line database system — LW DKIP — for recording observations. The system looked to be a very effective tool to turn data in to information.

Le rôle du chef d'opération de secours lors d'une crise complexe en montagne

Colonel Blaise Agresti, (FR, CNISAG / PGHM) trained as an engineer, historian, mountain guide and soldier Agresti currently serves as commander of the National Center for Skiing and Mountaineering in the Gendarmrie (Chamonix) and was chief architect for the French military's response in the Afgan war. Colonel Agresti has a tremendous amount of knowledge in planning, implementing and controlling operations. His presentation focused on the PGHM's method to bring back order into disorder. Interestingly, career soldier Agresti said the military way did not work for organizing a mountain rescue. His reasoning was in terms of the planning time scale. Mountain rescue planning takes place in minutes versus weeks, months or years for military operations. Since the first few minutes are critical to the initiation of all mountain rescue actions, he presented a simple three-part model that focused on the first 5, 10 and 15 minutes of any callout.

The first step (5 minutes) deal with information gathering about the incident. Step 2 addresses the “what” you're going to do. Agresti also considered this phase as the “rhythm of the operation” and the importance of taking a minute or two to reflect on what you think will be the main effects of your decisions. In the PGHM, and especially in Chamonix, legal issues are important and must be addressed during step 2. Notes must be meaningful, even 10 years later. Step 3 addresses the “how” the operation will work. This includes consideration to risks, and to the consideration of advantages and disadvantages for the chosen strategy and tactics. Steps 2 and 3 must be completed before calling in support.

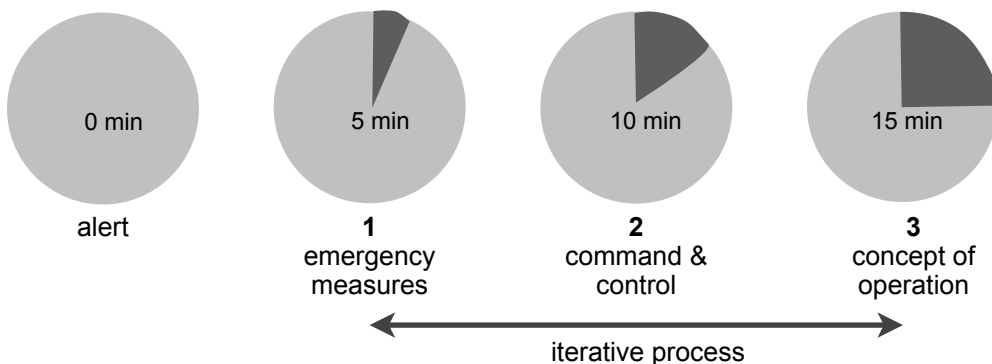


Figure 19. Agresti's 3-step model for managing chaos in the early minutes of any rescue call out.

SAR leaders in the PGHM receive 2 weeks of formal training. The topics covered include:
operations — real examples

- decision making
- operation coordination
- command and control

Col. Agresti ended his presentation with an interesting comment — especially for a career military

officer; he added that **it is more important to put effort into the leader and decision-making than to emphasize plans**. On reflection the colonel's comment makes sound sense. A good leader can adjust and make even a bad plan work, but a bad leader will fail, even with a good plan.

Lernen aus Beinaheunfällen

Hans Martin Henny (CH, KZDA) gave an interesting presentation about learning from near misses and suggested the creation of Critical Incidents Reporting System for the mountain rescue community to report near misses. Staff Warrent Officer Henny's presentation focused around two summer time incidents — one involving the misuse of a Petzl ID and the other a hurried tyrollean. These lessons learned, however, apply in both summer and winter operations. Henny used a MTO (man, technology and organization) methodology to assess the close calls. He pointed out that we tend to implement redundancies for technology but not for people. He asked us to consider when using or thinking about including redundancies, **"Is the redundancy in the right place?"**

Changes in the Avalanche Algorithm

Herman Brugger (IT, EURAC) presented the new consensus effort produced by the Medical Commission. The algorithm uses some of same criteria from the 1996 and 2001 versions as to burial time and core body temperature. Instead of identifying an "airpocket" or "air space" this new version only seeks to identify a "patent" airway. Also, the new algorithm includes potassium serum values. The algorithm also stress the importance of getting a patient to a hospital with an emergency department. Unchanged are the basic rules that without a patent airway — blocked — a buried victim can be cold and dead. However, if the buried victim was found with a patent airway they are not dead until they are warm and dead. Basically, **"hypothermic patients with a patent airway must be resuscitated and rewarmed."**

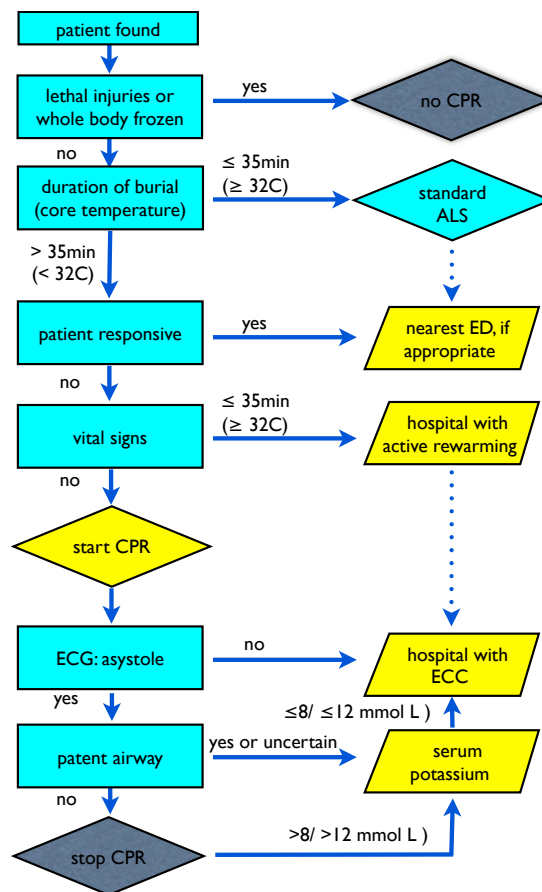


Figure 20. Draft version of new consensus avalanche rescue algorithm for use by physicians and others with ALS training.

2012 MEETING – Poland

The 64th IKAR Congress will be held 2–7 October in Krynica, Poland. Additional information can be found at: www.ikar-cisa2012.pl

NEW AVALANCHE RESCUE COMMISSION PRESIDENT

After many years of dedicated service Hans-Jürge Etter stepped down as president of the Avalanche Rescue Commission. He will also soon be retiring from his position at the SLF and be moving to the wide open spaces of British Columbia. At the general meeting of IKAR Delegates (member organizations) Etter was warmly recognized and thanked for his service and important

contributions. His practical knowledge and consensus-building leadership will certainly be missed.

Earlier in the week the Avalanche Rescue Commission elected a new president, Dominique Létang (FR) whose new position was confirmed by the IKAR delegates and will begin in 2012.

Professionally, Mr. Létang is currently the director of L'Association National pour l'Étude de la Neige et des Avalanches (ANENA). As a teenager he had the unfortunate experience to fall climbing and fractured his pelvis. This event lead to a long career of helping people in the mountains. He is a strong advocate for mountain safety education. Previous to L'ANENA, Létang served in the Peloton de Gendarmerie Mountain (PGHM) and has participated in more than 800 rescues. In addition to Mr. Létang's rescue experience, he is also a professional mountain guide. The Avalanche Rescue Commission is looking forward to Létang's leadership, which will begin in 2012.

RECOMMENDATION REGARDING THE MRA INVOLVEMENT IN FUTURE IKAR MEETINGS

It is this writer's opinion the MRA remain involved in IKAR. The exchange of ideas, knowledge, and skills, is of huge benefit to the MRA membership. The analysis, consideration and/or application of this information, skills, and equipment can benefit all MRA teams from training to actual mission operations. IKAR can help MRA teams become better, safer, and more efficient rescuers. The challenge to the MRA is better bring and share this knowledge to the MRA community. This report is one way to transfer information

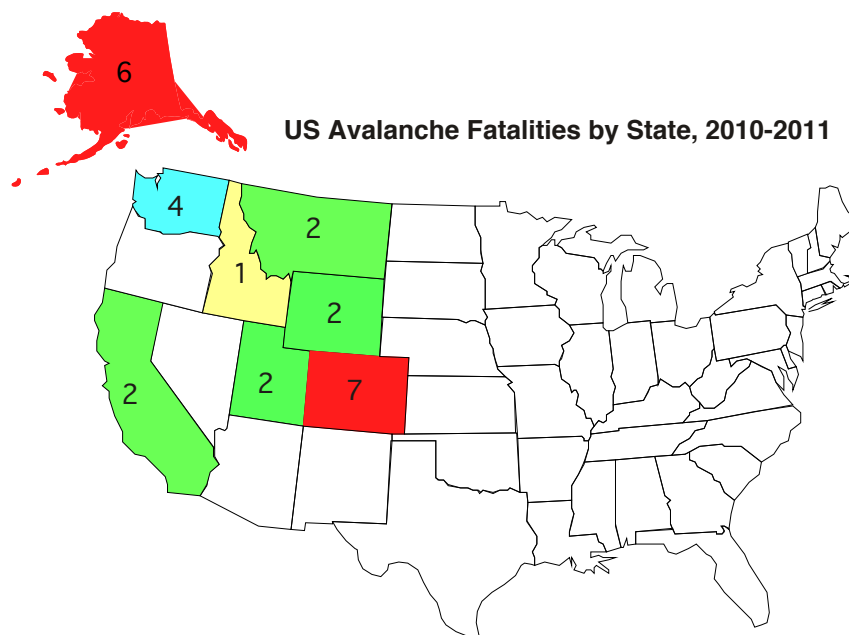
The Mountain Rescue Association (MRA) benefits from participation in IKAR in many ways. Perhaps the most import benefit is the opportunity to gain knowledge and skills from the leaders of mountain rescue from around the world, especially in Europe. The knowledge and skills learned can help MRA teams and members do their jobs faster and safer. In recent years the reach of IKAR has been expanding beyond Europe and North America. Japanese representation has been present for several years.

DISCLOSURE

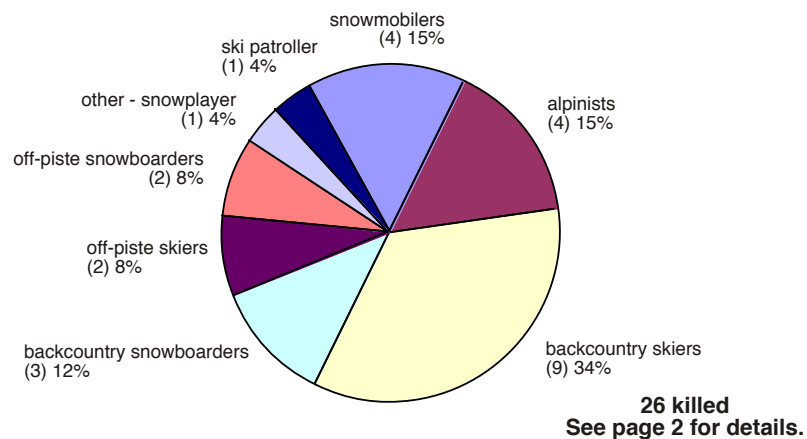
I, Dale Atkins, am a volunteer MRA member (Alpine Rescue Team, Evergreen CO) and I am also employed by RECCO AB who paid for my participation at the 2011 IKAR congress, reducing the costs of the MRA's participation. I am very aware of the potential for conflict of interests and have in the past withdrawn myself from specific voting actions. During the 2011 meeting no voting took place involving the RECCO system.

US Avalanche Fatalities

2010-2011



US Avalanche Fatalities by Activity, 2010-2011



Details

date	location	state	description	rescue method	rescue technique
Nov. 22	Wolf Creek Ski Area ¹	Colorado	1 ski patrol killed	organized	transceiver
Nov. 26	Umta Mtns ²	Utah	1 snowmobiler killed	organized	spot probe
Dec. 4	Morning Star Peak ³	Washington	1 climber	organized	partly buried
Dec. 5	Front Range, Trelease	Colorado	1 backcountry skier killed	companion	transceiver
Dec. 29	Calder ⁴	Idaho	1 snowmobiler killed	organized	transceiver
Jan. 9	Kalispell	Montana	1 snowmobiler killed	companion	transceiver
Jan. 17	Berthoud Pass ⁵	Colorado	1 backcountry snowboarder killed	organized	probe line
Feb. 1	Snoqualmie Pass	Washington	1 backcountry snowboarder killed	organized	probe line
Feb. 14	Truman Gulch ⁴	Utah	1 snowmobiler killed	organized	transceiver
Feb. 20	Meeker	Colorado	1 snowmobiler killed	organized	dog
Feb. 22	Snowmass	Colorado	1 off-piste skier killed	companion	transceiver
Mar. 5	Leavenworth ⁶	Washington	1 backcountry skier killed	companion	partly buried
Mar. 12	Ketchikan ⁷	Alaska	1 backcountry snowboarder killed	organized	matted out
Mar. 19	Hatcher Pass	Alaska	1 backcountry skier killed	organized	transceiver
Mar. 26	Horsehoe Mountain	Utah	1 backcountry skier killed	companion	transceiver
Mar. 27	Stevens Pass	Washington	1 off-piste snowboarder killed	organized	partly buried
Apr. 4	Aspen Highlands	Colorado	1 backcountry skier killed	organized	transceiver
Apr. 16	Tetons ⁸	Wyoming	2 backcountry skiers killed	organized	transceiver
Apr. 18	Chugach Mtns	Alaska	1 snowplayer killed	organized	probe line
Apr. 26	Bishop, Sierras	California	2 backcountry skiers killed	organized	not buried
Apr. 28	Ruth Gorge, Denali NP ⁹	Alaska	1 climber killed	companion	digging
May 21	Front Range, Torreys Pk ¹⁰	Colorado	1 backcountry snowboarder killed	organized	not buried

1. Ski patrol director working alone.
2. Left transceiver in truck on purpose.
3. Solo
4. Companion could not do transceiver search.
5. Left transceiver at home.
6. Leg dismembered; died from external bleeding.
7. Found 135 days later.
8. Buried in tent.
9. Ice avalanche.
10. Died from internal bleeding