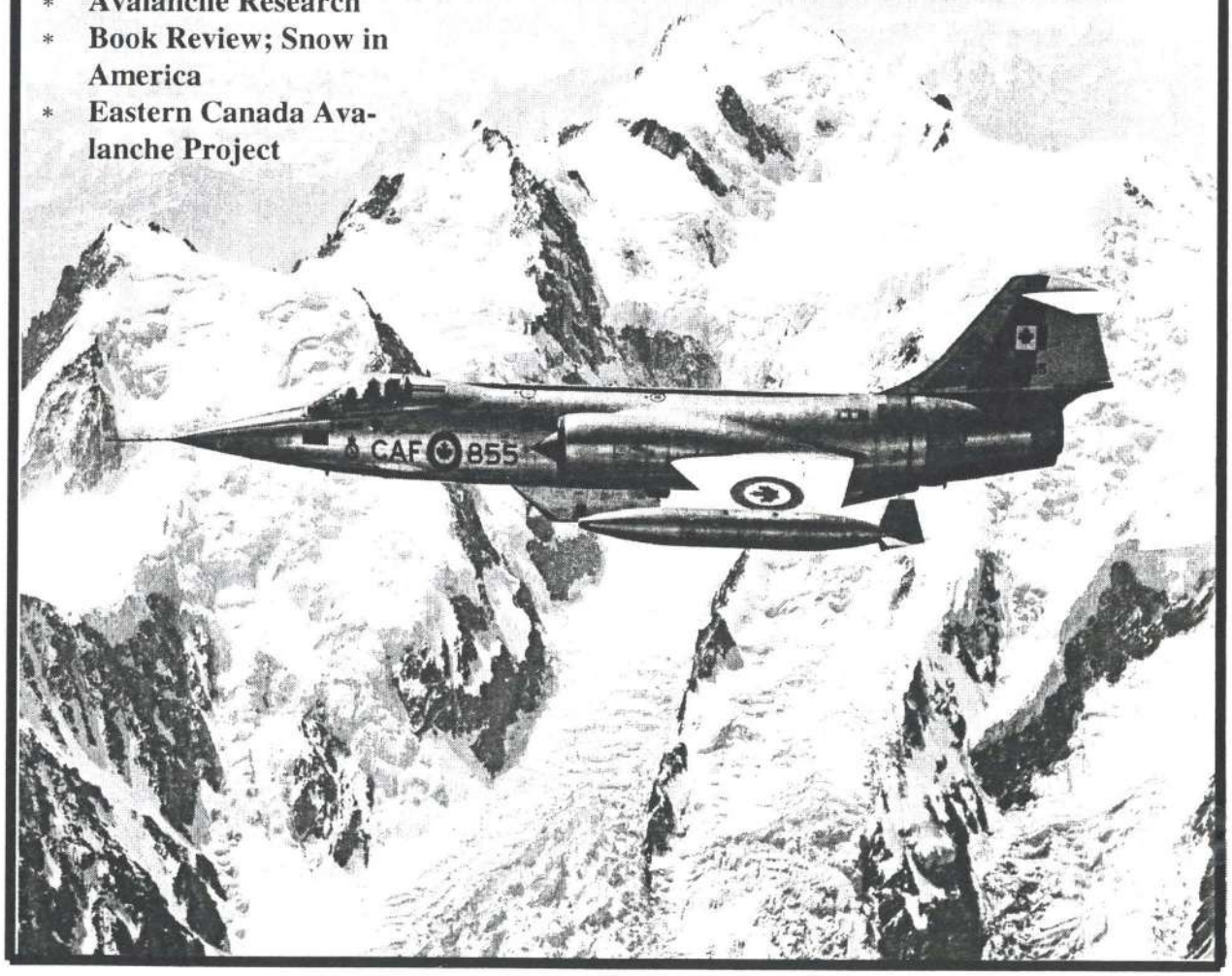
CANADIAN AVALANCHE ASSOCIATION

AVALANCHE NEWS

SUMMER 1999 VOLUME 58

* Message From The President
* Glacier Summit Awards
* Avalanche Research
* Book Review; Snow in America
* Eastern Canada Avalanche Project



AVALANCHE NEWS

SUMMER ISSUE VOLUME

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CANADIAN AVALANCHE ASSOCIATION

MESSAGE FROM THE PRESIDENT

In the past few years your association has seen rapid growth and expansion. The Board of Directors have followed your direction to use your financial resources to improve the Associations' services, products, business endeavors and its profile. Those people working for and with you have been very successful.

However, I believe that we now face a challenging year ahead. The Association must maintain the momentum while strengthening the gains we've made.
We must improve the way we do business through sound financial planning and control. We have hired a business manager. He looks at the world around us through a different set of lenses. This new management style will require adjustments but by embracing change and by working together, the Association will be stronger.

This spring we launched the Canadian Avalanche Foundation. This Foundation will have charitable status, something our association can not hold. The Foundation's initial objective will be to reduce the financial burden of the Public Avalanche Bulletin on the Association. The next target will be to expand the bulletin to a seven day a week product.

We have recently formed a Professionalism and Ethics committee. This committee's mandate will be to clearly define our responsibilities as avalanche professionals. We will carry on the work of the Professional Development Program with further hazard mapping courses, risk management seminars and possibly in the near future, courses such as a WCB endorsed Explosive Avalanche Control course.

Our Eastern Canada Avalanche project has raised our profile on the national stage and is helping us to truly become, The Canadian Avalanche Association. Our co-operative SnowSmart project with the CSPS and the Smartrisk Foundation is bringing our message into the schools and possibly, in the future, the homes of Canadians. Further projects are in the planning stages.

Finally, we must improve consultation with you the members. We need to have members become more interested and involved in the Association! Inform us of what you don't like, or as importantly, what you do like. Tell us how we can help you do your job, improve your knowledge or serve your needs. This is your Association, speak up, get involved.

(Continued on page 4)

(Continued from page 3)

In closing, I would like to thank immensely, all the people who have freely given their time and energy to the Association. They are our greatest asset.

Bruce Allen

President, Canadian Avalanche Association

FROM THE EDITOR'S DESK

It is hard to believe that summer is now half over and soon I will be standing in front of my closet trying to decide what to wear to work! I would like to apologize for the delay in this edition of the newsletter. There were some technical issues that we had to deal with over the summer.

We are trying something new on the back inside cover. When filler is needed for empty space, we thought that you might find some old news articles of interest. If you have any old or not so old news clippings that others might find interesting, please send us a copy for our files.

Despite the unpredictable weather we are experiencing, I hope that everyone is enjoying their summer. The deadline for the winter issue is October 15, 1999.

Heather Buerge

Editor, Avalanche News

The front cover photo is courtesy of Phil Engstad, one of our guest speakers at this years AGM. Phil is a retired Top Gun Fighter Pilot, who spoke at this years Risk Management seminar.

This is a photograph of Phil flying a CF-104 Starfighter Aircraft with the French Alps as a backdrop.

The photo was taken by Phil's wingman who mounted a 70 mm Vinton camera under his aircraft. The photo was taken in the spring of 1966.

Thanks to Phil for sharing this wonderful photograph with us. Check out page 20 of this newsletter for an article written by Colonel Phil Engstad.

MESSAGE FROM THE GENERAL MANAGER

What does membership in the Canadian Avalanche Association mean to you? I must admit it was wonderful to participate in the AGM in Penticton with over 120 of our colleges and related industry people. I had my eyes opened to the similarities, as well as the diversity, of the membership at large. Some members have desires for better working conditions in the winter. Other members just want to have fun as well as practice in a profession that keeps them on the edge and outdoors. Some members love to do committee work and change the world around them. Others want to increase their knowledge to be the best that they can be. Whatever type of member you are, I hope that the Canadian Avalanche Center can fulfill your hopes and dreams for the future.

There is so much talk about the millennium these days I do not want to go there, but I will for a brief moment. What does the Canadian Avalanche Association mean to you for the year 2000? Think of the decisions you will make, the lives you will impact, the people you will meet throughout the association and it's various partners. Will you participate in Avalanche Awareness Day? How about an upgrade in your education, level 2 or CPD. What about becoming a RAC provider or CAATS instructor? Is the year 2000 the year you become a professional member? Is this a year we collectively make a difference?

The strength of any organization lies within the diversity and expression of new innovative ideas by its membership. I think that is what the center and myself will be thinking about this summer. How to get the most for you the members of the Canadian Avalanche Association? How to harness all that enthusiasm and talent to reach the goals of every committee? How to help the individual member in their quest for knowledge? How to take all that industry passion and pass it on to the public for their own well being?

I hope as each person reads this they will contemplate the future. Ask yourself questions, ask your other members the questions, ask your board representatives the questions. When we come back into operation in September be ready to ask us the questions. We are here to help you find the answers. You will most likely see Evan and myself out in the field a bit more this season because we really want to get to know the membership. If we don't see you personally, please feel free to call the Center and express your thoughts to us. I know that together we can make a difference. Until then relax and unwind, because as we all know another winter is just around the corner.

Richard Rotteveel

General Manager, Canadian Avalanche Association

COLUMBIA BREWERY – STELLAR SUPPORTERS OF THE CAA

The Columbia Brewery, located in Creston BC, and the brewers of Kokanee beer, is the premier supporter of both professional and amateur snowboarding events across Canada. It is a natural fit for the Columbia Brewery to partner with the Canadian Avalanche Association and support your efforts in promoting safety in the backcountry amongst outdoor enthusiasts.

Our partnership began in February of 1998 when the Columbia Brewery donated $10,000 to the CAA in honour of Ross Rebagliati's gold medal win in snowboarding at the Nagano Olympic Winter Games. The cheque was given in memory of Ross' friend Jeff "Lumpy" Leidal who died along with five other skiers in an avalanche.

The following January, the Columbia Brewery came on board to support the CAA's first ever ***Avalanche Awareness Day*** with a successful media event at Big White Ski Resort in Kelowna. Here, the president of the Columbia Brewery, Tim Vauthier, presented Chris Stetham with a cheque for $5,000 to help launch the Associations' new charitable Foundation.

Left to Right: Richard Rotteveel (CAC), Peter Schaerer, Johann Slam, Clair Israelson, Phil Hein, Nancy More (Brewery Manager for Columbia Breweries)

In May of this year, we solidified our commitment by establishing the ***Columbia Brewery Glacier Summit Awards*** to help the CAA recognize the outstanding contributions of its members. The first ever recipients of the Awards were Peter Schaerer for his Lifetime Achievement, Phil Hein for Education, Peter Spear for Public Safety, Clair Israelson for Rescue and Johann Slam for Rookie of the Year. Congratulations to all on receiving this well-deserved award and to all the members who supported them in reaching this "summit". In each of their names, the Columbia Brewery donated an additional $5,000 towards the development of a snowboarder safety book currently being written by Bruce Jamieson and Jennifer MacDonald and scheduled to be released this fall.

From all of us at the Columbia Brewery, we hope you enjoy a well-deserved rest and a bottle of Kokanee this summer! Looking forward to our continued partnership in 1999/2000.

Cheers!

Tanya Oliva
Public Relations Manager,
Columbia Brewery

The new revised constitution is now available at the Canadian Avalanche Centre.

Please call the office, if you would like one mailed out to you. (250) 837-2435

Patterns in Unexpected Skier-Triggered Avalanches[1]

Bruce Jamieson and Torsten Geldsetzer
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Phone (403) 220-7479; Fax (403) 282-7026; e-mail jbjamies@ucalgary.ca

Summary

To determine recurring weather, snowpack and terrain characteristics of unexpected skier-triggered avalanches, we surveyed 153 experienced avalanche workers in Western Canada. Each person answered up to 27 multiple-choice questions about an unexpected skier-triggered dry slab avalanche. To determine if the characteristics of unexpected avalanches are atypical, some results are contrasted with a dataset of 1390 skier-controlled avalanches from the Columbia Mountains. Some of these patterns in unexpected skier-triggered avalanches may help with future decisions about where and when to ski in avalanche terrain.

For the unexpected dry slab avalanches, the weather was usually fair (69%) and the temperature stable (69%) or cooler than the previous day (21%). Half the unexpected avalanches occurred when there was a lack of recent avalanche activity. Half the slabs were hard slabs and most were thicker than skier-controlled slides. Over half the avalanches failed on a layer deeper than the storm snow and almost three-quarters of the failure layers consisted of persistent grains such as surface hoar, facets or depth hoar. Spatial variability was an important factor since 41% of the unexpected avalanches were remotely triggered and the location of 33% of the trigger points were surprising. The snowpack for the unexpected avalanches was generally thinner or much thinner than for skier-controlled avalanches. Seventy percent of the avalanches started where the slope angle was reported to be 35° or less. Remarkably, 42% occurred on cross-loaded slopes and almost half were in the alpine.

Introduction

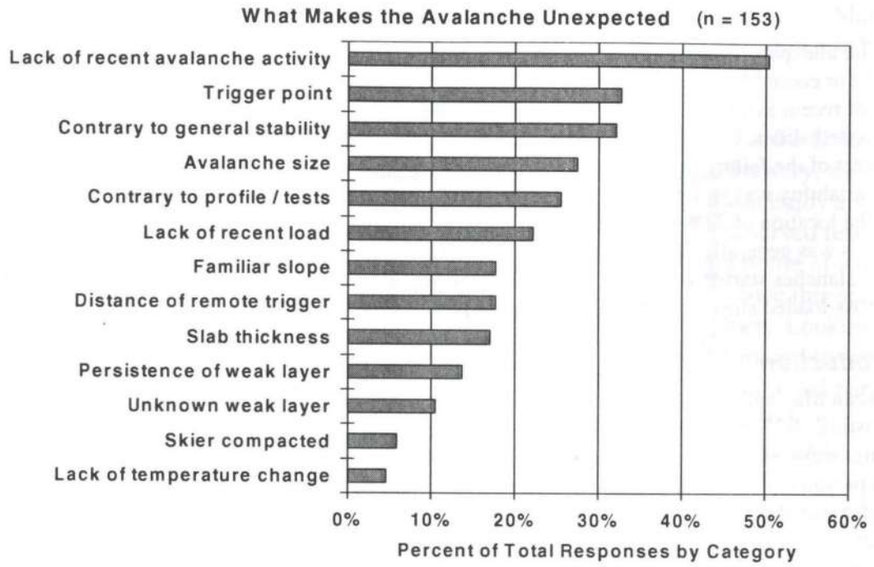
Between May and December 1998, 153 experienced avalanche workers each completed a questionnaire consisting of 27 multiple-choice questions. They were ski guides, avalanche forecasters and controllers for highways, ski areas and mountain parks as well as avalanche consultants and researchers. We asked each person to select **one** unexpected dry slab avalanche that had been triggered by a skier or snowboarder and about which they recalled most facts about the weather, snowpack and terrain. It did not matter if the avalanche occurred during work or recreation. Although the questionnaires were completed in Western Canada, those surveyed were free to select events that occurred outside Canada. While it is possible that more than one person may have chosen the same avalanche, we expect that redundancy in the data set is very limited.

If most unexpected avalanches have a certain characteristic, we often want to know if that characteristic is unusual. For example, if 65% of unexpected avalanches occur on north and east aspects, we might be tempted to be raise a warning flag for these aspects. However, if about 65% skiing in avalanche terrain is on north and east aspects, then the warning flag is inappropriate. Fortunately, for several of the questions we were able to contrast the results for unexpected avalanches with results for 1390 skier-controlled avalanches in the Columbia Mountains. These occurrence data were provided by two heli-skiing operations: the Canadian Mountain Holidays near Bobby Burns Lodge from 1996 to 1998 and Mike Wiegele Helicopter Skiing from 1990 to 1999.

1 Presented at the Technical Meeting of the Canadian Avalanche Association, Penticton, 5 May 1999

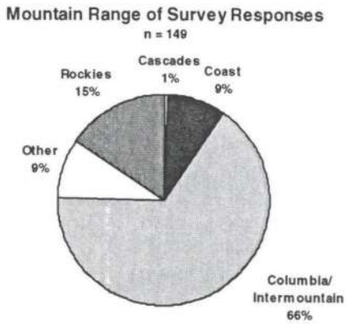
What was Unexpected about the Avalanche?

This was the only question that allowed multiple answers. The most common factors were lack of avalanche activity (50%), the location of the trigger point (33%), the event contradicted general stability (32%), the size of the avalanche (27%), the event contradicted profiles and/or snowpack tests (25%) and lack of recent load (22%). If only 25% of the unexpected avalanches were contrary to profiles and tests, does this imply that 75% were consistent with profiles and tests? We don't think so. There may have been some in the "grey zone" where the profiles and snowpack tests were neither consistent with, nor contrary to, the occurrence. Also, some of the tests and profiles may have been done after the event at sites indicated by the avalanche and not obvious prior to it.



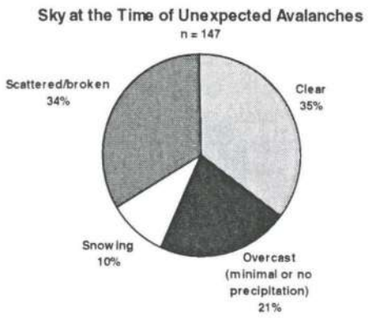
Mountain Range

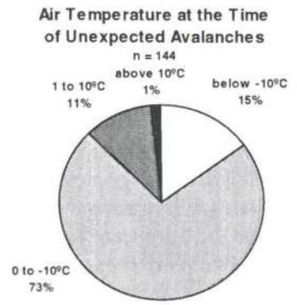
Sixty-six percent of the reports are from the Columbia Mountains of Canada or the Intermountain regions of the United States. Fifteen percent are from the Rocky Mountains and 9% are from the Coast Range. This concentration of reports from the Columbia Mountains probably reflects the fact that many of the avalanche workers who completed the questionnaire are ski guides who work in the Columbia Mountains.



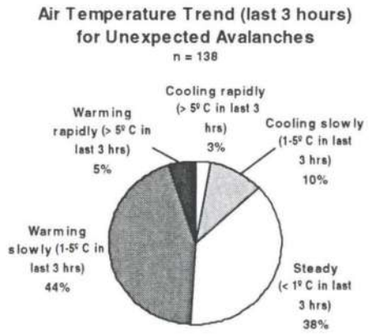
Weather

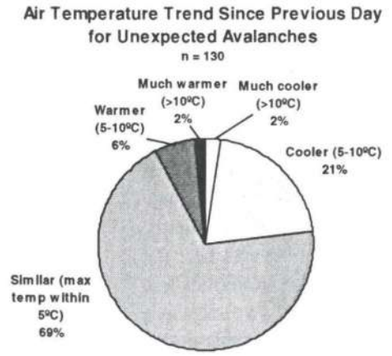
For 35% of the avalanches, the sky was clear and an additional 34% occurred when the sky was scattered or broken, indicating that most unexpected avalanches happen when the weather is fair. Presumably we select avalanche terrain more often in fair weather than during stormy weather. However, fair weather may also make us feel optimistic or euphoric and thereby lead to decisions that, in hindsight, are high-risk.





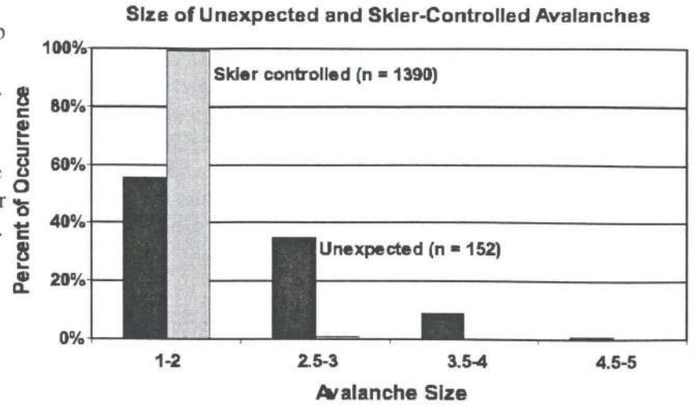
The air temperature was usually between 0°C and -10°C (73%) which are probably just the common temperatures for skiing. In most cases the temperature was steady in the last 3 hours (38%) or rising by 1 to 5°C (44%) which is common during the skiing day. For 69% of the avalanches, the temperature was similar to the previous day (±5°C) and for 21% the temperature had cooled by 5 to 10°C. This cooling may be associated with clearing after a storm since skiers often return to avalanche terrain when the weather improves. Warming by 5 to 10°C was only reported in 6% of the avalanches.

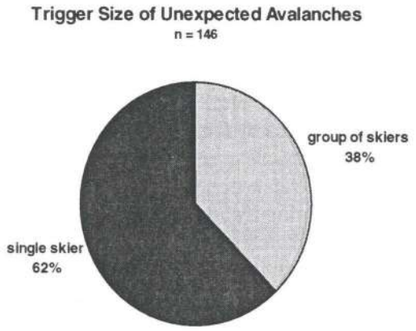




The Avalanches

The avalanches were all dry slab avalanches since the questionnaire asked for such avalanches. Using the Canadian size classification (CAA, 1995), 55% of the unexpected avalanches were size 1 or 2, 35% were size 2.5 or 3 and 10% were size 3 or larger. This is in sharp contrast to skier-controlled avalanches in the Columbia Mountains which are mostly size 1 or 2 (99%).

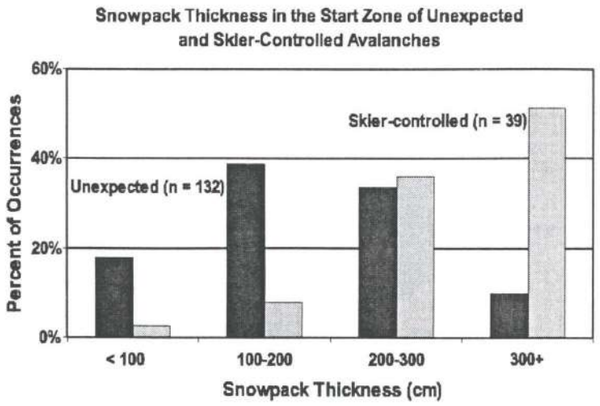




Thirty-eight percent were reportedly triggered by a group of skiers rather than a single skier (62%). Groups of skiers are considered strong triggers in the Canadian snow stability ratings (CAA, 1995, p. 94) and the European Avalanche Danger Scale but not in the Canadian or US Avalanche Danger Ratings (Dennis and Moore, 1997).

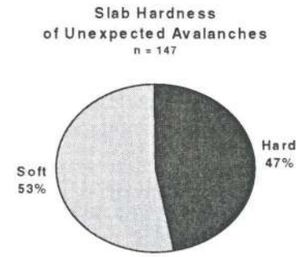
Snowpack Thickness

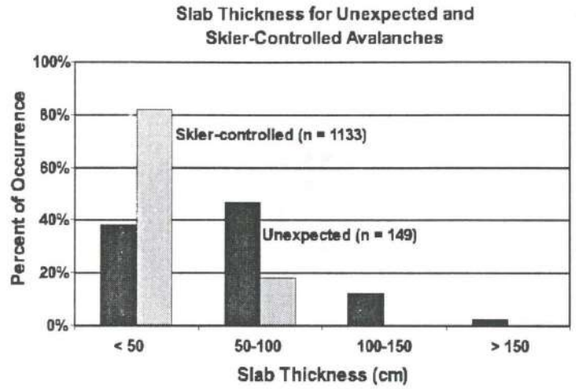
In the start zone of over half the unexpected avalanches (57%) the snowpack thickness was 200 cm or less. This contrasts with skier-controlled avalanches in the Columbia Mountains (Jamieson and Johnston, 1998) where only 10% started where the snowpack was 200 or less cm thick and most started where the snowpack was over 300 cm thick. We conclude that many unexpected avalanches occur where the snowpack is shallower than average, and perhaps much shallower than average.



Slab Properties

About half the slabs were hard and half were soft. Our field experience indicates that most skier-controlled dry slab avalanches are soft slabs, indicating that hard slabs are more difficult to forecast.

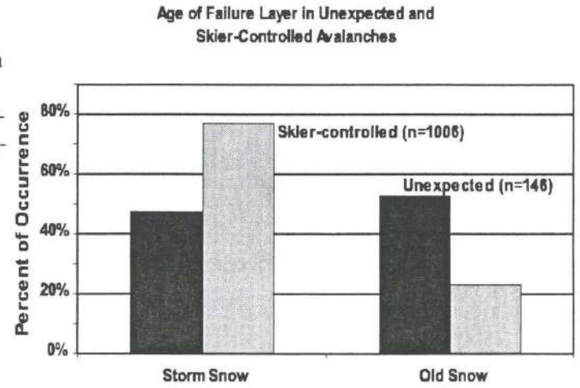




Thirty-eight percent of the unexpected slabs were less than 50 cm thick and an additional 47% were between 50 and 100 cm thick. This is in contrast to skier-controlled avalanches in the Columbia Mountains of which 82% were less than 50 cm thick and 18% were 50 to 100 cm thick. This suggests that unexpected avalanches are thicker than most skier-controlled avalanches. However, it may be that most respondents reported a relatively thick slab avalanche because these are often more memorable. Nevertheless, thicker slabs represent a forecasting challenge.

The Failure Layer

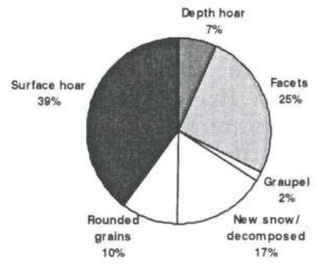
Over half of the avalanches (53%) failed on a weak layer deeper than the snow from the most recent storm. This is in contrast to skier-controlled avalanches in the Columbia Mountains of which only 23% failed on a weak layer deeper than the storm snow. Clearly, unexpected avalanches more often involve deeper slabs with older weak layers than do skier-controlled avalanches.



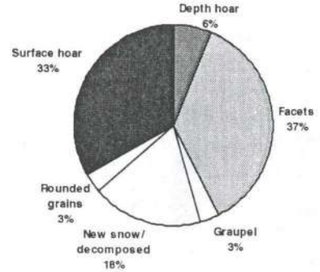
Seventy-one percent of the unexpected avalanches involved persistent failure layers of surface hoar (39%), facets (25%) or depth hoar (7%). The types of grains reported in the failure layers at remote trigger points are similar except that 76% are persistent forms and the percentage of facets rises from 25% to 37%. The grain types for the failure layer in start zones and remote trigger points are similar to a study of fatal avalanches between 1972 and 1991 (Jamieson, and Johnston, 1992) in which 78% failed in persistent weak layers.

Graupel, which often appears as a failure layer in tests such as the compression test or rutschblock test, was only the failure layer for 2% of unexpected avalanches. One reason is that the roughly spherical grains of graupel roll out of avalanche start zones but remain in the less steep locations where we often test the stability of the snowpack.

Grain Type of the Failure Layer in the Start Zone of Unexpected Avalanches
n = 133



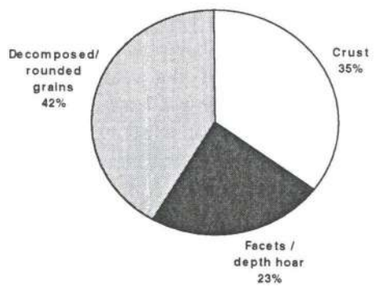
Grain Type of the Failure Layer at the Remote Trigger Point of Unexpected Avalanches
n = 33



The Bed Surface

The bed surface usually consisted of a layer of rounded grains or decomposed and fragmented particles (42%), a crust (35%) or a layer of facets and/or depth hoar (23%). This percentage of bed surfaces of facets and/or depth hoar is certainly not typical of the Columbia Mountains. It suggests that some of the avalanches occurred where snowpack was unusually shallow and weak. The hand hardness of the bed surface was usually pencil (56%), one-finger (21%) or knife (16%).

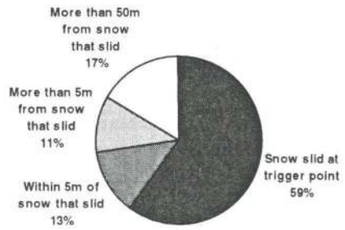
Bed Surface Grain Type of Unexpected Avalanches
n = 131



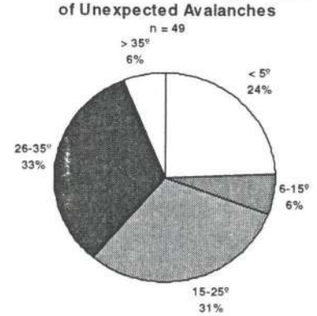
Remotely Triggered Avalanches

Remarkably, 41% of the avalanches were triggered remotely, that is, from a point where the snow did not slide. For remote triggering, the fracture spreads along a weak layer and releases an avalanche where the slope is steep enough. Consequently, even when not in avalanche terrain, skiers are potential triggers, capable of releasing nearby slopes and sometimes the slopes above them.

Trigger Point of Unexpected Avalanches
n = 149



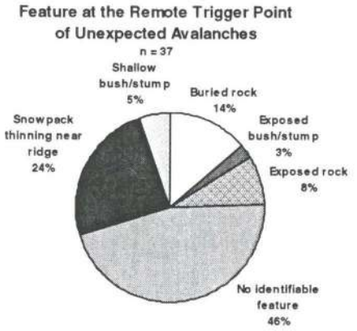
Slope at the Remote Trigger Point of Unexpected Avalanches
n = 49



In 61% of the remotely triggered avalanches, the slope at the trigger point was 25° or less. However, the slope was more than 35° – and therefore steep enough to slide – in 6% of the remotely triggered avalanches.

In over half of the remote trigger points there was an identifiable feature. These included snowpack thinning near a ridge (24%), buried rock (13%), exposed rock (8%), a shallow bush or stump (5%) or an exposed bush or stump (3%). This supports the idea that skier triggering can occur at small areas of low stability where the snowpack is thin and weak (Logan, 1993) and the fracture propagate through larger areas of relatively stable snow (Jamieson, 1995, p. 185-194).

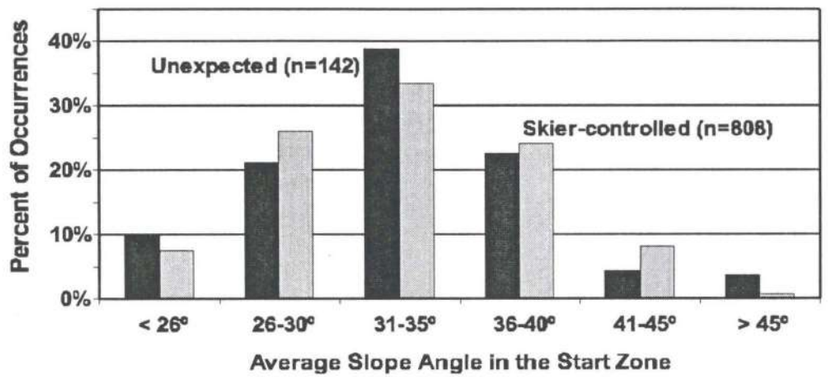
Feature at the Remote Trigger Point of Unexpected Avalanches
n = 37



Terrain

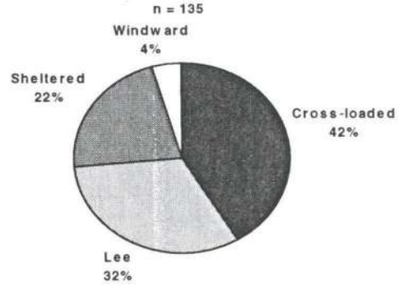
The slope angle is usually considered the most important terrain characteristic for avalanching. Often, the average of the slope angles in the start zones of slab avalanches is 38° (Perla, 1977). However, for unexpected avalanches, 70% are reported to have start zones of 35° or less, and 31% have start zones of 30° or less. These figures are similar for skier-controlled avalanches reported by ski guides in the Columbia Mountains. While the slope angle of most of these start zones was probably estimated rather than measured, it is a strong reminder to "think avalanches" even when the slope angle appears to be less than 35° or even 30°.

Average Slope Angle in the Start Zone of Unexpected and Skier-Controlled Avalanches



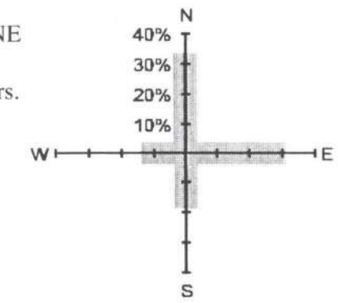
Most books on avalanches indicate that orientation to wind is the most second most important terrain characteristic (e.g. Fredston and Fesler, 1994). Often lee slopes are identified as particularly problematic. However, for unexpected avalanches, 42% are cross-loaded and only 32% are lee slopes. Twenty-two percent are sheltered slopes, mostly below tree line. These results suggest that cross-loaded slopes deserve additional caution.

Wind Exposure of the Start Zone of Unexpected Avalanches
n = 135

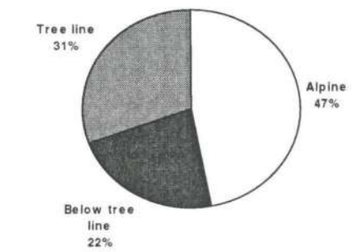


Aspect of Start Zone of Unexpected Avalanches
n = 139

Thirty-five percent of unexpected avalanches occurred in the north quadrant (NW through NE) and 30% occurred in the east quadrant (NE through SE). This is not surprising since these slopes are often lee slopes with deeper than average snow and therefore attractive to skiers.



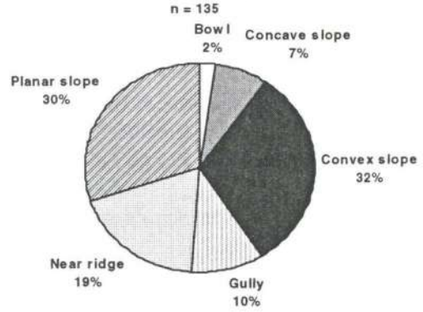
Vegetation Zone of Unexpected Avalanches
n = 149



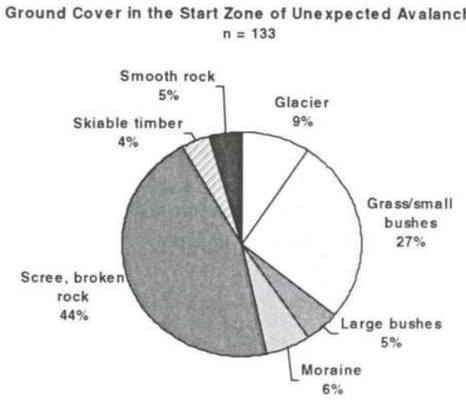
Forty-seven percent of unexpected avalanches were triggered in the alpine, 31% near tree-line and 22% below tree-line. We doubt that 47% of skiing in avalanche terrain occurs in the alpine, which implies that experienced avalanche workers get surprised more often above tree-line than at, or below, tree-line.

Thirty-two percent of unexpected avalanches start on convex slopes, 30% on planar slopes and 19% near ridges. These features may simply reflect the avalanche terrain that is commonly skied. Although fracture lines for storm snow avalanches are often found on convex slopes, these unexpected avalanches occurred as often on planar slopes.

Feature in Start Zone of Unexpected Avalanches
n = 135



Forty-four percent of unexpected avalanches reportedly occurred where the ground cover consisted of scree or broken rock and 27% occurred where the ground was covered with grass and small bushes. These may be typical of the skied avalanche terrain. The fact that only 6% of the unexpected avalanches occurred in moraines is interesting. Moraines are associated with rocky terrain often with boulders including some areas where the snowpack has been thinned by the wind. Consequently, moraines should have many areas of weak snow which may be triggered by skiers. Perhaps the reason moraines have so many areas of weak snow and so few reports of unexpected skier-triggered avalanches is that moraines are so conspicuous. Experienced avalanche workers probably ski over boulders on grassy slopes without realizing it but they do not ski moraines without recognizing them. This probably means that avalanche workers wait for quite stable conditions before skiing moraines.



Acknowledgements

We are very grateful to all those who shared their experience with unexpected avalanches by completing a questionnaire.

Our thanks to Mike Wiegele Helicopter Skiing in Blue River, BC and to Canadian Mountain Holidays at Bobby Burns Lodge for providing avalanche occurrence data from the Columbia Mountains, and to Jill Hughes for compiling the data from Blue River.

This study is part of an ongoing Collaborative Research and Development Project funded by the Natural Sciences, and Engineering Research Council of Canada, Canada West Ski Areas Association, Mountain Equipment Co-op, the Canadian Avalanche Association and the BC Helicopter and Snowcat Skiing Operators Association (BCHSSOA). The supporting members of the BCHSSOA include Canadian Mountain Holidays, Cat Powder Skiing, Crescent Spur Helicopter Holidays, Great Canadian Helicopter Skiing, Great Northern Snow Cat Skiing, Island Lake Lodge, Klondike Heli-Skiing, Kootenay Helicopter Skiing Ltd., Last Frontier Heli-Skiing Ltd., Mike Wiegele Helicopter Skiing, Monashee Powder Adventures, Peace Reach Adventures Ltd., Purcell Helicopter Skiing, R.K. Heli-Skiing, Retallack Alpine Adventures, Robson Heli-Magic, Selkirk Tangiers Heli-Skiing, Selkirk Wilderness Skiing, Sno Much Fun Cat Skiing, TLH Heli-Skiing, Whistler Heli-Skiing Ltd. and White Grizzly Adventures Ltd. The supporting members of Canada West Ski Areas Associatplainion include Apex Alpine, Big White, Intrawest Corporation, Mt. Norquay, Mt. Washington, Nakiska, Resorts of the Canadian Rockies, Silver Star and Whistler Blackcomb.

For in-kind support, we are grateful to the Avalanche Control Program at Glacier National Park and the Snow Avalanche Programs of BC Ministry of Transportation and Highways.

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BOOKS

Mergen Bernard: *Snow in America.*
1997. Smithsonian Institution Press, Washington and London. 321 p.

The participants of the International Snow Science Workshop 1988 at Whistler may remember Bernard Mergen's presentation on snow in art and poetry. The lively talk was an enjoyable variation from the technical papers of the workshop. Mergen is a professor of American civilization at George Washington University at Washington D. C. With this book, he has presented the extensive results of his research on how snow was portrayed in art and daily life in U.S.A. and Canada, and has added information on the role of snow in recreation, traffic, and ecology. The book, which is altogether descriptive and non-technical, makes easy and entertaining reading about snow.

Professionals who work with snow, will find most interesting the description of the struggles for developing ski areas on U.S. Forest Service land, the origin of avalanche control in the U.S.A, the history of snow surveying for hydrological forecasting, and the discussion of the numerous terms for snow. With respect to the terminology, Mergen disproves the stereo-

(Continued on page 18)

(Continued from page 17)

type that Inuit people have more words for snow than the people living south of the Arctic Circle do. One reason for the numerous native words is that various Inuit dialects use different words for the same type of snow. Furthermore, Mergen draws attention to the great variety of terms in the International Classification for Seasonal Snow and the skier slang, which includes words such as breakable crust, crud, boilerplate, Whistler powder, and Sierra cement.

The book contains many more interesting observations. It makes fascinating reading for those who are in the business with snow and wish a change from reading technical literature.

Peter Schaerer

The Canadian Avalanche Association would like to welcome Tracker Beacons as our newest Steller Sponsor.

Avalanches on "The Rock"

By Clair Israelson and Sue Hairsine

In early 1990's Drs. Martin Batterson, David Liverman et al of the Newfoundland Geological Survey (NGS) were researching natural hazards accident data, and were surprised to discover that snow avalanches were the most deadly natural hazard in the province. To date their research has documented twenty eight avalanche events that killed thirty four persons, and injured twenty one others. Surprisingly, twenty three of these people were killed when avalanches destroyed the homes that they were living in.

In 1995, the NGS contacted Alan Dennis at the Canadian Avalanche Center (CAC) to learn more about the avalanche phenomena and safety programs. In the fall of 1996, at the SARScene conference in Halifax, Dr. Liverman met with CAC representative Phil Hein to discuss what might be done to mitigate the snow avalanche hazards in Newfoundland. As a result of this meeting, and with sponsorship from Parks Canada, a New Initiatives Fund (NIF) grant from the National Search and Rescue Secretariat was generated, and the Eastern Canada Avalanche Project (ECAP) was born.

In the spring of 1998 the CAC contracted Clair Israelson and Susan Hairsine to develop and manage the project to promote avalanche awareness, training, and avalanche hazard mitigations in Newfoundland. A steering committee comprised of Bruce Jamieson, Phil Hein and Evan Manners worked with Clair and Susan to finalize the ECAP goals. They agreed on the following as the project deliverables:

- Document the avalanche accidents, and the weather events that caused them
- Facilitate development of avalanche knowledge among the professional staff of the NGS
- Conduct avalanche training programs to educate skiers, snowmobilers, SAR personnel and other winter recreationalists, and develop local teachers in the rapidly growing recreational/adventure guiding sector for future RAC and ARAC training in Newfoundland
- Develop partnerships and create a permanent repository of avalanche safety training and reference material and links to the CAC
- Deliver presentations and develop publications to increase awareness of the snow avalanche problems in Newfoundland.
- Produce a report describing ECAP programming elements delivered, methods used, and lessons learned.

(Continued from page 18)

During winter 1998/99 one RAC course for snowmobilers, and two ARAC courses for skiers, snowboarders and SAR personnel were extremely well received. Along with Clair Israelson, we were fortunate to have Phil Hein and Randy Stevens as our instructor team. These men all proved they too could be "buddies". They discovered that the Newfoundland culture is strong, that it was important to work on their terms, and that our ideas from western Canada were not necessarily appropriate there. During the introduction to the first course, the participants looked puzzled when Phil began discussing avalanches in Newfoundland. One student finally informed him that "We don't have avalanches in Newfoundland. Avalanches are huge events that crash down huge mountains in the European Alps. Here in Newfoundland we've got snow slides; sometimes, lots of snow slides." After being straightened out on that issue, things went better.

During these three courses, the CAA instructors selected four candidates as potential future avalanche course instructors in Newfoundland. This coming winter three of these candidates will take a CAA Level I course and one will take the CAA Level II course in western Canada. They will then act as "instructors in training" for RAC and ARAC courses to be held later this winter in Newfoundland.

Remains of the Williams house following an avalanche at Tilt Cove in March 1912. Photo courtesy of the Mackinnon family.

At the CAA annual meeting in Penticton this spring, the steering committee met to fine tune some of the ECAP deliverables. Although the project has been received very positively from the recreational guiding community, to date provincial and municipal land managers have not been enthusiastic. While they agree that avalanches can occur in some communities, other priorities and fiscal constraints are a reality. One high level provincial official told us "Many of these small communities can't afford to turn on the street lights; they don't want to hear about avalanche problems that could cost a lot of money to mitigate."

SARScene 99 in St. John's this October will be an optimum time to further showcase the CAA and the ECAP in Newfoundland. Dr. Liverman will make a presentation on avalanches in Newfoundland, and members of the CAA will make presentations and staff an information booth at the trade fair. At this venue we hope to make stronger in roads with more members of the SAR community, and provincial and municipal representatives.

The ECAP concludes in March 2000. We have been extremely pleased to help promote the CAA in this venture. We also would like to take this opportunity to thank our steering committee for their ongoing assistance excellent advice in this project.

May all your cod tongues be cooked....

Clair and Susan

DECISIONS AND THINGS

SOMETHING TO THINK ABOUT
BY
COLONEL PHIL ENGSTAD (RET'D) MSM, CD2

1. CORE VALUES

THINK SERIOUSLY ABOUT WHAT YOU PERSONALLY WANT FROM LIFE AND ESTABLISH YOUR CORE VALUES. ONCE ESTABLISHED, TAKE CONTROL OF YOUR LIFE AND PROTECT THESE VALUES UNCOMPROMISINGLY THROUGH RESPONSIBLE, DISCIPLINED DECISION MAKING WHERE YOU AND YOU ALONE " PULL YOUR OWN STRINGS".

2. KNOWLEDGE AND EXPERIENCE

EXPAND AND DEVELOP YOUR KNOWLEDGE AND EXPERIENCE MEMORY BANK FROM THE "BROADEST SPECTRUM OF SOURCES POSSIBLE". THIS WILL EXPAND YOUR DECISION MAKING SCOPE, EXPAND YOUR OPERATING ENVELOPE AND INCREASE YOUR COMFORT LEVEL WITHIN THAT ENVELOPE.

3. PERSONAL FACTORS

REVISIT AND REVIEW REGULARLY YOUR PRIORITIES, SITUATION, EXPERIENCE, LIMITS, COMFORT LEVEL AND THE CHEMISTRY OF THE GROUP WITH WHOM YOU ASSOCIATE AND MAKE CHANGES AS NECESSARY.

4. DECISION MAKING

THINK ABOUT THE THREE TYPES OF DECISIONS I OUTLINED AND DISCUSSED DURING MY PRESENTATION (NO TIME DECISIONS; LOTS OF TIME DECISIONS; AND CLOCK TICKING DECISIONS) AND HOW YOU MIGHT APPLY OR INCORPORATE THIS METHODOLOGY INTO YOUR OWN "MODUS OPERUNDI" OR THAT OF OTHERS.

5. DECISION MAKING CUES

THINK ABOUT HOW TO APPLY YOUR "CLOCK TICKING" DECISION MAKING CUES SUCH AS KEEPING THE BIG PICTURE; MAINTAINING SITUATIONAL AWARENESS; ASSESSING YOUR COMFORT LEVEL; CHECKING YOUR PERSONAL WARNING SIGNS; GO/NO GO ASSESSMENT; INDICATION OF "PRESS-ON ITIS"; COMPLACENCY; ANTICIPATION OF EVENTS AND THE BIG ONE – "GUT FEEL". MONITORING THESE WILL PROVIDE YOU WITH A "HOW GOES IT CROSS-CHECK" THAT WILL ENABLE YOU TO MAKE "FINE TUNE DECISIONS" FOR NORMAL TYPE DEVIATIONS FROM PLAN. IMPORTANTLY, THIS WILL ALSO ENABLE YOU TO MAKE THOSE DIFFICULT "BIG ONES" WITH THE CONFIDENCE AND TIMING NECESSARY TO RECTIFY A SERIOUS SITUATION THAT IF NOT HANDLED, COULD DEVELOP INTO AN UNMANAGEABLE OVERLOAD AND A DOWNWARD SPIRAL THAT COULD VERY WELL BECOME LIFE THREATENING IN SHORT ORDER. YOU NORMALLY JUST GET "ONE SHOT" AT "THE BIG ONES"!

6. MISSION/TRIP PLANNING

MISSION OR TRIP PLANNING CAN MAKE OR

(Continued on page 21)

(Continued from page 20)

BREAK A MISSION. A COMPLACENT "SHORT CUT" ATTITUDE WILL GUARANTEE MAJOR DOWNSTREAM PROBLEMS THAT COULD LEAD TO INJURY OR LOSS OF LIFE. CONVERSELY, UNCOMPROMISED PROFESSIONAL MISSION PLANNING WILL PAVE THE WAY FOR A COMFORTABLE AND REWARDING TRIP WHERE YOU ARE PREPARED FOR A BROAD SPECTRUM OF CONTINGENCIES IF THEY OCCUR.

7. RESPONSIBILITY AND SELF DISCIPLINE

CORE VALUES MUST BE PROTECTED BY RESPONSIBLE, DISCIPLINED DECISIONS. FAILURE TO DO SO WILL RESULT IN A LOSS OF CONTROL OF SITUATIONS AND THOSE THINGS IN YOUR LIFE YOU CAN MAKE DECISIONS ABOUT.

8. PROFESSIONALISM

STRIVE TO BE A PROFESSIONAL. PROFESSIONALISM IS AN ATTITUDE WHERE YOU CONSTANTLY STRIVE FOR THE BEST, DO YOUR BEST, ENCOURAGE OTHERS TO DO THEIR BEST AND BUILD A TEAM OF THE BEST. WITHIN A PROFESSIONAL ORGANIZATION THERE EXITS A COMMON BOND; THAT LOOK IN THE EYE WHEN YOU MEET OR PASS, THAT CONFIRMS IN AN INSTANT THAT YOUR COLLECTIVE GOALS, INITIATIVES, STANDARDS, STRENGTHS AND FRIENDSHIP ARE "EXACTLY WHERE YOU WANT THEM".

9. LEADERSHIP

THE WORLD IS FULL OF FOLLOWERS. BE A LEADER AND AN UP FRONT ADVOCATE FOR YOUR ORGANIZATION. TAKE YOUR IDEAS TO THE FRONT. SHARE YOUR VISION AND MAKE IT HAPPEN. THIS WILL KEEP YOU FOCUSED AND ENABLE YOU TO INFLUENCE PEOPLE, GOALS AND EVENTS IN A POSITIVE AND TIMELY ACTION ORIENTED WAY THROUGHOUT YOUR PROFESSION – AND IN YOURS – AS A MOUNTAIN PROFESSIONAL – YOU COULD SAVE LIVES!

10. THE BASICS (YOUR FOUNDATION)

LAST BUT NOT LEAST, THIS IS WHAT YOU HAVE BUILT ON – FROM TIME TO TIME. REVISIT THIS IMPORTANT AREA AND:

- FOCUS ON THE BASICS
- PRACTICE THE BASICS
- REMEMBER THE BASICS
- BUILD ON THE BASICS; AND
- RESPECT THE BASICS

ENJOY THE MOUNTAINS!

Colonel Phil Engstad (Ret'd) MSM, CD2

Spell Checker

Eye halve a spelling chequer
It came with my pea sea
It plainly marques four my revue
Miss steaks eye kin knot sea

Eye strike a key and type a word
And weight four it two say
Weather eye am wrong oar write
It shows me strait a weigh

As soon as a mist ache is maid
It nose bee fore two long
And eye can put the error rite
Its rare lea ever wrong

Eye have run this poem threw it
I'm shore your pleased two no
Its letter perfect awl the weigh
My chequer tolled me sew

Source unknown

Minutes of the Public and Technical Meeting Of the Canadian Avalanche Association Wednesday, May 05, 1999

Chairperson Bob Sayer welcomed 110 attendees at 1305 hours. In his opening remarks, Bob encouraged participation in attending the various sessions and to use this week to get to know each other.

REPORTS:

Eastern Canada Avalanche Project:

Clair Israelson reported on the 2-year project from its conception out of Dr. David Liverman's research to the role that the CAA plays in its administration. He explained the 7 Deliverable points and the following is a recap:

1. Documenting Avalanche Accidents
2. Facilitate Professional Development
3. Avalanche Training – 3 elements required
4. Public Awareness Programs
5. Develop Source for Avalanche Safety Info
6. Presentations and Publications
7. ECAP Final Report

A slide presentation complimented the dialogue and in his closing remarks, Clair highlighted the definite need for avalanche safety involvement and the receptive nature of the people in Newfoundland to our initiatives.

Research Findings:

Dr. David McClung reviewed the Snow and Avalanche Research that is being carried on by his section at UBC. He acknowledged the supporters and funding agencies without which these research programs would suffer. Three of the primary areas that are being researched are:

7. Avalanche Forecasting for Heliskiing
2. Avalanches and Forest Cover
3. Land-use Planning and Avalanche Return Periods

To date, on the above projects, two comprehensive papers have been written. One on Avalanche

(Continued on page 23)

(Continued from page 22)
Forecasting and another on Skier Triggering. Also explained was the application of Neural Network Modeling, which replaces discriminate analysis. In co-operation with Whistler-Blackcomb, extensive verification of computer generated ensemble, averaged, fine grid snow and weather forecasts is being carried out. In conclusion, there are 10 to 20,000 clear cuts in BC with avalanche problems that could necessitate further research.

Canadian Avalanche Centre Report:

Richard Rotteveel reviewed the centre's mandate as laid out by the consultant's recommendations 2 years ago. Staffing continuity working in a Team oriented fashion is being achieved to serve the membership in a professional manner. The mandate of the CAC is to engage in more business type relationships in the future, to work under a zero-base budget for the upcoming year, to communicate in a timely fashion with the membership and to develop partnerships in industry and business on their behalf. The memberships input is solicited.

Explosives Supplier Report:

Everett Clausen, CIL - Evan explained how they undertook the development and marketing of fuses for the avalanche control industry. They use triple crepe paper, which is good for cold weather, bitumen asphalt for waterproofing and a PVC outer covering which prevents cracking and gives adequate protection against moisture and oils. The field tests were satisfactory. One test involved wrapping each fuse around a half-inch mandrill and subjecting them to -40° for 4 hours before ignition. The fuses were built in Ohio by Austin Powder. Their future plans are for extensive marketing and serving the avalanche control industry. Andre Gagnon, an associate was also in attendance and was available for questions.

Explosives Supplier Report:

Rob Slivinsky, Explosives Ltd. (ORCA formerly ICI), representative from Alberta acknowledged that he will relay our concerns with the fuses supplied last winter. He will also fight to get rid of the waiver.

Fuse Design Report:

George Hafke, explosives inspector for Natural Resources Canada, reviewed his background and gave a report on the 2 types of fuses that he analyzed. Although he can not recommend one fuse over another, he stated that the basic ingredient of a good fuse is bitumen.

(Continued on page 24)

(Continued from page 23)

Access Innovations Report:

Doug Kashuba from Survival On Snow gave an overview on the new Avie Gate, one of which is in operation at Sunshine Village. Its conception came out of the need to educate out-of-bounds skiers to the dangers to which they were exposing themselves to. The gate opens only if you have a beacon on and it also affords a place to post the Public Safety Bulletin to raise their awareness. It operates on 24 volt or solar panels. The cost will vary depending on size, location and installation but would probably retail around $2000-$2500.

Accident Trends:

Evan Manners, Centre Manager, reported on the pattern for the 98-99 season, which showed 50% of the normal volume of incidents and involvements. Total involvements were 46 involving 80 people and resulting in 17 fatalities. In almost all categories the figures showed a 50% reduction.

MOTH:

Jack Bennetto, MOTH, gave tribute to co-workers Al Evenchick and Al Munro who lost there lives in the line of duty on January 7, 1999. Jack described the terrain at the Snowbank Creek paths. He then discussed the weather patterns, noting that it was the biggest snowpack by 60%+ in 15 years of data collecting. The path had an average slope angle of 36°. The fracture line was at a convex roll of 50° with a 2100 foot vertical drop from fracture line. Touching on the Why's, he noted the weather cycles, avalanche paths and decision-making human factors.

Kangiqsualujjuaq Accident:

Dr. Bruce Jamieson reported on the Northern Quebec incident stating that at about 0130 am on 1 January 1999, a dry slab avalanche struck the gymnasium and school in the village of Kangiqsualujjuaq in northern Quebec. During the preceding day and during the night of the accident, weather reports indicate that wind-blown snow was loading the 85 m high northeast-facing slope above the gymnasium. The 180 m wide avalanche ran down the slope, which averaged 38°, struck people outside the gymnasium, broke through the walls and struck more people inside the gymnasium. Using shovels and probes, the rescue continued through the night and into the day. Nine people died and 25 were injured. Dr. Jamieson noted in a later discussion that in the past 40 years there has been 31 fatalities in or near public or residential buildings excluding work camps.

(Continued on page 25)

(Continued from page 24)

Incident Report:

John Hetherington reported on an incident at Rainbow Mountain on March 11, 1999, that had great personal interest because it involved a good friend. In 9 m of snow there was a thin layer of buried surface hoar. The avalanche released above an experienced guide who could not see the entire release. He attempted to escape but unfortunately moved into the path of the approaching avalanche. Only his hand remained above the debris. Although this allowed a speedy recovery, he was badly injured.

Research Review:

Dr. Bruce Jamieson gave a brief overview of the research being done at the University of Calgary. This is the 10th year of field studies at Mike Wiegele's and the 1st year at Rogers Pass. Bruce then did a short recap of the upcoming evenings presentation touching on items such as recurring patterns of Unexpected Avalanches that were the results of surveys as well as the increasing popularity of compression tests.

SnowSmart Report:

Gord Ritchie explained that this Snow Risk Management Initiative is funded for 3 years by the Government's S&R Secretariat, sponsored by Parks Canada and managed by SMAR-TRISK in partnership with the Canadian Avalanche Association and the Canadian Ski Patrol System. It is a two-pronged initiative involving the development of both educational materials (SNOWSMART FOR SCHOOLS) and a comprehensive media campaign. The Timeline and Methodology followed outlining research being done in 1999;, identification of communication strategy in 1999 and 2000;, and the development and implementation in 2000-2001.

Provincial Emergency Program Report:

Terry Willis explained the role of PEP in the administration of Search and Rescue groups in the province. They supply funds for training volunteer groups and set standards. Policies are developed to prevent injury during avalanche operations and they now require a certified avalanche technician to accompany them. However, there is no definition as to what a certified avalanche technician should be and there is no way a regular volunteer in S&R could attain and maintain CAA Level II. PEP would like to develop a partnership with the CAA and create a policy whereby either a local S&R group would be able to qualify or an alternate policy of drawing on our membership to assist the first response input.

(Continued on page 26)

(Continued from page 25)

Multi Agency Rescue:

John Tweedy gave an excellent review of how well organized and effectively the multi agency rescue units have worked in the Nelson area. Much of the success on how the various groups in the region came as a result of the Silver Spray accident in Kokanee Glacier Park in January 1998. Using the Michel Trudeau incident as an example, he reviewed the circumstances of the mishap and the role that all the units played. The following is a list of all the key agencies that worked together: RCMP, PEP Nelson, MOTH, BC Forest Service weather forecast service, Parks Canada Banff Dog Handler, Nelson RCMP Dive Team, BC Parks and local air support from Kokanee Helicopters as well as the RCMP Air Division of Kamloops.

Dud Location Innovations:

Gord Burns, former RCMP dog handler, demonstrated the evolution of RECCO Rescue Systems device that should be viewed as another tool in the toolbox for rescue. The unit has developed into a safe way to search for duds. It will also find turned off beacons, cell phones and a host of other electronic equipment. Many ski areas are now equipped with their detectors and reflectors. Reflectors can be purchased separately or clothing and equipment can be purchased with pre-installed reflectors.

Youth Avalanche Awareness, "The Survival Game":

Tamara Pritchard and Marley Vaughn from the Vancouver Film School demonstrated their innovative inter-action CD ROM game. Although the game is still in the development stages, the audience was very supportive of the project and readily recognized the benefits this type of game has for avalanche education.

The speakers were thanked by Bob Sayer and a round of applause showed the members' appreciation to all.

SPECIAL ACKNOWLEDGMENT

The Canadian Avalanche Association would like to take this opportunity to thank all of our industry partners for their support with the Canadian Avalanche Association Training Schools.

Avalanche Expert Honoured

Written by Deana Lancaster
North Shore News, July 16, 1999

"So many people are interested in going into the backcountry now," he says. "All we can do is try to educate them."

The North Vancouver resident has spent a lifetime doing just that. As the founder of the Canadian Avalanche Association, he's spent years making sure ski patrollers, highway avalanche technicians, mountain guides and others have the most up-to-date information on controlling and preventing the tumbling masses of snow and ice.

Earlier this year, the CAA introduced the Columbia Brewery Glacier Summit Awards — sponsored by the Columbia Brewery — and Schaerer was awarded the first ever Lifetime Achievement Award.

Schaerer came to Canada from Switzerland in 1957. Trained as a civil engineer, he came to practise avalanche control during construction of Rogers Pass on the Trans-Canada Highway.

"It was a unique project. The usual approach was to build a highway and deal with any problems after."

For the construction of the pass, Schaerer helped local engineers plan a route that would be least affected by avalanches, and he designed snow sheds to cover the highway, so the snow could slide right over the road.

When the pass was finished Schaerer stayed in Canada, doing a stint in Ottawa studying snow removal, and later, travelling back to B.C. to do more work on avalanche control.

In the '70's, after a number of fatalities resulting from avalanches, the B.C. Ministry of Highways launched the largest control program in Canada, "maybe in this continent," according to Schaerer.

Creating the Canadian Avalanche Association was a labour of love for Schaerer. Professionals from the fields of transport, guiding, patrolling, Parks Canada wardens and university research joined the association to promote and teach avalanche protection.

The association currently has about 150 active members, and its role include looking after their interests and upgrading their expertise.

The CAA also coordinates the collection and exchange of information. Members from different parts of the province report conditions to the avalanche centre in Revelstoke and the association send the compiled information to subscribers.

It's a valuable service, says Schaerer, because "it's important to know what's happening on the other side of the mountain."

Twice a week the CAA makes a public avalanche forecast. Schaerer would like to see that service offered more frequently, but it would require more money than the CAA currently has.

"I would like to have (the forecast) every day. But the association survives on donations."

So with all his expertise, has Schaerer himself ever run into trouble with an avalanche?

"I've twice had a ride," he says — once while doing avalanche control with the ski patrol at Lake Louise. Of the second, he says they started it on purpose — one technique used in controlling avalanches, "but it was bigger than we expected." Schaerer escaped without injury.

Although retired now, Schaerer is still an active member of the CAA and continues to do consulting work in the field.

We are always looking for interesting articles and photographs to use in the newsletter. If you have any you would like to share, please send a copy to the Centre or
e-mail: schools@avalanche.ca

AVALANCHE NEWS

PRINTING AND DISTRIBUTION:
Snow Avalanche Program
Ministry of Transportation & Highways
4C - 940 Blanshard Street
Box 9850 STN PROV GOVT
Victoria, BC V8W 9T5

The deadline for the winter issue is October 15, 1999

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