AVALANCHE news

canadian avalanche association
Volume 68 Spring 2004

inside

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new products

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Avalanche News Volume 68 ❄ Spring 2004

Avalanche News is the official publication of the Canadian Avalanche Association, a national non-profit society based in Revelstoke, BC. The goal of *Avalanche News* is to keep readers current on the issues and happenings affecting avalanche safety in Canada. It is published quarterly.

Avalanche News always welcomes your opinions, teaching tips, photos, research papers, survival stories, new product announcements, product reviews, book reviews, historical tales, event listings, job openings, humourous anecdotes and really, *anything* interesting about avalanches or those people involved with them. Help us share what you've got. Please send submissions to:

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Note: Digital contributions work best for us. For details, contact Brent Strand at publish@avalanche.ca.

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And we think we have it bad. Trans-Labrador Highway

Editor's View

Helping people acquire the tools to build better judgment and enjoy positive experiences in the winter backcountry is a big part of the CAA's role. With the mid-February announcement by Environment Minister David Anderson (see pages 6 and 9), the CAA can now work harder to fulfill that role with backing from Ottawa. It's unfortunate the catalyst for this move had to be last year's tragic death toll. But many of the victims' families and friends have made it clear they want something to be learned from those accidents. Public avalanche awareness always increases with big accidents; now comes the job of building that awareness into a form of understanding.

Some of the work lies in helping ALL Canadians realize they live in one of the world's great alpine nations. Most in the avalanche industry will agree that's a privilege; but, like all privileges, it comes with responsibilities. Responsibilities such as acknowledging the hazards inherent in the mountain environment, treating that hazard with the respect it deserves and ensuring the best possible methods are employed to manage the risks.

Our elected officials must be made aware of these responsibilities. Some already are. The provincial government of BC has shown, in both word and deed, a strong commitment to increased avalanche safety. Victoria made its contribution early to the National Avalanche Centre (NAC). And just last month, BC lifted the provincial sales tax on avalanche-related safety equipment (see page 9). Now the federal government has demonstrated its support for the NAC with funding for the next three years. The CAA both appreciates and applauds each of these developments, and we're more than ready to take on the task of furthering avalanche education.

Education is the theme of this issue of *Avalanche News*. We have extensive coverage of this year's Avalanche Awareness Days held in more than 35 different communities during the month of January. This was the sixth annual event and the biggest ever. Hundreds of people turned out in various locations to learn more about avalanches. In some of the areas there was extensive media coverage. But, as we all know, there's still work to be done. Next year will be even better. Don't miss the wrap-up of Avy Days 2004 on page 17.

For your reading pleasure we have some insiders' views of the early days of Canada's backcountry. Sticking with the education theme, this issue's installment of the CAA's oral history project focuses on the early growth of recreational pursuits in our mountains. Several of Canada's mountaineering pioneers share their memories of the avalanche awareness learning curve. Catch that on page 51.

Another good read is Thierry Cardon's article on page 34. He tells us how "go – no go" decisions are made in the heli-skiing industry and how that process has changed over the years and between countries. We all know heli-ski guiding is a demanding job – balancing the wants of powder-hungry guests with the need to stay safe. As a world leader in the business, Canada has a lot of expertise to offer. Just another aspect of our alpine-nation heritage we have every right to be proud of.

Canada's tradition of excellence in avalanche education is well-earned. What's fascinating to see is how the leaders in that field constantly demonstrate their own willingness to learn and adapt. With the myriad of changes going on in the industry right now, the CAA's own education committee recognized a shortfall in the recreational avalanche courses. With little fanfare, decisions were made and action taken. Read about it on page 32.

From the hills of higher learning, we have a couple of very interesting research papers. Bruce Jamieson and Alec van Herwijnen share more of their findings on fracture characterization in compression tests. American researcher Ian McCammon has taken a look at heuristic traps in recreational avalanche accidents. His findings into the effects of human nature on even the most experienced person's decisions should give us all food for thought.

And speaking of education, I know I'm in for one. I took on the job of editor in late January and I've been learning ever since. Having been away from the snow industry for a number of years it's great to be back, even if only from behind a computer for now. I hope you enjoy this issue. I certainly enjoyed my part in putting it together and I look forward to hearing from you in the near future.

Happy reading,

Mary Clayton
editor@avalanche.ca

Executive Director's Report

BY CLAIR ISRAELSON

It's nearly the end of March, and fiscal year end for the CAA. It's time to take stock of what has been accomplished in the past 12 months, and what needs to be done in the year ahead.

A year ago, the BC Public Safety Avalanche Review was just gearing up. Commissioned by BC Public Safety Minister and Solicitor General Rich Coleman, under the leadership of BC Provincial Emergency Program Deputy Director Bob Bugslag, Ross Cloutier and Jon Heshka of Bhudak Consulting worked with a diverse team of avalanche community representatives to craft a road map for bringing public avalanche safety programming in Canada into the 21st century. This review, publicly released in October, has received broad and universal support. Canada needs a National Avalanche Centre to focus and coordinate avalanche safety programming from coast to coast to coast. To signal the BC government's commitment, Minister Coleman committed $375,000 over the next three years to support improved avalanche safety programs. In addition, in its February 2004 provincial budget, BC removed the provincial sales tax on avalanche safety equipment; specifically, beacons, probes, Avalungs and ABS airbags.

Concurrent with the BC review, Parks Canada tasked Denis O'Gorman, Dr. Bill Leiss and Phil Hein to conduct an independent study of their avalanche safety programs and recommend improvements. The Strathcona Tweedsmuir School retained Ross Cloutier to do the same for them. These three comprehensive reviews, all now publicly available, share three common themes:

- The popularity of winter backcountry recreation will continue to grow. To reduce the avalanche accident rate we must become better at understanding, communicating and managing avalanche risks. Natural and social sciences expertise will be required to get it right.
- Our public avalanche safety programs need improvement. Government agencies, private industry, outdoors clubs and groups and organizations like the CAA need to work together to develop and deliver avalanche accident prevention programs that work for Canada. No single organization has the expertise or the money to do it alone.
- Society expects a higher standard of protection than we have been delivering in the past, especially for people and organizations with responsibility for the safety of others. The bar has gone up.

The BC review calls for a National Avalanche Centre to be structured as a partnership of industry, provincial and federal agencies, and groups such as the Alpine Club of Canada, the Canadian Ski Patrol System, and the BC Snowmobile Federation. Our President and Board of Directors have affirmed the CAA's willingness to serve as the table that stakeholders gather round to resolve common issues, and to deliver improved avalanche safety services for industry and the public.

In the past year Parks Canada and the Meteorological Service of Canada, now both reporting to federal Environment Minister David Anderson, have committed to revitalizing their avalanche safety programs within the National Avalanche Centre concept. On February 19th in Calgary, Minister Anderson committed corporate in-kind support and $525,000 in direct funding over the next three years for National Avalanche Centre programs. With assistance from the National Search and Rescue Secretariat, the CAA is presently working with Environment Canada, the Canadian Avalanche Foundation, and other stakeholders across the country to develop structures and financial processes that will ensure our National Avalanche Centre is successful. This work will be completed no later than June 21, 2004.

The goal is this: by next fall, Canada will have a National Avalanche Centre to provide enhanced avalanche safety programs in Newfoundland and Labrador, Quebec, the Arctic territories, and British Columbia. Everyone hopes Alberta will also choose to participate in this national collaboration.

"Everyone hopes Alberta will also choose to participate in this national collaboration."

In the past year the private sector has reaffirmed its crucial role in improving avalanche protection for Canada. For most of the past decade, industry operators, retailers to the mountain community and small personal donations have carried the burden of supporting public avalanche accident prevention programs through their participation in InfoEx, through corporate sponsorship of the CAA's public avalanche programs, and through industry's significant and direct financial support to avalanche research programs at the University of British Columbia and the University of Calgary. We must publicly celebrate these efforts of our industry partners and profile their contributions. Without the continued full support of our industry partners, we will not succeed.

A few industry folks deserve special recognition for their leadership in the past year. Canadian Mountain Holiday's Walter Bruns, as president of the British Columbia Helicopter and Snowcat Skiing Operators Association (BCHSSOA), Jimmie Spencer, executive director of the BCHSSOA and the Canada West Ski Areas Association, Mike Weigele of Mike Weigele Helicopter Skiing, Doug Forseth of Intrawest, and Doug O'Mara of Whistler Heli-skiing have lobbied federal and provincial

politicians, and spent significant time and money to promote avalanche safety programs that will advance avalanche safety in both the public and private sectors. Karl Klassen and the Association of Canadian Mountain Guides executive, and Margie Jamieson and Brad Harrison of the newly formed Backcountry Lodge Operators of BC have worked hard on behalf of their memberships to ensure we all work together to be the best that we can be.

Government avalanche safety programs have also been active; these folks are also key players in our industry. Mike Boissoneault has taken over the reins as manager of the BC Ministry of Transportation avalanche programs. He has made real-time MOT weather data fully available to support the CAA's public bulletin program and has committed in-kind support to the Online Learning project that kicks off April 1. Grant Statham has come on board for Parks Canada and will be working with Michel Villeneueve at Parks headquarters in leading the renewal of their public avalanche programs. Recently on television I was pleased to see Steve Blake explaining how Parks Canada produces public avalanche bulletins, and how national park visitors can use this information to enhance their safety. Jim McAllister of the BC Provincial Emergency Program, and Stuart Macdonald of the Justice Institute played key roles in developing the Online Learning project and supporting the Backcountry Avalanche Risk Workshop in New Westminster last fall. Ken Little, Gabor Fricska and their team at the Mountain Weather Centre at Kelowna have generated a much improved mountain weather forecast that now includes both north and south coast mountains, and have provided daily weather briefings to the CAA's public forecast team. Congratulations, and thanks everyone for your contributions in the past year.

We've also strengthened relationships between the CAA and other non-profit associations in the past year. We collaborated with the BC Snowmobile Federation, the ACC, the ACMG, SmartRisk / SnowSmart, the Forest Industry Safety Association, the American Avalanche Association, the National Ski Areas Association of the US, the Japanese Avalanche Network, the Canadian Ski Guides Association, the Canadian Avalanche Foundation and other groups on initiatives that advance avalanche safety.

At the CAA, Marc Deschenes and Susan Hairsine have co-managed the third and final year of the Quebec Collaborative Avalanche Project with excellent results. In October, I visited Quebec with Marc and Susan, met with key leaders of the Quebec avalanche community, and was pleased to see that the QCAP project is exceeding everyone's expectations. There is growing support in Quebec for strengthening the partnership between the Gaspé Avalanche Forecast Centre, provincial and municipal government agencies, outdoors clubs, the federal government and the CAA. In the past couple of weeks I've received e-mails from Dave Liverman and Keith Nicol in Newfoundland and Labrador, stating their desire to be part of the National Avalanche Centre efforts. Within the next few weeks we will be meeting with these counterparts to begin exploring how Quebec and eastern Canada could operate within the National Avalanche Centre concept.

This winter, I've had opportunity to talk with ski patrollers, mountain guides and avalanche control personnel for forestry, highways and mining. I was impressed with their commitment and determination to evolve in order to face the challenges of the future. Collectively, in the past year the avalanche community in Canada has joined forces, committed to working together, and resolved to do everything possible to ensure avalanche safety in Canada is world class.

The CAA has never worked harder. CAA president Bill Mark, our Board of Directors, and our Standing Committees have all given far beyond what is normally expected of volunteers. They have selflessly donated their time and energy to ensuring this association does the right thing, the right way. They have provided me with good, clear and consistent goals, and addressed every issue with vision, integrity and transparency. By my best guess, Bill has put in more than 30 full days on the road in the past year, representing the CAA to federal, provincial and industry partners. Without this demonstration of commitment and capacity by Bill, the CAA's Board of Directors and the CAA's Committees we would not have been able to do the things that we have accomplished over the past 12 months.

Through all of this, the CAA staff at our office in Revelstoke has continued to do their part. Ian Tomm, with help from Carolyn, has done a great job of managing the expanding CAA Training Schools programs, and is bringing us in toward financial break-even in a very difficult year. Evan Manners has shown that old dogs can learn new tricks, and do them very well. He's managed our re-location into the new office, liaised with the City of Revelstoke on numerous initiatives crucial to our success, and has kept Audrey, Pat, Brent, Janice, Owen and Ryan going at full speed delivering service to the CAA membership, industry and the public. Alan Jones has come on board to lead the CAA's expanded public avalanche bulletin program development. Supported by John Kelly and Ilya Storm, they have done great work, and I look forward to where this capable team will lead these programs in the future. Jane Mitchell has brought professionalism to our sponsorship and marketing efforts, with the goal of building long-term, mutually beneficial relationships to support public avalanche safety services across Canada. Last month Mary Clayton agreed to work with us, bringing increased professionalism to the *Avalanche News* and other CAA communications initiatives. It's a great team and I'm privileged to work with such fine people.

executive director's report

It's been an amazing year. By working together, we've accomplished more than any of us thought possible a year ago. I've tried to get my head around how we were able to do what we have done, and what we are capable of as we plan for the future. Here's where those explorations have taken me.

The CAA has been successful because we are a voluntary association of the people of the Canadian avalanche community. We now have more than 700 members from across Canada representing the entire spectrum of avalanche-related activities in this country. In keeping with our long-standing tradition, we leave our personal agendas and petty politics at the door, and agree to work together for the common good. We are successful because of our diversity and because we respect and value the entire spectrum of perspectives within our membership. When we disagree, it's disagreement between colleagues with a shared commitment to the CAA's mission and vision. Without Randy and Bruce, Robin and Christoph, Bushrat and Lori, and each and every one of us continuing to contribute the best way we know how, the CAA cannot continue to be successful as we grow into the future.

Where does this leave us as we plan for next year? I'm convinced the CAA is fully capable of handling the opportunities and challenges of the year ahead.

"I'm convinced the CAA is fully capable of handling the opportunities and challenges of the year ahead."

Job one is to fill the upcoming vacancies on our Board of Directors with people who will represent the values of the membership and continue to provide good leadership, policy and strategic direction for the future of the CAA. We need wisdom, experience and enthusiasm for challenging work. If you are considering Board service, what should you expect? Expect to operate at an executive level. Expect to find yourself challenged by the scope of the issues you will address. Expect to work with a truly exceptional group of people on the Board who are collectively responsible to be the North Star, to keep the CAA's map properly oriented as we explore our path into the future. Expect to grow professionally and personally. You can likely expect to have to put up with me for at least another year.

Operationally, in the next year we will develop the mandate, reporting and financial structures for a National Avalanche Centre that will include a French language presence in Quebec. We will work with stakeholders to develop and deliver new public avalanche awareness and accident prevention programming to be delivered by the National Avalanche Centre. We will complete the InfoEx data project being led by Roger Atkins and Pascal Haegeli, so that InfoEx becomes the most powerful tool possible to track and manage avalanche risks. We will continue to develop new CAA Training Schools programs, and renew our existing offerings. We will work closely with a broad spectrum of industry and professional associations to develop communications strategies and programs to educate and inform target audiences regarding our efforts to responsibly manage avalanche risks in Canada. We will engage experts in risk management, risk communications, and human-decision science as we work toward full integration of industry and public avalanche safety programming in Canada. We will begin work in a three-year National Search and Rescue Secretariat (NSS) funded project to develop a scientifically-validated decision support framework for amateur recreation. We will also begin work on a second NSS project, a two-year development of a nationally standardized on-line training program for first responders to avalanche accidents. We will also continue to serve as Canada's storefront and first point of contact for avalanche expertise. It's going to be another busy year.

Are we up to the task? I believe we are, but we can always use more horsepower. If you have colleagues or co-workers who are not currently CAA members, encourage them to join. Every avalanche worker in the country should be demonstrating their professionalism by being part of the CAA's Continuing Professional Development program, and committing to the Code of Ethics. The CAA is the people of the Canadian avalanche community, and everyone has a stake in helping to get it right. Get on board, and grab an oar. We've got work to do. And let's have some fun as we do our work together.

I look forward to seeing you at our Annual General Meeting in Penticton the week of May 3 through 7. The annual gathering of the clan is always a valuable learning experience, and a great opportunity to catch up with old friends. Let's make this year's AGM the best ever.

Sincerely,

Executive Director
Canadian Avalanche Association

Question Period Highlights, House of Commons, Ottawa

Tuesday February 24, 2004

Sophia Leung (Lib - Vancouver-Kingsway):
Thank you, Mr. Speaker. My question is for the Minister of Environment. Last year, avalanches caused eight fatalities in our national parks, including seven students from Strathcona Tweedsmuir schools in Southern Alberta. What has the Minister done to improve the public safety in our national parks?

Hon. David Anderson (Minister of the Environment):
Mr. Speaker, I'm pleased today to inform you and the House that, in fact, in Calgary last week, I announced a contribution of some $525,000 over the next three years to the Canadian Avalanche Foundation for the creation and development of the National Avalanche Centre. We are accepting all 36 recommendations of the avalanche risk review, and we are, in fact, having the centre to coordinate public safety programs and provide avalanche warning systems throughout Canada.

New Requirements for Custodial Groups Traveling into Avalanche Terrain in the Mountain National Parks in Winter

Parks Canada believes strongly in opportunities for young people to safely experience the beauty and challenges of the national park wilderness.

To ensure appropriate backcountry leadership and terrain choices, effective April 01, 2004, custodial groups must obtain a permit and be accompanied by a certified mountain or ski guide before they will be allowed to travel into avalanche terrain in Mount Revelstoke, Glacier, Yoho, Kootenay, Banff, Jasper and Waterton Lakes National Parks.

A "custodial group" means an institutional group where at least one person is below the age of majority and that minor is not in the company of his/her parent. Institutional groups include but are not limited to School Groups, Scout/Guide Groups, Church Groups, Cadet Groups and Community Youth Groups.

Group leaders now have new obligations when leading a custodial group. This applies to both day trips and overnight trips between October 15 and May 31 each year; pre-trip planning is essential. For more information, the mountain national park websites can be reached via: www.parkscanada.gc.ca

Please help us spread the word by passing this information along to the appropriate contacts within your organization or business. To this end, we have provided text that can be posted on your website, used for an e-mail update to your members, and/or used in a newsletter.

Thank you very much for your help.

Sincerely,

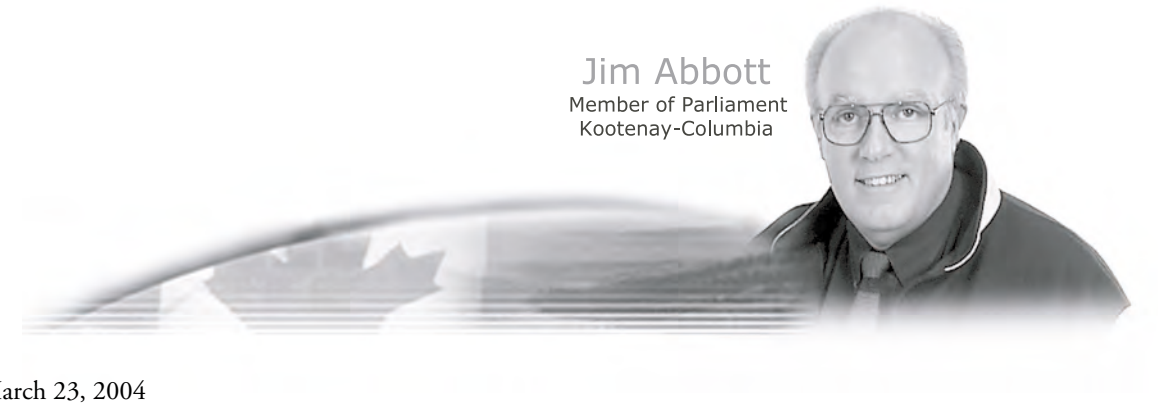
Bill Fisher
Executive Director
Mountain Parks

Government of BC Demonstrates More Support for Avalanche Industry

(Excerpt from this year's provincial budget)

Effective February 18, 2004, the following avalanche safety and rescue equipment is exempt from provincial sales tax:

- avalanche airbag backpack systems specifically designed to carry gas cartridges and airbags which inflate instantly when triggered to help keep the wearer above the snow surface during an avalanche;
- avalanche beacons and probes for locating avalanche victims; and
- avalanche equipment specifically designed to reduce the likelihood of asphyxiation from ice mask formation by providing an artificial air pocket through which air is taken by the victim from the surrounding snowpack (i.e. AvalungTM).



March 23, 2004

The article below which appeared in The Vancouver Province *on March 23, 2004, is further indication that in spite of the specific success in saving this man's life, and others, the Canadian Department of Transport continues to drag its feet in approval of the high pressure canister that is at the core of the ABS lifesaver. I find the Department's inertia to be completely unacceptable and encourage everyone who is concerned about this to be diligent and continue the pressure on the government.*

Section: News
Byline: Mike Roberts
Outlet: The Province
Title: Red tape hampers sale of a proven life-saver
Page: A11
Date: 2004-03-23
Source: *The Province*

But for the grace of God, and two marvellous wings of air, 30-year-old Tom Shadlock, an oil-field worker from Drumheller, would be a statistic this week, a footnote to the story of another Alberta man, the 29-year-old buried and killed in an avalanche near Revelstoke on Saturday while backcountry snowmobiling with a friend.

Shadlock was snowmobiling near Golden with his friend exactly one week before the Revelstoke tragedy. He, too, was caught in a BC backcountry avalanche, torn from his machine and hurled down a hill by a mass of crushing snow. Same scenario, two very different outcomes. Unlike BC's latest avalanche victim, Shadlock was wearing an ABS Backpack, an innovative device containing a canister of pressurized nitrogen and two manually-deployed air bags that "float" the wearer to the top of moving snow. Shadlock was climbing a sun-soaked hill when the snow gave way beneath his snowmobile. "I thought, 'Oh boy, here we go!' and I pulled the (ABS) cord," he recalls. "I heard a small 'shhht' and I thought it hadn't worked. I thought, 'Oh, s—!' I went down the mountain kicking and swimming and trying to stay up and when I came to a stop my legs were only buried up to my knees. Then I noticed the air bag was deployed." The seasoned snowmobiler, who carries all of the recommended avalanche safety gear and discovered the high-tech backpack at a snowmobile trade show in Alberta, credits the device with saving his life.

"Seven hundred and fifty dollars is what I paid for it," he says. "But when I bought it, I thought, 'If it was to work once, it would be paid for.' " The remarkable ABS Backpack has been directly credited with saving over 30 lives in Europe, where it has been used for 15 years. But in BC, where 27 people died in avalanches in the 2002-2003 season, few have even heard of the life-saving device.

Kootenay-Columbia MP Jim Abbott wants to change all that. He's on a personal mission to the get the packs on backs. "My constituency suffered better than 15 fatalities last winter," he says. Abbott says the device has fallen victim to some "grotesquely bizarre" bureaucracy here in Canada. The ABS Backpacks (with their original high-pressure canisters) are approved for Canadian import, but there are no regulations dealing with the import of individual refill canisters.

"If you deploy the thing, according to the current rules, you have to ship the entire backpack with the expended cylinder back to Europe where they would unscrew this little container, put in a fresh one and ship it all the way back to you," explains Abbott.

Ridiculous. But just ask Tom Shadlock — any price is a small price to pay if it means surviving a backcountry avalanche.

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20 December 2003

Clair Israelson
Managing Director
Canadian Avalanche Centre
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Dear Clair:

My former supervisor Lorne W. Gold has expressed his appreciation of the progress of the Canadian Avalanche Association and he applauds the recognized role of the Association in education and avalanche warning.

Lorne Gold was the head of the original Snow and Ice Section of the National Research Council of Canada and became the Assistant Director of the Division of Building Research later. He has been involved with the development of avalanche control in Canada and has supported the avalanche studies since the mid-1950 years. Although I am credited often with promoting avalanche education and safety in Canada, I would not have been able to do my work without the continuous encouragement, advice and support of Lorne Gold. Avalanche information, education and warning in Canada under the Canadian Avalanche Centre and research by Dave McClung and Bruce Jamieson made an amazing progress, which we had never dreamed. Now Lorne Gold is grateful for receiving *Avalanche News,* which keeps him informed about the work that he had initiated.

I join Lorne Gold in wishing the Canadian Avalanche Association continuous success.

Peter Schaerer

Copy:
Dr. Lorne W. Gold
1903 Illinois Avenue
Ottawa, K1H 6W5

Attention Evan Manners, Canadian Avalanche Association (CAA), Operations Manager

RM Solutions has recently completed a *Risk Management Guide for Tourism Operators* on behalf of the Canadian Tourism Commission *(CTC)*. We developed a comprehensive risk management framework with specific tools and we proposed practical, focused solutions that CTC members can adopt to effectively manage the risk issues facing their businesses. Currently, the CTC is providing our expertise to their members and affiliated industry associations. Here is a link to the Guide... http://ftp.canadatourism.com/ctxUploads/en_publications/RMG.pdf .

We use Case Studies in risk management workshops to learn lessons and develop action plans that may prevent tragic events.

Our group has unique skills AND experience that can be of value to the Canadian Avalanche Association and other organizations that must manage avalanche risks. We can assist your organization to investigate events and determine the real root causes. This is the essential first step in developing an effective avalanche risk management framework to prevent tragic incidents from occurring.

I would welcome your comments and observations on the CTC Guide, particularly whether this framework might be adapted to be an effective tool for the CAA as it carries out this important mandate which is so vital to Canada's tourism reputation. I will also approach Parks Canada and the Government of BC to determine their interest in our services and would also welcome some contacts if you think this is of value. Many thanks,

Paul Fitzgerald, Partner
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SNOWSMART Update

E-mail from Sarah Marshall
Youth Program Coordinator, SNOWSMART
Sent Thursday, March 18

Now that winter is slowly winding down, we can finally take a breath and start planning for our next SNOWSMART winter. I wanted to take a moment to share with you some exciting developments related to SNOWSMART, as well as our upcoming plans to continue offering the SNOWSMART program to teachers and programmers across the country.

As some of you are aware, we had great success offering the SNOWSMART curriculum program to 80 classrooms in Calgary back in December. Thanks to the help of a local coordinator in Calgary, who worked with SMARTRISK to connect us to school boards and teachers, we were able to host an information/kick off event that brought teachers and local injury-prevention organizations, as well as our SNOWSMART partners together to learn more about the program. The learning that came out of this experience was fantastic in terms of SMARTRISK being able to move forward with a community action plan which will allow us to do more than simply sending out kits. We hope to have the opportunity in the future to work with other communities in the same way we worked with Calgary. Special thanks to Peter Spear of CSPS for guidance, liaison with the Calgary school boards and assistance to our Calgary coordinator.

In other news...We are currently in the process of transferring the SNOWSMART curriculum to a CD-Rom format. There will be 3 CDs: one for English Grade 7; one for English Grade 10; and the third will be French Grades 7 and 10. The goal, as we discussed in June 2003, is to make these kits more affordable and easier to ship. Our plan is to burn them in-house and send one CD with one video to interested customers. Once we have finalized these plans we will send all of our partners a demo.

Our other big SNOWSMART related news is that we have successfully launched the SNOWSMART Peer Leadership Program. The initial phase of this project involved three schools (Fernie, BC; Collingwood, ON; and Calgary, AB). For more information on this project, please check out the youth section of the SMARTRISK Website at www. smartrisk.ca. Also, please note we are constantly updating the Website and hope to have the peer leadership information completed by next week. Student articles and examples of activities are being added on an on-going basis, so please continue to check the site regularly.

Based on our learning from this initial SNOWSMART Peer Leadership pilot, we are now in a position to recruit seven additional schools from Ontario, Alberta, British Columbia and Quebec. We have decided to recruit the sites in clusters, so that we can train a few schools at the same time. In terms of where we are in the recruiting process, I am still looking for a contact in Vancouver and one relatively close to Calgary or Canmore. If any of you have suggestions for schools close to the mountains and enthusiastic about winter sports, I would welcome them!

Finally, we have produced a Peer Leadership toolkit, used in the delivery of this program, which we would like to share with each of our partners. This will be sent out to CAA, CSPS and Parks Canada early next week. We will include a letter, as well as some further information about the program, in the hope that you will provide us with some content-related feedback. If each partner could please send me a contact name and address for the recipient of this package, I'd appreciate it.

1. June Partner Meeting - June 20 or 21st?
2. Contact name and address to receive our Peer Leadership Toolkit.

Thanks and have a great day,

Sarah

Canadian Avalanche Foundation Dinner, Calgary, February 19, 2004

BY CHRIS STETHEM (President, CAF)

The Canadian Avalanche Foundation (CAF) held its second annual fundraising dinner and its first fundraiser in Calgary on February 19th. The venue was the Safari Centre of the Calgary Zoo. More than 250 people attended the dinner, which was hosted by Justin Trudeau and Chris Stethem.

Chris Stethem, Debbie & Gord Ritchie

This was also the day of Environment Canada's announcement of support for the National Avalanche Centre. Minister David Anderson and several Parks Canada representatives were able to attend the social and mix with members of the Calgary and Bow Valley community. A variety of ski industry and CAA members rounded out the group.

Special guest speaker Hans Gmoser delivered a fascinating presentation on the history of backcountry skiing in the Canadian Rockies, which took us from the late 19th century up to the mid-1960s. He included great anecdotes and photographic images, delivered with humour and style. I think everyone who listened learned many things, whether an avalanche professional or a new mountain enthusiast.

The event was a great success financially for the CAF, netting more than $30,000 from the dinner, silent auction and raffle. The silent auction was hotly contested with artworks, guiding services, ski passes and a mountain bikes amongst the items offered. The Calgary community is very supportive of the objectives of the CAF and we look forward to returning to Calgary next year.

The CAF would like to thank all the volunteers and the silent auction donors who made this possible, with special thanks to Mary Jane Pedersen, Mike and Heather Mortimer, Gord Ritchie and Dwayne Kohut.

Minister of Environment David Anderson, CEO of Parks Canada Alan Latourelle, Hans Gmoser, Justin Trudeau

Evan Manners, Peter Perreault (Vertec-Janod, Mountain Management)

Dave Stark, Gord Ritchie, Clair Israelson, Bill Mark

Photos courtesy:
Mike Mortimer

Heather Mortimer, Scott MacKay (Special Assistant to Deputy Prime Minister Anne McLellan) , Mike Mortimer

Girls of the Canadian Rockies Calendar

Sure, we all know plenty of them. Some of us actually ARE one of them. But this new calendar will show you a side of Canadian mountain women you may never have seen before – and it's all for a good cause. Resorts of the Canadian Rockies and Kokanee have joined forces in support of the CAA and have made a fund-raising calendar featuring passionate, smart, successful, community-minded women: Divina Angelini, Moe Burns, Julia Delich, Jennifer Delich, Kristin Elliott, Carol Lobello, Meg Oster, Brodi McCrae, Cara Moeller, Maureen Mosteller and Jikke Stegeman

"The Girls of the Canadian Rockies, staff of Resorts of the Canadian Rockies and Kokanee feel very connected to the mountain places in which we live and we want everyone to enjoy the mountains with their friends and family safely," says Matt Mosteller, Senior Director, Business Development for Resorts of the Canadian Rockies. He adds, "This is a way for us to give back to our communities by raising $10,000 in support of the Canadian Avalanche Association."

Photographer Pat Bates shot the calendar on location at Fernie Alpine Resort. Organizers expect the calendars will raise $10,000 in funds to be directly donated to the CAA. For more information on how to purchase a calendar log on to www.skircr.com or call 1-800-258-7669.

Moe Burns

Jikkee Stegeman

Brodi McCrae

Maureen Mosteller

Photos courtesy: Pat Bates

canadianavalancheassociation

COLUMBIA BREWERY

6th Annual Columbia Brewery Avalanche Awareness Days 2003

This year, the CAA and Columbia Brewery supported more than 35 ski areas, snowmobile clubs and outdoor organizations in coordinating local Avalanche Awareness Days. These public outreach events aim to heighten awareness, profile the avalanche industry and raise funds for the public avalanche services.

From January 9th to 11th 2004 skiers, boarders, and snowmobilers were treated to free avalanche awareness education across Canada. CARDA dogs and handlers impressed folks with their skills while avalanche technicians spoke to the curious about the snowpack and terrain. Marketing departments, bar managers, and concerned backcountry citizens threw parties, slideshows, auctions and raffles in support of the CAA Public Safety Programs.

Every year, as part of the national awareness campaign, the CAA coordinates an exclusive media event. This year we went to Fernie Alpine Resort. The Fernie Pro Patrol treated the cameras to an energetic interactive display of avalanche forecasting and rescue demonstrations. The Fernie Alpine Resort was the hub of activities, but several events also took place in the town of Fernie.

Things kicked off on Friday morning with a number of media events at the ski hill. Members of the media were invited to the ski patrollers' room to attend the daily meeting. Senior ski patroller Dave Aitkens briefed the crew on the weather forecast and avalanche conditions. A plan was made to open the mountain for the day, including a discussion of explosive avalanche control routes. After that, a swarm of media, CAA representatives, sponsors and the ski patrol headed to the top of the Grizzly Chair where Avalanche Awareness Days officially kicked off! Welcoming words were provided by Justin Trudeau, Alan Jones representing the CAA, Dave Aitkens representing Fernie Alpine Resort, Ryan Radchenko a survivor of an avalanche burial at the mountain, and Dave McAnerney and Neil Sweeney representing Columbia Breweries (the main sponsor of the event).

After kicking things off, the group rode the chairlift to the top of the mountain for a demonstration of explosive control of avalanches. A couple of control teams were already high on a ridge, ready to illustrate how hand charges are used to initiate avalanches. Up in the gun tower, the patrol demonstrated the use of the Avalauncher to fire charges into start zones. The crew was able to get a few small avalanches running to impress the media folks, which included the *Toronto Star, Calgary Herald, Fernie Free Press*, A-Channel (Calgary), CBC - The National, Global (Calgary) and CFCN (Lethbridge & Calgary).

Next up was a rescue demonstration back at the top of the chairlift. Justin Trudeau, the brave soul that he is, agreed to be buried by snow and hopefully found by a rescue team. One of the ski patrollers, trying to overcome her claustrophobia, also agreed to be buried. In the rescue scenario that followed, the patrol honed in on Justin and managed to dig him up after finding his neck with a probe. The second buried victim wasn't wearing a beacon so a probe line was established and the CARDA rescue dog was called in to help with the search. The search was declared a success after the dog's finely tuned nose sniffed out the final avalanche victim, who was carried off the scene in a rescue toboggan.

The volunteers make Avalanche Awareness Days a success!

Next stop was the weather station for a demonstration and discussion of where some of the data comes from to help make avalanche hazard decisions. The process of collecting and analyzing data was discussed in relation to making decisions such as run closures and explosives control. The way in which this information is fed to the CAA to produce public avalanche forecasts was also discussed. After this event, everyone was free to continue enjoying the mountain on skis or head down to the lodge for a hot chocolate.

Next up in the lineup of events was the Avalanche Awareness Fundraiser Lunch held at the Fernie Golf and Country Club. This sold-out affair was made possible by the Fernie Chamber of Commerce. More than 100 members of the community attended the lunch including family members of two Fernie residents—Daren Jones

and Tom Brown—who lost their lives to an avalanche in March 2003. The Fernie Snowmobile Club also made a presentation of the ABS Airbag System. The well-attended event demonstrated the community's interest for promoting backcountry skills and the need for more awareness of the signs and hazards present in the backcountry. The benefit raised $800.00 for the CAA, along with a Community Memorial Donation for two families directly affected by avalanche tragedy last year.

Justin Trudeau and Alan Jones from the CAA then headed off to talk to the local Fernie high school where about 500 riled- up teenagers were learning about making good decisions as part of the SmartRisk program. Justin gave an impassioned speech where, amongst other things, he told the crowd that once he started wearing a helmet he found he was able to ski faster!

Starting at 7pm and running to, well, really late, the Avalanche Awareness Fundraiser Party at Fernie's Grizzly Bar was a huge success. A backcountry slide show was provided by local pro photographers Henry Georgi and Judy McMahon while local band "Tequila Execution" had the house rocking with floor-shaking beats. A charity auction featured a day of Cat Skiing at Island Lake Lodge, gear from the CAA, Marmot, Pieps, local merchants and a one-hour snowboard session with Justin Trudeau. The rocking band and copious amounts of Columbia Brewery products helped the crowd open up their wallets and raise funds for public avalanche programs.

The events continued on Saturday with a snow profile demonstration and avalanche rescue dog demonstration by the Fernie ski patrol. Later in the afternoon, transceiver information sessions and demonstrations were held at the base of the Timber Express Chair. That night, a public avalanche awareness presentation was given at the Fernie Arts Station in downtown Fernie. This event included a presentation by Fernie pro patrollers and a reading by Nelson-based author Vivien Bowers from her book, *In the Path of an Avalanche*. This book provides a "rare look inside the world of avalanches and the community of people who live and work around them." More prizes were handed out and the crowd headed home to rest up for the next day of skiing.

On Sunday, a few additional events included a kids' transceiver scavenger hunt and an adult transceiver search competition. There were lots of good prizes for a speed competition for the adults, and tots as young as three-years old participated in the kids' event.

Overall the Fernie Avalanche Awareness Days event raised $3400.00 to help fund the public avalanche bulletin and other avalanche awareness initiatives.

The CAA would like to the following communities and partners for their hard work and energy:

- **Fernie Alpine Resort (Raised $3363)**
- **Whistler Blackcomb (Raised $2248)**
- **Fernie Chamber of Commerce (Raised $800)**
- **Pemberton Snowmobile Club (Raised $400)**
- **Castle Mountain Resort**
- **Cypress Mountain**
- **Hemlock Valley Resort**
- **Kicking Horse Moutain Resort**
- **Lake Louise**
- **Marmot Basin**
- **Mt Baldy**
- **Mt Seymour**
- **Norquay**
- **Panorama Mountain**
- **Shames Mountain**
- **Ski Smithers**
- **Sunshine Village**
- **Whitehorse, Yukon**
- **Revelstoke (Raised $2625)**
- **Big White (Raised $707)**
- **Apex Mountain (Raised $472)**
- **Grouse Mountain (Raised $150)**
- **Banff Centre (Raised $530)**
- **Glacier Country Avalanche Center Whitefish, MT**
- **Kananaskis**
- **Kimberley Alpine Resort**
- **LLYK Parks Canada**
- **Mont Tremblant**
- **Mt Cain**
- **Mt Washington**
- **Nakiska Resort**
- **Red Mountain**
- **Silver Star Mountain**
- **Sun Peaks**
- **Wells Gray Outdoor Club**
- **Whitewater Ski Resort**

What happened at Columbia Brewery Avalanche Awareness Days in Your Community? Organizers Report:

Revelstoke Rallied! On Boulder Mountain, sledders took part in a poker rally. Each participant received a playing card at each of four stations: a snow profile demonstration, avalanche beacon search practice, an avalanche probe line and a safety tent. The weather was in our favour as low-lying cloud limited the sledding and kept them near the cabin where the activities were set up. This year we saw 80 people and it was encouraging to find a heightened awareness compared to the last two years. More people mentioned they had participated in a Recreational Avalanche Course and almost everybody was wearing a beacon. The fifth poker card could be picked

Excellent turnout of sledders in Revelstoke revved up the event.

up at the Regent Hotel's Pub, where the evening's presentations, auction, prizes and general festivities occurred. This year the auction raised $1025 in donations. The Snowmobile Revelstoke Society donated $500, the Revelstoke Snowmobile Club donated $500, and the proceeds at the door were $600. The grand total going towards the CAA Public Avalanche Bulletin: $2625!

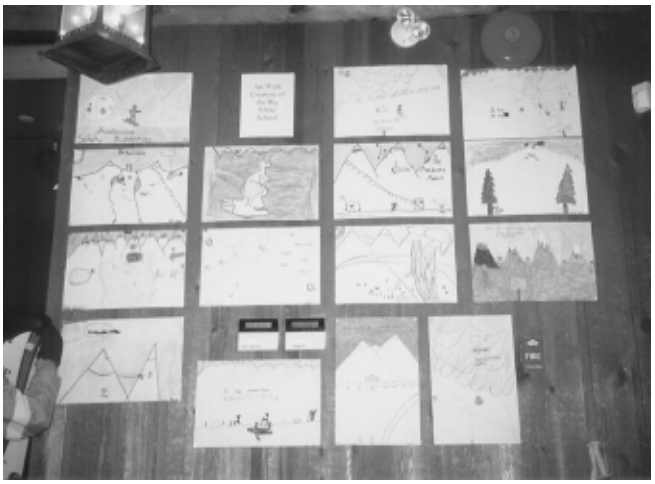
Whistler/Blackcomb hosted a day of on-mountain activities fully supported by the Whistler/Blackcomb Ski Patrol. Mini- avalanche tours were the highlight of the day which included beacon demonstrations, CARDA dog demos, a snow pit, and non-stop questions and answers about avalanche safety. Whistler/Blackcomb donated $1,000 to the event and a retail fundraiser was also set up and has raised $1248 to date. It was a successful event and fun for all involved!

Full house at The Banff Centre. Columbia Brewery Avalanche Awareness Night in Banff was a huge success! More than 400 people crammed into the Max Bell Auditorium at The Banff Centre on a cold and snowy Banff night to hear presentations from snow safety experts, see high-adrenaline films from the Banff Mountain Film Festival, and visit over a dozen booths in the trade show. The highlight of the night had to be the DOOR PRIZES! Local support for this event was tremendous, with everything from Avalanche Video gift certificates, to RAC courses, ski passes, equipment and overnight accommodation at Num-ti-jah Lodge up for grabs.

Attended at Apex! The Columbia Brewery Avalanche Awareness Days at Apex were once again a great success. We had the Apex Pro Patrol, Apex CSPS Patrol, Penticton Search & Rescue, and the Apex Mountain Hosts all involved with the events of the weekend. An avalanche info booth was set up on the traverse to the lifts with videos and printed materials. There was a beacon search for prizes, snow pit analysis and the opportunity to talk with the pros. Later in the evening we had a 50/50 draw and raffle of prizes in the Gunbarrel Saloon. We raised $472 this year.

Outside or indoors, attendance was good and the message was geared towards education and knowledge.

Participants received a hands-on demo in a snowpit at Big White.



Many talented youth entered poster contests held during Columbia Brewery Avalanche Awareness Days.

Big at Big White! Our Columbia Brewery Avalanche Awareness Days was again a huge success. We had more press coverage this year and CHBC did a great story. We had a kids' poster competition which turned out really well. We held a raffle for Marmot gloves donated by the CAA, a pair of collapsible poles donated by a local retailer and a Stepchild Snowboard. The snowboard was donated in memory of Neil Edgworth, who was killed in an avalanche in Chamonix in 1997 and was a good friend of the president of Stepchild Snowboards. There were also fundraisers at the local pubs as well. We found the biggest interest to be in the RAC courses that we offered.

Misty days didn't keep people away from Columbia Brewery Avalanche Awareness Days at **Mount Seymour and Cypress Provincial Park**. A good turnout by BC Parks, ski patrol, local Search and Rescue, CARDA, and CSPS attracted a lot of media coverage as well as a steady stream of interested backcountry users. The avy savvy of those coming to the booths varied greatly with many interested in the beacon search demonstrations, the CARDA dog, and the snow profiles. We stressed where to find avalanche information including the North Shore Avalanche Advisory now linked on the avalanche.ca website. The greatest success was the media coverage. Our Avalanche Awareness Days made the evening and nightly news on several channels.

South of the border jumps on board! Thanks so much again for keeping us in your loop in the past couple months. **Glacier Country Avalanche Center's (Whitefish, MT)** 1st annual Avalanche Awareness Days was a great event January 9-11, 2004 with a lot of community involvement and support. We ended up with a total of 307 people participating throughout the weekend which included a presentation by the snowmobile association, rescue dog demos, ALERT helicopter demo, transceiver clinics, snowmobile trailhead program, Avy Savvy party, and practical stability testing clinics. We had two outdoor equipment companies donate a transceiver (Mammut) and an Avalung (Black Diamond) which we were able to award to two of our participants—both of whom are women that are out in the backcountry in our area a lot! We didn't focus on fundraising this year. Our aim was to offer a free weekend to the community. We're looking forward to making Avalanche Awareness Days bigger and better next

Full house at Max Bell Auditorium in Banff to hear presentations from snow safety experts.

year, and reaching out to even more of our winter backcountry community. We would love to work more in sync with you next season. Thanks again for making us a part of this great event!

Rescue demo with CARDA dog and handler was the biggest hit at Hemlock.

Success at Shames Mountain near Terrace. We offered various types of beacon searches, information and gear demos. The eye-catcher that attracted so many to visit our display site was the giant geo dome (Mountain Hardware base-camp shelter) at the top of the ski area. People had to participate in a beacon search in order to enter their name in a draw for wonderful prizes donated from local businesses. A total of 78 shredders tested their skills at the beacon search. Although visibility was an issue on Sunday afternoon, it so happened that the highways avalanche crew had to perform some hazard reduction via heli-bombing along the Shames access road. Lots of great, positive comments received by participants, sponsors and media crews. The energy level for next year's event is at an all- time high and planning has already begun. Thanks again to all the volunteers and here's to making every day an Avalanche Awareness Day!

Whitehorse, Yukon celebrated Avalanche Awareness Days for the first time! Temperatures were in the low -40s to -50s. The mountain was open for the first time in weeks but because it was still cold, folks did not realize it was warmer up at the ski hill. Even though it was a very quiet day we did some transceiver lessons and dog demos, and showed videos. A fair number of people came to the videos and because the dog demo was beside the chairlift we could hear lots of folks talking about it as they went overhead. We will set something up again further into the season when it's warmer, likely at the Whitepass in the Parks Canada parking area for the Chilkoot.

Mount Washington met the challenge. Stormy weather didn't stop 30+ people from coming out. Events during the one-day event included a rescue demonstration with CARDA-trained Yuki and the head of patrol, Brad Frechette. A backcountry skills workshop and snow profile demo was presented by Shred Safe's Ryan Stuart. A transceiver search competition, led by the head of Safe Slope, Steve Blackwell, went well with 11 participants. We also ran a transceiver workshop. The events were all very popular but, of course, the rescue scenario attracted the biggest crowd. Planning on extending the one-day event to the whole weekend next year!

Interest was great for the Columbia Brewery Avalanche Awareness Days at **Castle Mountain Resort**, with lots of questions at the booth in the day lodge and several inquiries about RAC. Our all-mountain transceiver search (we buried three transceivers at various locations on the mountain, prizes were handed out to whoever found them) worked out great, with likely 20 or so people looking. We also did a full rescue practice with our dog, Avi. This was likely the most popular event with 35-40 people watching and some participation in the probe line.

Presentations, demonstrations and gear displays—there was something to interest everyone.

Snow Avalanche Management in Forested Terrain

Snow avalanches are a common phenomena in most mountain ranges of British Columbia. This land management handbook is a must-have for natural resource managers, ski hill and land developers, backcountry tour guides, forestry workers, and winter recreationists. This book presents a risk assessment procedure suitable for incorporation in the terrain stability field assessment process. This book outlines harvest design and silvicultural strategies to reduce the risk of snow avalanches. Approaches for managing avalanche risks in winter are also presented. An extensive bibliography is included, along with links to relevant publications, data sources, and resources available on the internet.

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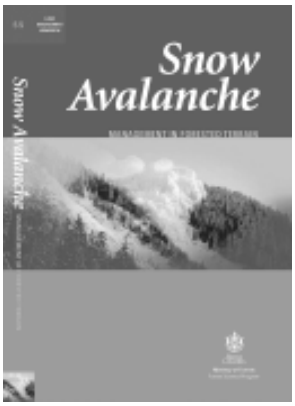


Recreational Avalanche Course Providers Training 2004

BY DAVE STARK

Thanks to a generous donation from Mountain Equipment Co-op, this season a number of recreational avalanche course providers were given the opportunity to upgrade their skills in the field. The training was spearheaded by members of the CAA educational committee and the Recreational Avalanche Course Providers Advisory Group (RACPAG). The intent of the training was to upgrade the skills of RAC providers who meet today's minimum instructor qualifications as affiliate members but who would benefit from working with a more experienced instructor. The training, however, was open to all registered providers.

Courses were carried out over two weekends in January in four different locations. The Whistler session was facilitated by Brian Gould. Rich Marshall ran the course in Rogers Pass, Dave Smith in Nelson and Dave Stark in Canmore. All the instructors hired for conducting the training are professional members of the CAA and fully certified mountain guides with the ACMG.
An outline was developed for the course with consultation from all the instructors involved. The material covered was basic risk management on a RAC, companion rescue and group management in the backcountry. The instructors found the risk management component to be fairly new to most of the participants. Even the idea of having a process for presenting waivers was a new concept for many. A day could easily be spent on this topic alone and could perhaps be the topic of a further workshop next season.

The CAA decided on a nominal fee for the course of $100.00. Registration went through the CAC and was handled by Audrey Defant. Audrey also took care of the advertising in the form of two e-mails to all RAC instructors.
The final numbers were:

Nelson:	7 participants (one no show)
Canmore:	7 participants (one cancellation)
Whistler:	3 participants
Rogers Pass:	5 participants

Organizers felt the lack of participation was partly due to the lateness of putting the event together. In the Whistler area, it seems like weekends are poor times to run courses as most people are working. In Canmore, the course was scheduled during Avalanche Days which proved a conflict for some. In addition, the low price of the course may have contributed to the problem. Future courses are recommended to have a fee associated to ensure participant commitment.

All the candidates expressed a desire to see RAC training continue into the future. It was seen as a valuable resource to upgrade skills and stay current in skills. In addition, there seems to be a clear demand for more northern training. Future venues could perhaps include Prince George or Whitehorse. Courses should also be organized far sooner to allow participants the opportunity to plan ahead.

Recommendations:
Given the uncertain relationship between the CAA and the RAC program as well as the uncertainty for future funding, three recommendations follow:

1) The CAA needs to define and be comfortable with the RAC program.
2) Instructor standards need to rise. Level one should not be the stand alone course for RAC providers. This increase in standards needs to be balanced and inclusive of eastern instructors and snowmobile instructors. In other words, it must be an attainable standard for all providers.
3) The RACPAG needs to become a formalized committee and serve the RAC program.

Acknowledgments:
Mountain Equipment Co-op for the generous funding of RAC training.
The Canadian Avalanche Centre for its direction and logistical support.
Audrey Defant was essential in providing logistical feedback and structure to the administrative process. It would have been a nightmare without her help.
Steve Blake for providing the initial outlines.
Rocket Miller and Gord Ritchie for the RACPAG point of view.
Dave Smith, Brian Gould and Rich Marshall for their instruction and insight.
Ian Tomm and Clair Israelson for their insight.

An Update from the Public Avalanche Forecast Program

BY ILYA STORM

"Would a boarder really think that?"
"Yup! I'm convinced some of our readers are diabolically clever at willfully misinterpreting the most precise, lucid, simple statements I can make."
Overheard at the Wordsmith Associates written communications workshop in Revelstoke, February 2004.

Two of the biggest challenges we face when writing our forecasts include understanding who our different user groups are, and learning how to effectively communicate to these diverse groups. While on the surface the public avalanche forecasts may not look very different from the past, changes are ongoing. Most importantly, behind the scenes projects and new initiatives promise future developments and better services for all users.

The Federal Government's announcement of additional support for public avalanche safety in Canada (see Question Period transcript, page 9) will help. This announcement caused us at the Public Avalanche Forecasting office to pause for a moment and reflect on where we are, what we've accomplished so far this winter, and where we think new initiatives will take us in the future.

Where are we?

Both our office and our forecast team were new back in November, and we knew there were big shoes to fill in order to simply do the job to the standard which Evan and his team of contract writers accomplished over the years. Well, now we're in full swing sending out our three-times weekly forecasts, weekly reports and sage advice over the web, by fax and through e-mail; hopefully we're maintaining quality and meeting expectations. We've been encouraging feedback and have received lots of positive comments from the avalanche community and the public, as well as the occasional "Did you think about...?" or "You should have considered..." comments. We appreciate this feedback.

We consistently do radio, newspaper and television interviews to talk about avalanche safety and conditions in the mountains. We issue press releases and avalanche warnings as special or unusual conditions dictate. When possible, we meet with various user groups and stakeholders. And we even get out to the mountains to dig in the snow and better understand those interesting layers, and of course do some of our own slope and ski quality tests!

Phil Hein joins the team

To strengthen our capacity to provide high-quality services as well as help implement new initiatives, we have brought a new hired hand onto the program. We're extremely pleased to welcome Phil Hein to the team. Phil is a well-respected ACMG Mountain Guide with 25 years of professional practice in guiding and teaching avalanche safety programs, both in Canada and internationally.

Phil has worked in a wide variety of operations and projects involving avalanche safety practices, education and mountain safety/risk management programming. Here are just a few of his accomplishments: program coordinator for the CAA Training School (CAATS) program for seven years; CAATS instructor for the past 17 years; heli-ski guide in many areas of BC in the past 25 years; safety consultant and mountain guide for many projects ranging from Northern BC to Newfoundland, and to far-flung places such as Borneo and Patagonia.

Phil brings a wealth of knowledge and enthusiasm to the program. He'll be helping us put out bulletins to the end of the season as well as working to develop new programs for the future. Phil also likes riding his sled and getting covered in gasoline, so he'll also be helping us work more closely with the snowmobile community in the future.

What's been accomplished?

Public Avalanche Forecast and Public Avalanche Information Report

The Public Avalanche Bulletin has been divided into two products: the Public Avalanche Forecast (PAF) and the Public Avalanche Information Report (PAIR). The PAF is produced three times a week for the five regular forecast regions, while the PAIR is created weekly for the North Rockies. For the first time ever, we provided 11 daily forecasts for our five forecast regions during the Christmas holiday season. Additionally, because there is a forecaster on duty daily throughout the winter, we issue additional forecasts as changing conditions or special situations require.

Why the name change?

Under the guidance of Alan Dennis and Evan Manners, the Public Avalanche Bulletin matured over the years from one person sitting in an office telling the public what he knew to a team of forecasters interpreting observations from more than 70 InfoEx subscribers and various weather resources. The new name reflects the primary function of a Public Avalanche Forecast—to provide the public with a **forecast** of future avalanche danger and conditions. This paved the way for a second type of service, the Public Avalanche Information Report—a **nowcast** whose primary function is to report historic and current conditions. A PAIR lets us

provide service to areas with an established need but where a relatively sparse data network and inconsistent field reports do not yet support the production of a full-fledged forecast.

The North Rockies PAIR
A new service began in mid-January for the Northern Rocky Mountains—the region of the Rockies north of the Yellowhead Highway to the Peace Reach, and from Prince George east to the Alberta border. The North Rockies PAIR is issued weekly on Thursday afternoon and to a large extent is made possible through the commitment of a network of field observers. We are grateful to the dedication and effort of Craig Evanoff, Greg MacAuley, Kevin Taylor, Amber Shipley, Mark Aubrey, and Sean Fraser, all of whom send us regular field observations and take the time to answer our phonecalls.

Special Bulletins and Press Releases
During periods of rapidly changing or high-risk conditions we issue Special Bulletins, combined with a press release and a media campaign. Special Bulletins do not necessarily correspond to High or Extreme avalanche danger ratings; when it's storming out and the danger is going through the roof many people are safely inside nestled by the fire and those who are in the backcountry are reasonably tuned in to the danger. Rather, a special bulletin may be issued for a Saturday after the storm when danger levels are declining to Considerable and sunny blue skies are forecast. It's during these times that people's confidence may increase faster than the snow stability, and managing the human factors becomes extremely important.

Other Initiatives

- **Media relations** have been divided up at the CAC, with the forecasting office fielding regular media requests for information about current avalanche conditions and general avalanche safety. We provide several interviews weekly for radio, print and occasionally television media.

- **Outreach** initiatives are ongoing as we try to improve communication with the sledding, boarding, skiing and climbing communities and improve the services we provide for these different user groups. Some of this happens through established events like Avalanche Awareness Days while new initiatives include presentations and talks given to snowmobile clubs or search and rescue organizations.

- **A multiple-layer forecast** is being designed to help our diverse users access meaningful information. We want to reach everyone—from the inexperienced or unaware visitor to the well-trained local who wants access to snow profiles and other technical data and information. We are moving away from a static product packed full of words to one that is dynamic and incorporates visualization tools and layers of information to better communicate important details to all users.

- **Parks Canada** and the CAA have been working together to coordinate some of the changes going on in both organizations. Together, we'll be working on initiatives such as a "media portal" to improve access to avalanche information for the mainstream media.

- **The Meteorological Service of Canada** and the forecast office have been working cooperatively to improve the weather forecasts we provide in our reports. For example, a meteorologist has been available each forecast day to discuss current weather conditions and the weather forecast.

- **An informal Observer Network** has been set up, in which trained observers, who are not InfoEx subscribers, can provide the forecast office with important avalanche field observations. We currently have several of these observers who regularly provide us with information and we will be working on developing more of these observers into our network for next season.

- **Media/Communications Training** has begun. Our forecasters, in cooperation with Parks Canada, have attended two communications workshops this winter to help develop written communications skills. In addition, we held a media training workshop in Revelstoke in November to help us know what to say, what not to say, and how to say it when dealing with the media.

Where to from here?

"Our goal is to provide internationally recognized and respected public services that help people make good decisions in the mountains."

We provide public avalanche services and are accountable to both the general public and our stakeholders—the government agencies, non-governmental organizations, industry partners and private supporters who provide us with the resources required to do our work. Our goal is to provide internationally recognized and respected public services that help people make good decisions in the mountains. We want to be on the leading edge, defining and creating "best practices" in our area of the avalanche safety industry. Therefore we encourage your comments on what we're doing right as well as suggestions for improvement. We constantly seek ideas for new services, future initiatives and bold visions. Please send us your feedback by calling Alan, JK, Phil, or myself at (250) 837-2435, e-mailing us at forecaster@avalanche.ca, mailing us a letter at the CAC, or just dropping by our office in Revelstoke.

Operations Level 2 – Module 2
First Modules a Success

BY IAN TOMM

This season marks the last phase of implementation for the new Operations Level 2 course changes from the New Initiatives Fund National Search and Rescue Secretariat Advanced Decision Making for Avalanche Professional Training (ADAPT) Project. The Level 2 program is now comprised of a total of three modules spread out over 14 days of training and evaluation. The four-day theory module on Operational Risk Management, Advanced Snow Science and Human Factors in Decision Making was implemented during the 2002-03 winter season and received very positive feedback right from the start. This season the three-day terrain module was implemented alongside a modified seven-day evaluation module – Module 3. This is a preliminary report on the first Module 2 courses. A more detailed report of the CAATS season and the full three module Level 2 will be included in the summer edition of the *Avalanche News*.

The CAATS program ran a total of three Module 2s this winter. Each course had a minimum instructor-to- student ratio of 1:6:

Blue River:	24 students
Whistler/Blackcomb:	18 students
Num-ti-jah Lodge:	24 students

Comments from instructors and students alike reflected the opinion that three days for this module seemed short and that the CAA should consider lengthening it to four days as well. Other feedback suggested the lectures be removed in the evenings to make the days more reasonable and to include more pre-course information on the specifics of field trip locations to allow for more thorough pre-course planning by students.

There were two primary themes in student feedback: having an opportunity to travel in the field with the instructors without the fear of evaluation was appreciated by all, including the instructors; and Module 1 and 2 should somehow be combined into a seven day course.

Generally, instructor and student feedback was in agreement that the Module 2 is a step in the right direction. It is clear, however, that the CAATS program has to set back and fine tune the new program so that we reach a balance of ideal learning opportunities with program cost and time commitments. This will be a priority for me at the spring AGM CAATS instructor meetings and this summer in preparation for next season's programs.

I would encourage anyone to approach me with comments, suggestions and general feedback on the new Operations Level 2 program or any other CAATS initiative currently underway. Front line feedback from industry is vital in the ongoing maintenance and development on this and other CAA educational initiatives.

Ian Tomm
Schools Coordinator
Canadian Avalanche Association
ian@avalanche.ca

Technical Committee Update

The CAA Technical Committee is pleased to announce that in February, Rob Whelan became the new chair. The committee would also like to thank Bruce Jamieson for his dedication, after more than four years in that position.

As always, any questions or concerns are welcome. In an effort to facilitate future discussion, the group now has a new point of contact. Any member of the CAA, or the public, can now reach the committee at this e-mail address: **techcomm@avalanche.ca**. Please feel free to contact the technical committee on any matter relating to its mandate.

Explosives Committee Update

BY BERNIE PROTSCH

There has always been a requirement for physical security of explosives for the obvious reasons. Magazine standards were last reviewed in detail in 1982. Since then the design technology for vaults has changed little, but the skill level and tools used by those with an intent to break and enter have changed significantly. A number of recent thefts and attempts at theft illustrate this security problem graphically.

Natural Resources Canada, Explosives Division (ERD) is responsible for the administration of the explosives act, which includes the storage of explosives under its jurisdiction. ERD has set a deadline of May 31, 2006 in the provinces of British Columbia, Alberta, Ontario, and Quebec to meet the new regulations. If you have any questions regarding the new process and timelines please contact Terry Matts, Senior Inspector of Explosives Pacific Region, ERD at 604 666 0366. You can e-mail him at **tmatts@nrccan.gc.ca** or **plim@nrcan.gc.ca**.

And a reminder for all operations using explosives: any misfires, mislights or other problems must be recorded and brought to the attention of Dick Shaw, Chief Blasting Inspector of British Columbia. It is also important to contact your supplier of explosives regarding any problems and have a technical representative visit your site to investigate any problems with any of the products being used. Hopefully this reminder will prompt us all to plan and act for the May 31, 2006 completion deadline.

Information Technologies Committee Created

BY JEFF GOODRICH

A new standing committee for the CAA has been formed in response to growing needs in the avalanche community related to electronic data and information technology issues. This Information Technologies Committee (IT Committee), which was approved by the Board of Directors this past December, will provide support and advice to the Board of Directors and the CAC staff on technical aspects of data management and related computer technologies. Also within the scope of the committee is investigating and facilitating new technologies that will improve data management and ensure the CAA is keeping up with best practices and principles in data management.

The IT Committee members are: Jeff Goodrich (Chair), Senior Avalanche Technician for Glacier National Park; Simon Walker, Weather Services Specialist for BC Ministry of Transportation; Jan Bergstrom, IT Specialist for CMH; and Donna Delparte, Integrated Environmental Planning Technology at Selkirk College.

The main focus so far for the committee members has been working with CAC staff and industry representatives from InfoEx to help develop an XML standard for data transmission first proposed by CMH. This new data transmission standard, called Canadian Avalanche Association Markup Language (CAAML), is being developed to benefit Association members by complying with existing OGRS standards, enabling data to be used more easily in web applications (such as a web-based InfoEx), and allowing easy exchange of data across different operations, research databases, or computer operating systems. As the amount of electronic data in our industry grows, so does the benefit of having a common way to share and exchange information.

It is exciting to see the interest and innovation in our community as new tools and initiatives are being developed. It is the hope of this committee that we can assist these efforts by providing a central point for discussion and promoting standards that enhance interoperability.

Events Schedule

April 12-16, 2004

Symposium of Snow and Avalanche in Warm Climatic Zones

The Snow and Avalanche Study Establishment (SASE), a research and development organization dedicated to controlling the avalanche problem in the Indian Himalaya, will host an international symposium on snow and avalanche in warm climactic zones. The focus will be on the mechanical and physical behavior of snow found in warm conditions, since little research has been done on snowpacks at temperatures above 10 degrees Celsius. The symposium organizers propose publishing the proceedings in the *Annals of Glaciology*.

Where: Manali, India
Info: Contact S.S. Sharma, SASE, RDC, Him Parisar, Sector 37A Chandigarh UT 160036, India; Tel: 0172 699804-06; Fax: 0172 699802; E-mail: sase_afg@yahoo.com or root@sasehq.ernet.in.

Arpil 19-24, 2004

Western Snow Conference 2004

The purpose of the Western Snow Conference is to provide a forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff from any viewpoint and to advance the Snow and Hydrologic Sciences. This year's topic is Snow: Friend or Foe? Organizers are now accepting papers for oral and poster presentations.

Where: Delta Hotel Vancouver Airport in Richmond, BC.
Info: www.westernsnowconference.org
Contact: Jon Lea, Program Chair; Tel: (503) 414-3267; Fax (503) 414-3277; E-mail: jon.lea@or.usda.gov

May 3-7, 2004

CAA Annual General Meeting (AGM) & Spring Meetings

This annual *gathering of the clan* gets bigger and better each year. Meet people in your industry and find out what's new with the CAA, research, products and more.
Schedule: Monday – public avalanche bulletin writers workshop
Tuesday – CAATS instructor meetings
Wednesday – public & technical meetings (of most interest to public: new research, accident reviews, new products, and the pro program seminar)
Thursday – public and technical meetings in morning, AGM and elections of new board members in the afternoon
Friday – full day Continuing Development Seminar, open to the public

Where: Penticton, BC
Info: To be distributed in early spring. Contact Brent at (250) 837-2435; E-mail: publish@avalanche.ca for more details.

May 3-7, 2004

Avalanche Photography Contest

Info: Enter to win incredible prizes, not to mention the glory of having your photo published in the *Avalanche News* or on-line. There will be four categories: **Events & Occasions, CAA Members at Work, People's Choice** and of course **Avalanches!** All images entered will be displayed at the next AGM. See pages 30-31 for more details.

When: CAA AGM 2004
Where: Penticton, BC
Contact: Brent Strand; E-mail: publish@avalanche.ca

Events Schedule

July 5-8, 2004

5th International Conference on Snow Engineering

The Snow Engineering Conferences is an established forum for snow practitioners and researchers to present, discuss and exchange research results. Unlike other snow conferences, Snow Engineering is dedicated to the application of snow science to industrial and engineering applications. The sponsor of the conference is the Swiss Federal Institute for Snow and Avalanche Research SLF, Davos. For more information on the conference, visit www.snow2004.ch.

Where: Davos, Switzerland,
Contact: Snow Engineering Secretariat at E-mail: snow2004@slf.ch

September 19-24, 2004

International Snow Science Workshop (ISSW) 2004

Snow scientists and avalanche practitioners from many nations will meet in Jackson Hole, Wyoming to present papers and exchange information at the International Snow Science Workshop 2004. ISSW 2004 will continue the theme of past workshops "A Merging of Theory and Practice". The American Avalanche Institute, Jackson Hole Mountain Resort, and United States Forest Service will be hosting this event.

Where: Teton Village, Wyoming
More info: www.issworkshop.org
Contact: American Avalanche Institute, PO Box 308, Wilson, WY 83014; Tel: (307) 733-3315; E-mail: issw@aol.com

October 13-16, 2004

SAR*SCENE* 2004

Organized by the National Search and Rescue Secretariat and the Search and Rescue Association of Alberta. Don't miss the games, workshops, tradeshow and search and rescue demonstrations.

Where: Calgary, Alberta
More info: www.nss.gc.ca or call 1-800-727-9414
Contact: Registration - Lynn Tremblay (613) 996-4737; E-mail: ltremblay@nss.gc.ca
Inquiries - Tina Bouchard (613) 992-8215; E-mail: tbouchard@nss.gc.ca
Games - Carole Smith (613) 996-3727; E-mail: csmith@nss.gc.ca

canadianavalancheassociation wants to showcase your photos!

categories

Events and Occasions: Best image of gatherings or a little bit of dirt on a member.

CAA Members at Work: Best image of people working in the avalanche patch.

Avalanches: Best image of the white dragon itself!

People's Choice: Best overall image selected by the membership at the AGM

prizes

There will be awards in each of the four categories: first place, second place and special mention.

1st Place: Marmot Quantum Jacket
total prize value $400

2nd Place: Deuter Guide 35+ Backpack
total prize value $150

1st Place People's Choice: Marmot Never Summer Sleeping Bag
total prize value $400

2nd Place People's Choice: Deuter Guide 35+ Backpack
total prize value $150

the prizes!
the glory!
the competition!

rules

Entries: The 1st Annual CAA Photo Contest is open to all members of the CAA.

Entry Deadline: Entries must be received by April 15, 2004.7

How to Enter: Each person may submit up to a maximum of three (3) images. Only one entry form is required per submission. You must be able to supply a signed release from any person(s) appearing in the photograph, but do not send with submission.

Specifications for Accepted Formats: 35mm slides (transparencies), unmounted prints up to 8 x 10 inches and high resolution digital (300dpi or 2000x1300 pixels minimum). Digital images must be from original work. No digitally altered images will be accepted. Images must be JPEG, TIFF or RAW format only; all other formats will not be accepted. Digital images may be received on CD, DVD and e-mail.

Identification: Each participant must fully complete entry form provided. Please identify the top of each image.

Publishing Agreement: CAA reserves the right to reproduce and or publish (in print and on the CAA website) in various not-for-profit uses supporting educational and public awareness efforts. Photographer will be credited with caption on any images used.

Return of Images: If you want your images returned, you must include a self-addressed stamped envelope with sufficient Canadian postage (stamps only). We can not return submissions which are accompanied by US or other international postage.

Responsibility: CAA will take due care in handling all entries. However, CAA is not responsible for any loss or damage to entries, regardless of the cause, or for any delays in receipt of entries.

Judges: Images will be judged in terms of their appropriateness to the category theme, creativity and technical quality. Decisions of the judges are final.

Winners: Contest entrants may only be awarded one first place prize. For example if you win first place in "avalanche" category then win first place in the "people's choice" award at the AGM you must relinquish your first place in the "avalanche" category. Prizes will be adjusted accordingly.

Contest is open to all members except individuals directly involved in the planning of this event.

entry form must be fully completed for entry into the contest

Name (please print) _____

Address _____

Telephone _____ Fax _____ E-mail _____

I understand and agree to the rules of this photo contest.

Signature _____ Date _____

photograph details for each photo submitted, please provide the following information:

title	category	photo location
1. _____		
_____		
2. _____		
_____		
3. _____		
_____		

Drop entries off at the CAA office 110 MacKenzie Avenue, Revelstoke.

Mail in entries send to:
Photo Contest, Canadian Avalanche Association
Box 2759
Revelstoke, BC V0E 2S0

E-mail entries: publish@avalanche.ca

Entry Deadline: All entries must be received by April 15, 2004

Notice to Recreational Avalanche Course Providers

In late January of 2004, the Education Committee of the CAA made several recommendations to the Board of Directors. The minutes of February's directors' conference call stated: ***Robin Siggers made a motion that the BOD recommends implementing the policy as written by the Education Committee as per their January 23, 2004 document, and RAC providers should be informed of this. John Birrell seconded the motion. The motion was carried with all in favour.*** Although legal council on the issue is not yet conclusive, this information is presented here to provide advance notice to Recreational Avalanche Providers and other interested parties.

To: The CAA Board of Directors
From: Education Committee
Re: RAC Instructor Standards
Date: January 23, 2004

The CAA has long been committed to reducing avalanche accidents in Canada. It also recognizes the fact that in many communities across the nation there are insufficient numbers of Professional Members available to deliver avalanche-training courses. Thus was born the Recreational Avalanche Course program, a program that recognizes Affiliate Members of the Association to be "qualified " to deliver introductory avalanche awareness training. This instructor standard has been under scrutiny in the past and is the subject of much discussion today. In light of the avalanche fatalities of 2003 and society's changing view on risk tolerance, the Education Committee puts forward the following recommendations we feel will help provide clarity around this issue and help enhance the liability firewall the CAA desires.

Immediate Action:

As there are several substantial inconsistencies in the RAC Instructor Manual regarding travelling in avalanche terrain, we feel a clear policy statement regarding travel in avalanche terrain is required. For maximum clarity this statement must be universal (i.e. it must apply to all **Introductory** RAC providers whether their professional standing is a limiting factor to their teaching level or not). This should be approved by the board and distributed to all RAC providers as soon as possible.

We suggest that the policy statement closely reflect the following text:
"**The CAA only supports the delivery of Introductory RAC training in non-avalanche terrain. All course providers must accept full responsibility for their actions should they depart from this guideline.**"

This policy statement is consistent with the existing IRAC instructor qualification being CAATS Level 1 certification. One of the course objectives of the Level 1 states that successful candidates will have the basic skills required to: "**Recognize avalanche terrain and identify safe areas and routes**."

The policy statement as it applies to professional members is moot, since their instructor qualifications are not an issue. However, we suggest that most professional members who teach IRAC will have no objections to the universality of the policy and will adopt it.

- We also suggest that a legal opinion be solicited regarding this policy.

Future instructor agreements should also include a recommendation regarding other trip leadership considerations. While not inherently the "business" of the CAA, we feel this is a prudent inclusion:

Further to this, the CAA recommends that all RAC providers:
- Obtain appropriate insurance for their activities
- Maintain first-aid qualifications
- Prepare emergency procedures for their activities
- Stay current with industry-wide risk management practices

Short Term Action (next 8-10 months):
For next season (04-05), the Education Committee recommends that:

A Risk Management Training Course for RAC Instructors be put in place as a prerequisite for all new instructors. (Available in French and English)

This course could be similar in nature to this year's RAC instructor training and should focus on managing risks, group dynamics and custodial care responsibilities.

Long Term Action :
The Education Committee recommends that the CAA continue to explore sustainable funding mechanisms for the RAC program.

The Education Committee recommends that the CAA and the RACPAG clarify their mutual roles and responsibilities in regards to RAC training and that the two continue to work closely to provide accessible and high quality recreational avalanche training nationally.

The Education Committee recommends a full revision of the RAC Instructor Manual. Particular attention should be paid to the CAA's position on teaching in avalanche terrain to ensure each lesson plan approaches this issue in a consistent manner.

Advanced RAC:
No changes recommended.

The Run List: History of a Cheat Sheet

BY THIERRY CARDON

"In an accident, presence of mind is good, absence of body is better." (Unknown author – this bottomless wisdom was found in a fortune cookie, which is a great tool to deal with avalanche hazard.)

Accidents don't happen because of the existence of hazardous conditions. The ground doesn't buckle and jump up to crash into the aircraft and the mudslide may seem to be rushing with a mean determination to meet and crush the bridge or the cars on the highway. But those cars have a brain steering the wheel that makes nature's will seem slow-witted in comparison, and the bridge, even though its mobility is limited, got there because some educated brains decided so.

There is a big difference between "occurrence" (a word that seems to begin with "OK"), and "incident" or "accident" (words that start with "in" or "at", showing a purpose or a direction – and end both with "dent", indicating some kind of damage familiar to an insurance adjuster or a lawyer). I must confess that it took a few years of guiding to truly grasp the difference, having occasionally nurtured a flattering but delusive kinship with the cause of what is called an Act-of-God. To my European ears that word almost sounds like "guide" when spoken by an Australian. I love the Aussies.

An avalanche occurrence is just that, something that occurs. An avalanche "involvement", however, must have something to do with "me". I have to be there, then, and I must have made that choice.

Natural events seem to occur on their own schedule but "accidents" or "incidents" happen only because, for a variety of human reasons, people's (sometimes obscure) motivations come into contact with these hazardous conditions, triggering an unfortunate chain of events. This chain of events, some links of which are made invisible by the motivations that threaded them together, does not always unravel all the way to the final link that precariously holds the big disaster poised on the edge. Hence the dangerous reinforcement gained by the lack of really scary feedback even though the unwitting participant may have stepped with one foot over the doom pit for a brief moment without even realizing it. But with the next person on the site, or the next time one tries the same trick, all hell may break loose.

A question I always found fascinatingis how many times one comes close to a painful mishap during the course of a typical heli-skiing day in "fair" stability conditions. The clues are always there but if they are subtle or slow to show up, rationalizing and keenness may mute them in favor of "running the program".

Before I came to guide in Canada in 1974, the only type of decision-making amongst guides that I was familiar with in the Alps was the "free-4-all". That included various tools and techniques such as secrecy, sometimes withholding information and sometimes giving misleading information, leaving young and experienced guides alike alone with their decisions, these decisions being always motivated with the consideration that what one had decided not to do, someone else would, and in the process steal the clientele and the reputation. And there are lots of someone else's, regardless of how close to the edge one would choose to position oneself. Snow stability hard facts had to take a back seat. This was, and is, scary. Statistics and high profile events involving professionals speak for themselves. But then, an unsophisticated public – and Courts - could accept the "Act-of-God" concept as an explanation (the Aussie accent had yet to come into the alpine equation).

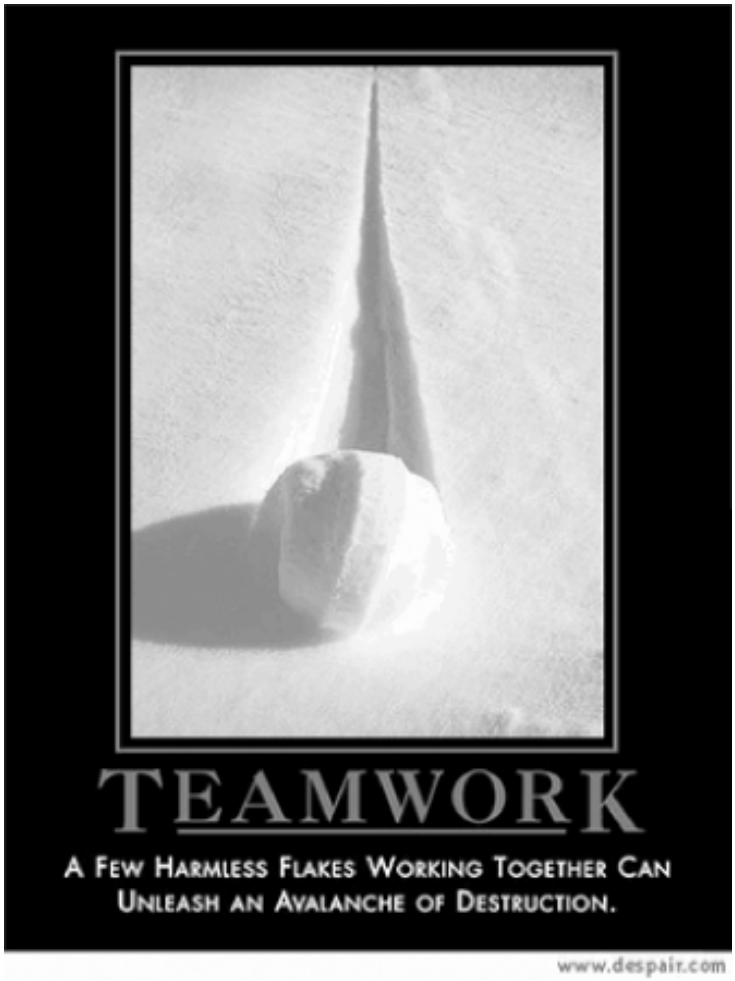
In the four-guide team system of heli-skiing in Canada I saw with relief the potential for much improved and safer decision-making, even though with its mechanized character heli-skiing multiplies exposure to hazard. Reduced competitiveness among guides, four pairs of eyes and brains instead of one—teamwork. But notice the adjective "reduced". That doesn't mean "eliminated" and rivalry fuels the motivational engine, the ego. Ego has a way of wiping out any gain additional eyes and brains make (with sophisticated methods of observation, recording, analysis, evaluation, etc.) by bending and biasing them, all the while retaining a validation of professionalism. The best intentions would occasionally break down and disaster would strike. Egos got bruised, bodies got caught, hearts got broken, lives got ruined. What to do?

Guides meetings were informal and minimalist then. I had noticed, however, that in order to avoid the pitfall of biasing snow stability clues and facts once in the thick of action, I had developed a habit. While shaving or brushing my teeth in the morning, I would run through my mind a list of acceptable slopes and lines and a list of places I promised myself I wouldn't touch that particular day, no matter what collective enthusiasm, surging confidence or nagging frustration would entice me to try after all – or worse, to invite others to try.

Perhaps my teammates here doing the same? If so, why not pool and challenge the results of this morning brainstorming and put it down on paper to make it binding? Doing this would open a Pandora's box of personal level of confidence and acceptance of risk exposure, which is a major issue in a guide's ego, much more threatening than impersonal discussion of snow stability, shear test scores or the size of faceted crystals. But an avalanche tragedy in 1982 prompted me to suggest that we try it since the increased sophistication of other more scientific approaches (more accidents=more snow profiles) didn't seem to avert such disasters.

The original idea was this piece of paper bearing a list of "OKs" and "No-Ways" clipped on the helicopter's instrument panel as a permanent reminder throughout that day of a firm and deliberate thought process, impossible to bend later on. The absence of "Maybes" (yellow) forced a keen, honest and clear mental effort. Soon after, compromise was accommodated to include the "Maybe" (and what was left to the ego). Was this fine-tuning or turning back the clock? That compromise could be negating the intent behind the whole process. Few people have ever been really comfortable with the "yellow", to the extent that now, 20 years later, yellow has often turned solid green or red depending on the confidence level and the motivation (the "attitude") of those wielding the coloured pens.

Are we back to square one? In spite of giant strides made in snow science, communication tools and electronic whatnots I don't think we'll ever see the gizmo analyzing zillions of bits of data, running them against models and spitting out a red or green light. A guide may always have to run a list through her or his mind in the morning and share it, have it challenged against three or four others. So it may be that the form still has to be worked on, if not the principle.



CORRECTION

From the last edition of *Avalanche News*: Volume 67, Winter 2003, Page 36

The article by Dr. Bruce Jamieson entitled *Fracture Propagation and Resistance in Weak Snowpack Layers* was unfortunately reprinted with an error. Due to a software problem caused by two articles in Volume 76 containing figures with identical file names, Figure 1 and Figure 2 of Dr. Jamieson's article contained incorrect graphs rather than the photographs presented in the original article. The first page of the article is reprinted correctly here. The production personnel of *Avalanche News* and I as program manager apologize to Dr. Jamieson, the University of Calgary, and you the reader for any inconvenience this may have caused.

Evan Manners
Operations Manager
Canadian Avalanche Association

Fracture Propagation and Resistance in Weak Snowpack Layers

Bruce Jamieson
Dept. of Civil Engineering, Dept. of Geology and Geophysics
University of Calgary

Introduction

As part of snowpack studies on 24 February 1994, Thierry Cardon, Roddy McGowan and I skied down a glacier in Hume Creek in the Purcell Mountains (Figure 1). We stopped near a small rock outcrop at the skier's right side of the glacier. As the third skier arrived, we all heard and felt a whumpf. Moments later, the heli-ski guide two runs to the north called on the radio to say the slope between his position and ours was avalanching. The guide and his group were able to watch the Class 4 avalanche (Figure 2).

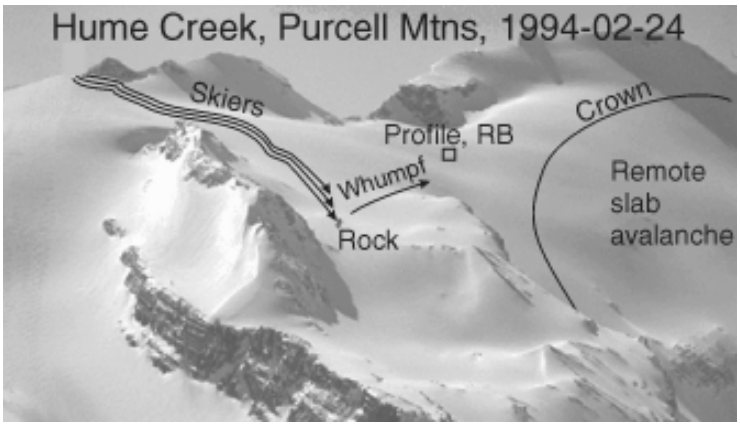


Figure 1. Photo of the glacier in Hume Creek in Purcell Mountains where the whumpf and remote slab avalanche occurred on 1994-02-24

*Figure 2. R*emotely triggered Class 4 slab avalanche - photo taken from the rock outcrop below the profile site.

Poking with our ski poles revealed that we had stopped where a thin slab was overlying depth hoar and rocks. We had started a fracture in depth hoar that had, presumably, extended into a surface hoar layer in which it propagated about 400 m across the glacier to the slope that avalanched (Figure 3). We chose to observe a profile and rutschblock test on a 28° slope about 150 m from the crown because we were concerned about the potential for the slab above the crown to release. The snow profile revealed that the February 6 surface hoar layer was down about 165 cm. We were unable to get it to slide in a rutschblock test, even when all three of us jumped together on the block. In this case, the snowpack where the fracture started (depth hoar under a thin slab) was very different from the snowpack at the profile site, which was likely typical of the snowpack where most of fracture propagation occurred and at the crown.

In his 1999 review of slab avalanche release, Jürg Schweizer clearly distinguished between fracture initiation and fracture propagation. Schweizer's distinction and this case study raise the question: When using snowpack tests to help assess avalanche risk, should we focus on whether fractures are likely to start in weak layers, or on whether they are likely to propagate far enough to release avalanches?

For the remainder of this article, please see Avalanche News Volume 67, pg 37

More Results on Fracture Characterization in Compression Tests

Alec F.G. van Herwijnen[1] and Bruce Jamieson[1,2]

[1]Dept. of Civil Engineering, [2]Dept. of Geology and Geophysics
University of Calgary

Fracture Character (*Avalanche News* 66, 2003) and its counterpart Shear Quality (*Avalanche News* 67, 2004) are very much in the spotlight this winter. Already some avalanche safety operations are starting to use these rating systems to supplement stability test results. However, as yet no consensus exists regarding which system to use for exchanging test results.

In search of ways to improve the interpretation of stability test results, researchers of the University of Calgary started systematically classifying fractures in compression tests and rutschblock tests during the winter of 1996-97. In December 2002, after careful review, the classification system was refined. Presently a five level description of fracture character (Table 1) is used by field workers of the University of Calgary, as well as by several avalanche safety operations in Canada.

Table 1: Fracture classification system and its equivalent typical shear quality. For definitions see: 'An Update on Fracture Character in Stability Tests' (Avalanche News 66, 2003).

Fracture Character	Code	Typical Shear Quality
Progressive Compression	PC	Q3
Resistant Planar	RP	Q2
Sudden Planar	SP	Q1
Sudden Collapse	SC	Q1
Non-planar Break	B	Q3

In a recent article conveniently titled 'An Update on Fracture Character in Stability Tests' (*Avalanche News* 66, 2003), we presented results from one winter of stability tests with the refined fracture characterization system. In the latest issue of the Avalanche News, Karl Birkeland and Ron Johnson outlined their 'shear quality' approach, with promising results.

Now, with sun-crust well on its way, it is time for another update. However, this time we focus on compression tests performed on skier-tested slopes and the evolution of fracture character for weak layers.

Since this study started in the winter of 1996-97 more than a thousand compression tests were performed on 345 skier-tested slopes, including whumpfed sites, in the Columbia Mountains of British Columbia. (Usually we do three compression tests at a representative site on each skier-tested slope.) In the fall of 2002, two new fracture characters (SP and RP) were introduced, replacing the broad Thin Planar classification. This limits the amount of data we have for these two classes. However, the definitions of PC, SC and B were not changed, allowing us to use some older data in the analysis.

Frequency of skier-triggering

The frequency of skier-triggering dry slab avalanches decreases as the compression test score increases (Figure 1). In the Easy range (E) 36% of the recorded fractures were the failure layers for skier-triggered avalanches. This indicates that the compression test identifies many potential failure layers and interfaces, some being more likely to produce avalanches than others. The frequency of skier-triggering is highest for compression test scores in the

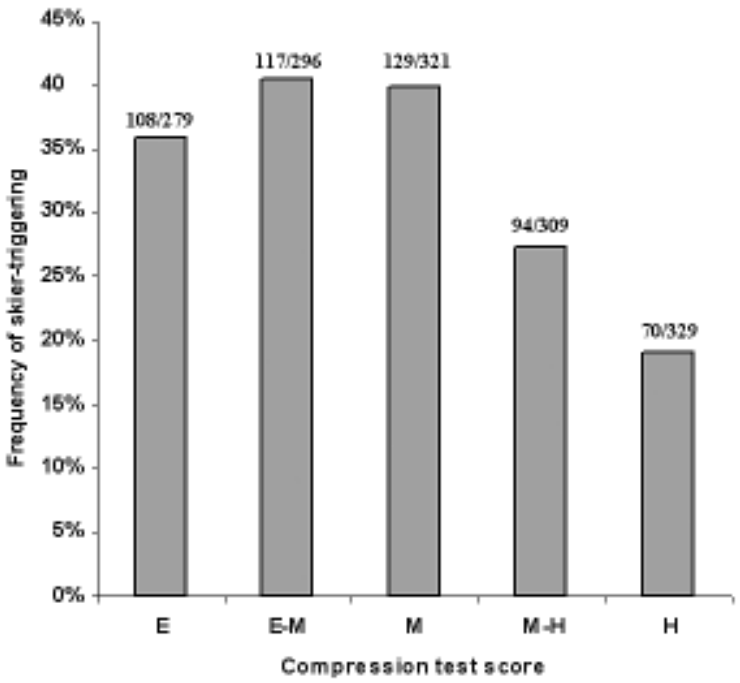


Figure 1: Frequency of skier-triggering by compression test score, regardless of fracture character. Easy (E): 0-7 taps. Easy-Moderate (E-M): 8-12 taps. Moderate (M): 12-17 taps, Moderate-Hard (M-H): 18-22, Hard (H): 23-30 taps.

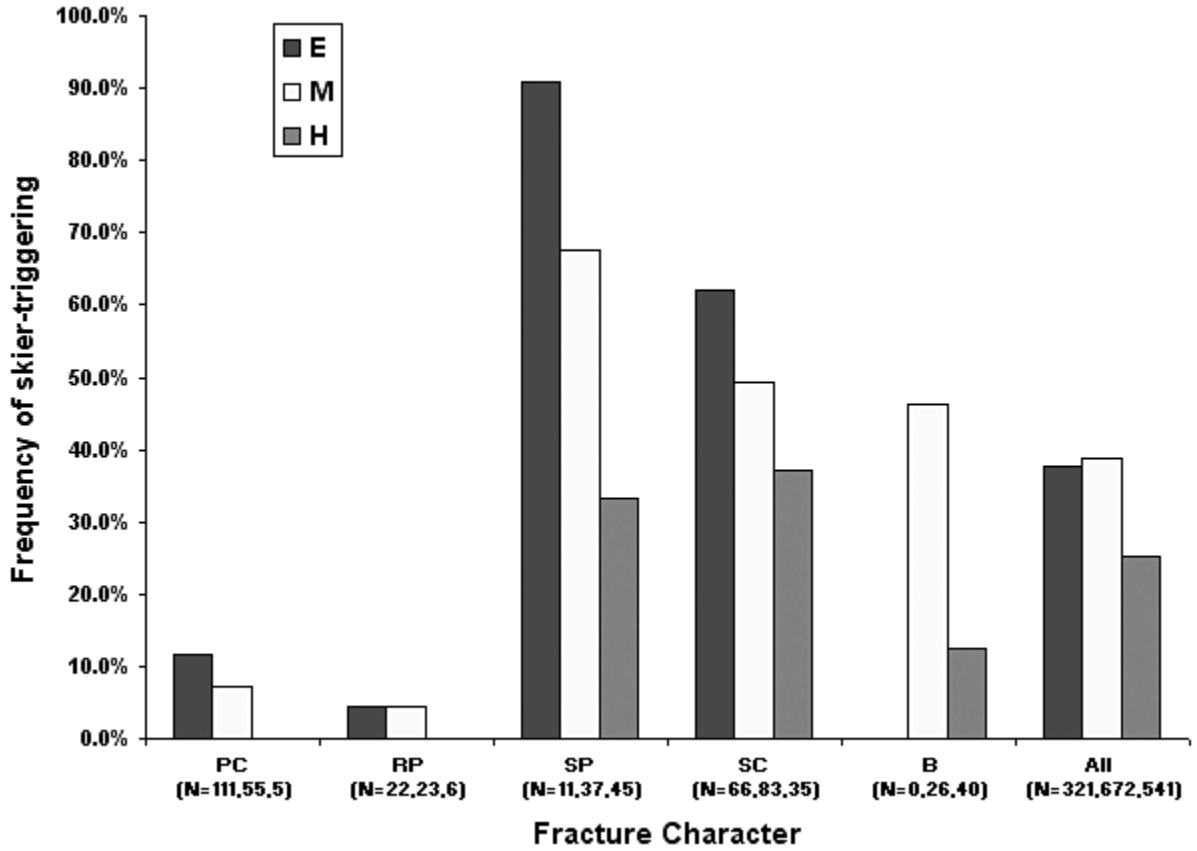


Figure 2: Frequency of skier-triggering by fracture character for compression test scores in the Easy (E): 0-10 taps, Moderate (M): 11-20 taps, and Hard (H): 21-30 taps range. The number of fractures recorded in each range is also shown for each fracture character.

Easy-Moderate (E-M) range, with 40%, decreasing to 19% in the Hard range (H), which is still rather high. In the easy range the frequency is lower (36%) probably because the slab is less often sufficiently cohesive to propagate the fracture.

A different picture emerges if we separate the data by fracture character. In Figure 2 the frequency of skier-triggering for compression test scores in the easy, moderate and hard range is shown for each fracture type.

At first glance we see that the frequency of skier-triggering for sudden fractures (SP and SC) and to a lesser extent for non-planar breaks (B) is considerably higher than that of PC and RP fractures, regardless of compression test score.

Looking at the different fracture characters in more detail we see that in the *easy* range, only 12% of the PC fractures and 5% of the RP fractures were the failure layers for avalanches. This is much lower than for SP (91%) and SC (62%) fractures. No breaks were recorded in the easy range. This means that for compression test results in the easy range, we can identify potential failure layers for skier-triggered dry slab avalanches more easily by also considering fracture character.

The same is true for compression test results in the *moderate* range. The frequency of skier-triggering is slightly lower for PC and RP fractures, with 7% and 4% of the fractures were the failure layers for skier-triggered avalanches. The sudden fractures more often identify the failure layers for skier-triggering: SP with 68% and SC with 49%, and also the non-planar breaks with 46%. Unfortunately, during the early years, non-planar breaks were only recorded if these were associated with the failure layer of a skier-triggered avalanche. Therefore, our data-set for non-planar breaks is biased towards skier-triggered avalanches.

None of the PC or RP fractures in the *hard* range were the failure layers for skier-triggered dry slab avalanches. However, the number of tests is very limited. For SP and SC fractures the frequency of skier-triggering drops off in the hard range to 33% and 37%, respectively. This is higher than for the 'average' compression test result in the hard range (25% for all compression tests, Figure 2). With only 12% of the fractures associated with avalanches, Breaks are below the average for the hard range.

Table 2: Evolution of fracture character for non-persistent weak layers. The amount of new snow since the last snow-pack observation in the nearby study plot is also shown, not taking into account any settlement.

Date	Depth (cm)	ÓHN (cm)	Taps	Fracture Character	Weak Layer Crystal
030102	31		5, 5, 3	PC, PC, PC	/
030103	42	13	13 ,11, 12	PC, PC, RP	/
030106	43	5	21, 20, 22	PC, PC, SP	/
030109	35	0	24, 23, 25	SP, SP, SP	µ
040126	10		2, 1, 1	PC, RP, RP	+
040129	48	54	11, 11, 11	RP, RP, RP	/
040202	76	45	29	RP	/
040203	70	0	24,23	SP, SP	µ

Spatial variability, an important aspect of snow stability in general, is also present in these results. In general we tend to perform three compression test results next to the profile site on a skier-tested slope. Occasionally a weak layer produces two or more different types of fracture and there is no such thing as an average fracture character for a set of tests. However, it must be pointed out that *none* of the layers or interfaces that fractured consistently as a RP was the failure layers for skier-triggered avalanches. On the other hand, 62% of fractures that consistently failed as a SP or SC were the failure layers for skier-triggered avalanches.

Evolution of fracture character

Over time, changes in the characteristics of the weak layer and the overlying slab can influence fracture character as well. We have observed that soon after burial when the overlying slab is not cohesive enough, persistent weak layers do not produce results in stability tests. As the slab over the weak layer thickens and becomes harder, persistent weak layers tend to produce SP or SC fractures, mainly depending on the thickness of the weak layer. Finally, once a weak layer is buried deep enough in the snowpack, it will stop producing stability test results.

Indeed, during the winter of 2002-03, several surface hoar weak layers were producing SP and SC fractures at our two study sites many weeks after being buried by snow. At the Mt. Fidelity study site in Glacier National Park, the November facet layer of that same winter was still producing SC fractures for up to 87 days after being buried, well into February.

The evolution of non-persistent weak layers is generally much faster. The first signs of ‘maturing’ storm snow interfaces are usually PC fractures. Because the layers are just becoming cohesive, the softer layers are gradually compressed in a compression test, exposing potential weak layers. As the snow becomes more cohesive, many storm snow interfaces evolve to RP fractures, followed by breaks and no results, within days. However, during the initial stages of the evolution, some slabs can become cohesive faster than the weak layer (e.g. weak layer of large stellars). Our observations on this transition are limited, however, some interfaces evolve into SP fractures, indicating that at this stage skier-triggered slab avalanches are more likely (Figure 2). The evolution of the fracture character of two non-persistent weak-layers can be seen in Table 2. Both weak layers are evolving from PC through RP to SP fractures, within 7 days. However, we believe that the evolution is often much faster.

Summary

The updated data shows that fracture character is a valuable addition to stability test scores. For compression test scores in the easy and moderate range, fracture character can clearly improve the interpretation of compression test results. In the hard range, however, fracture character only provides limited information based on the data currently available. Although SP and SC fractures are more likely to be associated with avalanches, the frequency of skier-triggering is only about 35%.

Tracking the evolution of potential weak layers through fracture character can prove to be useful as well. During the initial stages of the slab becoming cohesive, fracture character can provide information on the potential for avalanches to occur.

It is clear however, that fracture character is not the 'magic solution'. It provides additional information to stability test results, and as such it can be another piece in the puzzle of a daily stability evaluation.

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Heuristic Traps in Recreational Avalanche Accidents: Evidence and Implications

by Ian McCammon

Authors note: This article extends the findings I presented at the 2002 ISSW in Penticton, BC. A full version of the article, including a description of the statistical methods used, appeared in the Avalanche Review (Vol. 22, nos. 2 & 3). You can download the two-part article at www.snowpit.com.

Several years ago, my buddy Steve died in an avalanche. It was a stormy day and the avalanche danger was high, but Steve and his partners felt that by choosing a familiar route and carefully managing their exposure, they could stay out of trouble. After all, they were experienced backcountry skiers with avalanche training. Steve, the most skilled of the group, had just visited the area less than a week before.

Two hours into their tour, they met another party of skiers headed for the same pass and the low-angle slopes on the far side. They briefly discussed the avalanche conditions, and agreed that prudent route selection was the key to safety that day. But ten minutes later, as Steve's group broke trail across a shallow, treed slope, they triggered an avalanche that swept down on them from above. The avalanche caught all three skiers, seriously injuring one man and completely burying Steve. The other party witnessed the accident and came to the rescue, but by the time they dug Steve out, he was dead.

In the aftermath of the accident, some people felt that Steve died because he took foolish risks that day. Traveling in avalanche terrain during high hazard, they said, was reckless. They believed Steve's group had ignored obvious signs of danger, and that they were tempting fate by crossing under an avalanche path in such conditions. The explanation sounded reasonable.

But it didn't match what I knew about Steve. Weeks earlier, I had shared a lift ride with him at a local ski hill, and we had reminisced about our climbing adventures years before. We laughed about how Steve used to love leading thin, difficult routes, often high above his protection. But things were different now, he said. He told me about his wife and his beautiful four-year-old daughter, and how his days of being reckless were over, and how the time for raising his family had begun. He still loved to ski and climb, he said, but now it was more about enjoying the outdoors and coming home afterwards than about taking risks. When he died, it was on a popular route in familiar terrain, on a slope traversed by dozens of people every season, in a place that he believed was safe.

As sad as this accident was, the real tragedy is that similar stories unfold in accident after accident, year after year. An experienced party, often with avalanche training, makes a crucial decision to descend, cross, or highmark a slope they believe is safe. And then they trigger an avalanche that buries one or more of them. In hindsight, the danger was often obvious before these accidents happened, and so people struggle to explain how intelligent people with avalanche training could have seen the hazard, looked straight at it, and behaved as if it wasn't there.

Heuristic traps in avalanche accidents

So how do people come to believe that a slope is safe, even when they are faced with likely evidence that it isn't? One possible explanation is that people are misled by unconscious heuristics, or rules of thumb, that guide most of our decisions in everyday life.[1] Such heuristics work well for dealing with routine risks such as driving, using crosswalks, or avoiding social embarrassment. But as we'll see, avalanches present a unique hazard that renders some of our heuristics irrelevant, and in some cases dangerously misleading. When a rule of thumb gives us a grossly inaccurate perception of a hazard, we fall into what is known as a heuristic trap.

Six heuristics in particular are recognized as being widely used in our daily decisions: familiarity, consistency, acceptance, the expert halo, social facilitation and scarcity.[2] Because these heuristics work so well and because we've used them for much of our lives, we are largely unaware of using them, even when we are making critical decisions. Such conditions are fertile ground for heuristic traps.

To study the possible influence of these six heuristic traps in avalanche accidents, I reviewed 715 recreational accidents that took place in the United States between 1972 and 2003. Data for the study came from records maintained by the Colorado Avalanche Information Center, published accounts in the *Snowy Torrents* (Williams and Armstrong, 1984; Logan and Atkins, 1996), the Westwide Avalanche Network, the Cyberspace Snow and Avalanche Center, avalanche forecast center annual reports, and various Internet and newspaper resources.

We will see that there is good evidence that many avalanche victims fell prey to one or more heuristic traps. But because this study is based on accident data, it can only demonstrate correlations between victims' behavior and the presence of heuristic trap cues. Without doing controlled experiments on people's behavior in avalanche terrain (which would be problematic, to say the least), it is not possible to conclusively establish causation of accidents by heuristics traps. Thus, the conclusions of this study should be viewed as preliminary – other causative factors may be at work. Nevertheless, we will see that experimental results from other fields of human behavior support many of the findings.

Evaluating decisions by avalanche victims

If avalanche victims were in fact influenced by heuristic traps, we would expect to see the evidence in their decisions. Specifically, when trap cues were present immediately prior to the accident, susceptible victims would be less objective about the avalanche hazard and would tend to expose themselves to more hazard than they would when the trap cues were absent. In other words, in accidents where victims fell prey to heuristic traps, the presence of heuristic trap cues would correlate with greater exposure to avalanche hazard.

To approximate the objective hazard faced by each party prior to the accident, I computed an *exposure score* that was a linear combination of seven easily recognized indicators of avalanche hazard (Table 1). To minimize reporting biases, I chose indicators that would have been readily apparent not only to the victims, but also to any witnesses, rescue parties or investigators.

The distribution of exposure scores shows that most victims proceeded into the avalanche path in the face of ample evidence of danger (Figure 1). Almost three-quarters

Indicator	*Description*	*Frequency*
Obvious path	Distinct start zone, path, runout, trim lines or a known avalanche path.	82%
Recent loading	Loading by snowfall > 15 cm and/or wind in the last 48 hours.	66%
Terrain trap	Obvious terrain features such as cliffs, gullies or dense trees that increased the severity of the slide.	58%
Posted hazard	Considerable, high or extreme hazard posted for the region.	55%
Recent avalanches	In the immediate area, within the last 48 hours.	35%
Thaw instability	Above-freezing air temperatures or rain at the time of the incident.	20%
Instability signs	Collapsing, cracking, hollow sounds or low stability test scores noted by the victims or the rescue party.	17%

Table 1. Hazard indicators used in this study. Frequency column denotes the percentage of all accidents where the indicator was present (N=715).

of all accidents occurred when there were three or more obvious indicators of the hazard. This finding is consistent with the frequently-made observation that most avalanche victims appear to have ignored obvious signs of instability (Fesler, 1980; Smutek, 1980; Jamieson and Geldsetzer, 1996; Atkins, 2000; Tremper, 2001). Importantly, there were no cases in the data set where all of the hazard indicators were known to be absent.

The blatancy of the hazard in avalanche accidents would be understandable if most victims had little understanding of avalanches. Unfortunately, this does not seem to be the case. When accidents parties are categorized by the training level of the most skilled person in the party (Table 2), we find that almost half of the parties contained at least one person (often the leader) who had formal avalanche training and knew not only how to recognize the hazard,

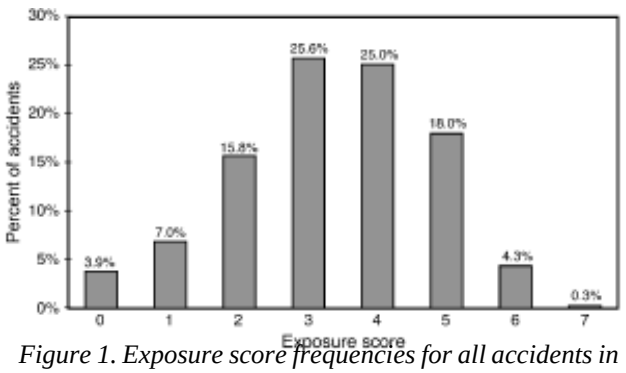

Figure 1. Exposure score frequencies for all accidents in this study, including those where little information was available (N = 715).

but also how to avoid or mitigate it. Almost two thirds of the parties were aware of the avalanche hazard, and still proceeded into the path anyway. Even more telling is the fact that exposure scores did not significantly decrease with training.[3] Thus, all four levels of training appeared potentially susceptible to heuristic traps.

A number of investigators have suggested that party size may have played a role in decisions leading up to avalanche accidents. A "risky shift," or the tendency of larger groups to take more risk, has been discussed frequently in the literature. As shown in Figure 2, there is a significant variation in exposure score by party size. It appears that people traveling alone and people traveling in parties of six to ten exposed themselves to significantly more hazard than people traveling in parties of four and more than ten people.

So far, we've seen that many avalanche victims appeared to ignore obvious signs of avalanche danger, regardless of their level of training. We've also seen that party size correlates with different degrees of exposure to avalanche hazard at the time of the accident. In the next six sections, we'll review each of the six heuristic traps, and examine how cues for these traps correlate with greater exposure by training level and party size. In other words, we'll look at how each trap may have influenced these victims, and why these traps may have been difficult for some parties to avoid. Next, we'll look at the possible cumulative effects of heuristics traps, and which groups were most

Training	*Description*	*Freq.*	*Mean age*
None	No training; displayed no awareness of the avalanche hazard.	34%	24.3
Aware	General awareness of the avalanche hazard; took no precautions prior to the accident.	24%	30.1
Basic	Formal avalanche training; consciously took group management precautions prior to the accident.	28%	30.9
Adv.	Extensive formal training; displayed ongoing avalanche and terrain awareness and risk management. Performed meaningful snow stability tests.	15%	33.5

Table 2. Training categories used in this study. Frequency denotes the percentage of accidents where training was known or could be reliably inferred (N = 484).

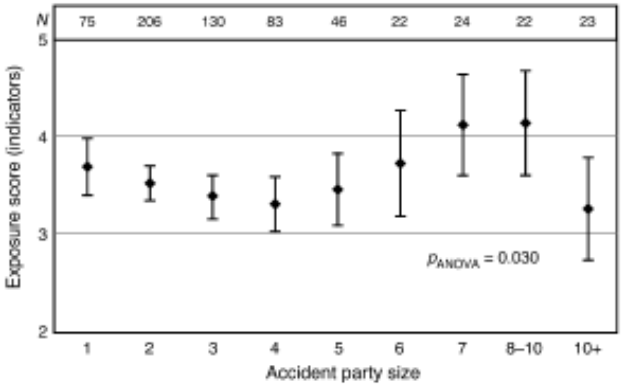

Figure 2. Exposure score variation by accident party size. Mean values and 95% confidence intervals are shown. Parties of 3–5 people and parties of more than 10 exposed themselves to the fewest number of hazard indicators prior to the accident (N = 631).

Figure 3. Exposure scores by training in familiar and unfamiliar terrain. Mean values and 95% confidence intervals are shown. Parties with advanced training showed a notable increase in risky decisions when in familiar terrain.

susceptible. Finally, we'll conclude by examining what all this might mean for avalanche education.

Trap #1: Familiarity

The familiarity heuristic relies on our past actions to guide our behavior in familiar settings. Rather than go through the trouble of figuring out what is appropriate every time, we simply behave as we have before in that setting.[4] Most of the time, the familiarity heuristic is reliable. But when the hazard changes but the setting remains familiar, this rule of thumb can become a trap.

To determine if there was evidence of the familiarity trap in avalanche accidents, I compared exposure scores of accidents that happened in terrain that was familiar (211 cases) or unfamiliar (56 cases) to the accident party. Taken as a whole, all groups showed a significant increase in exposure scores in familiar terrain. The effect was most pronounced in parties with the highest level of training (Figure 3), who exposed themselves to significantly more hazard indicators in familiar terrain. There was a marginally significant increase in exposure scores for parties of two people.

Apparently, there is a tendency among highly trained accident parties to make riskier decisions in familiar terrain than they do in unfamiliar terrain. Certainly, an intimate knowledge of terrain features, local avalanche history, snowpack structure, or the effects of skier stabilization might have contributed to this tendency. But given the large number of accidents that happened in familiar terrain, it appears that these parties greatly overestimated the degree to which familiar slopes were safer. Remarkably, parties with advanced training that were traveling in familiar terrain exposed their parties to about the same hazards as parties with little or no training. In some respects, familiarity seems to have negated some of the benefits of avalanche training.

> *"In some respects, familiarity seems to have negated the benefits of avalanche training."*

Trap #2: Consistency

Once we have made an initial decision about something, subsequent decisions are much easier if we simply maintain consistency with that first decision. This strategy, known as the consistency heuristic, saves us time because we don't need to sift through all the relevant information with each new development. Instead, we just stick to our original assumptions about the situation.[5] Most of the time, the consistency heuristic is reliable, but it becomes a trap when our desire to be consistent overrules critical new information about an impending hazard.

To determine if there was evidence of the consistency trap in avalanche accidents, I compared exposure scores of accident parties that had either high or low commitment to entering the path that eventually avalanched. Highly committed groups had a stated goal that they were actively pursuing or a goal they were motivated to achieve because of approaching darkness, timing or other constraints (253 cases). Groups with low commitment were not motivated to achieve a specific goal; the accident typically occurred during the course of routine recreational activities (138 cases).

Taken as a whole, exposure scores of all groups showed a significant increase when commitment of the party was high. Among different training levels, the effect was marginally significant for parties with basic and advanced training. Among different party sizes, the effect was marginally significant for parties of three people and significant for parties greater than four people. One might argue that any increase in exposure score is simply due to the fact that accident parties were more likely to commit to skiing or highmarking a slope when there was new snow, and thus conditions were more hazardous. However, a comparison of avalanche hazard ratings between high-commitment and low-commitment groups showed no correlation.[6] Thus, it appears that accident parties who felt highly committed to enter an avalanche path did in fact take more risks than parties who were less committed. This finding is consistent with the observations of other investigators, most notably Fredston and Fesler (1994) and Tremper (2001).

Trap #3: Acceptance

The acceptance heuristic is the tendency to engage in activities that we think will get us noticed or accepted by people we like or respect, or by people who we want to like or respect us. We are socialized to this heuristic from a very young age, and because we are so vulnerable to it, it's no surprise that it figures prominently among the heuristic traps embedded in advertising messages.

One of the more familiar forms of this heuristic is gender acceptance, or engaging in activities that we believe will get us accepted (or at least noticed) by the opposite sex. For men, this heuristic often manifests itself in certain types of risk-taking behavior, particularly during adolescent and early adult years. Various studies have established that under certain circumstances, men in the presence of female peers will behave more competitively, aggressively, or engage in riskier behaviors.

To see if the gender acceptance heuristic may have played a role in avalanche accidents, I compared exposure scores from accidents involving mixed-gender parties (109 cases) with those of all-male parties (371 cases). Across all groups, accident parties that included women had a significantly higher exposure score. This difference in exposure score did not vary by group size, but there were notable differences by level of training. Parties with awareness of the avalanche hazard but no formal training (the "aware" training category described in part 1 of this article) showed a significant increase in exposure scores when women were present.

The increase in the exposure score of accident parties that included women does not appear to be a result of those women taking more risks. Of the 1355 individuals present in avalanche accident parties during the study period, females had a slightly lower chance of being caught in avalanches then males. Furthermore, as shown in Figure 4, women appeared to avoid participating in parties where they had the highest probability of being caught.

The increased exposure of mixed-gender accident parties may well have been due to reliance on the gender acceptance heuristic by the male party members. In other words, males may have been more willing to expose themselves (and other party members) to greater avalanche hazard when there were women in the group because such behavior was viewed by the men as being more likely to gain the respect or acceptance of the women in their party. Certainly, this behavior matches conventional wisdom regarding the conduct of some avalanche victims, as discussed by Fredston, Fesler and Tremper (1994) and Tremper (2001, p. 226). It is also consistent with recent findings on the behavior of men in the presence of women (see, for example, Roney, et al 2003).

Trap #4: The Expert Halo

In many recreational accident parties, there is an informal leader who, for various reasons, ends up making critical decisions for the party. Sometimes their leadership is based on knowledge and experience in avalanche terrain; sometimes it is based on simply being older, a better rider,

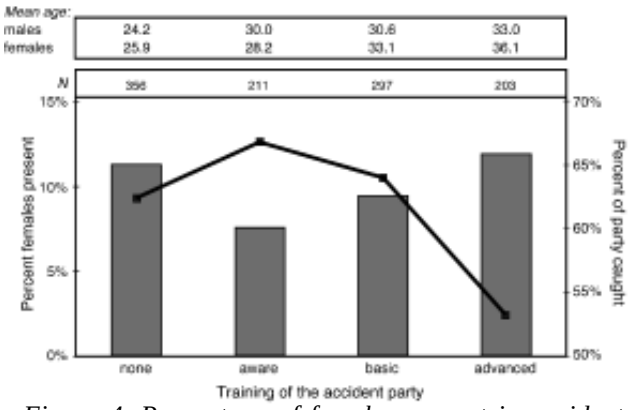

Figure 4. Percentage of females present in accident parties (columns) and the average percent of each party caught (line graph). Women appeared to avoid those groups where they had the highest chances of being caught.

or more assertive than other group members. Such situations are fertile ground for the expert halo heuristic, where an overall positive impression of the leader within the party leads them to ascribe avalanche skills to that person that they may not have.

To see if there was evidence of the expert halo heuristic in recreational avalanche accidents, I compared the exposure scores of parties that had a clear, identifiable leader (133 cases) with the exposure scores of parties that had no identifiable leader or the leadership was unclear (465 cases). Across all groups, parties with an identifiable leader had a significantly higher exposure score, but the actual differences depended greatly on the level of training of the leader.

As shown in Figure 5, the difference in exposure score was quite pronounced for those parties who were led by someone with minimal or no avalanche skills. What is surprising about this trend is that untrained parties with no leader (who presumably made decisions by some type of consensus process) exposed themselves to less hazard than they would have if they were relying on an unskilled leader. In other words, unskilled parties seemed to attribute more avalanche knowledge to their leader than to

Figure 5. Variation of exposure scores by training and leadership. Leaders with little or no avalanche training appeared to make worse decisions than did similar groups without leaders.

themselves, even when that leader had no such knowledge. Further evidence of the expert halo heuristic appears when we look at exposure scores by group size. As shown in Figure 6, leaders appeared to make significantly riskier decisions as the group size increased. Such results are consistent with the classic research in conformity, which has shown that pressures to conform in a group increase most significantly when there are majorities of two to four people (Asch, 1951; Plous, 1993).

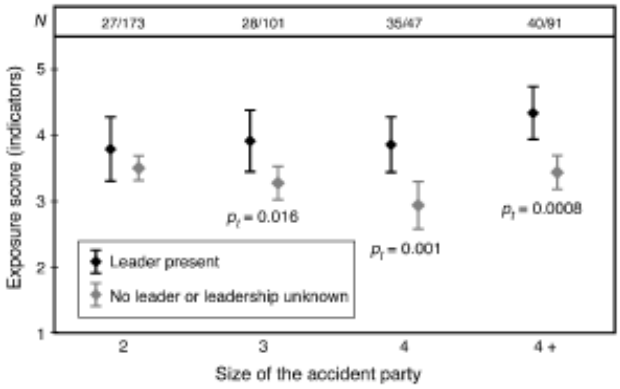

Figure 6. Variation of exposure scores by group size and leadership. Decisions by leaders in recreational accident parties appeared to get worse as group size increased, compared to the no leader condition.

This data suggests that the expert halo heuristic may have played a role in decisions leading up to avalanche accidents, particularly in large groups and in groups lead by individuals with little avalanche training. In general, it appears that groups were often better off utilizing a consensus decision process rather than relying on the decisions of a perceived "expert," particularly when that leader had poor avalanche skills. As they say, many heads are better than one. Leaders with avalanche training, however, did not make decisions that were significantly worse than those made by trained groups through a consensus process, a result that suggests that leadership by a well-trained individual will result, as we would expect, in more prudent behavior by the party in avalanche terrain.

Trap #5: Social Facilitation

Social facilitation is a decisional heuristic where the presence of other people enhances or attenuates risk-taking by a subject, depending on the subject's confidence in their risk taking skills.[7] In other words, when a person or group is confident in their skills, they will tend to take more risks using those skills when other people are present than they would when others are absent. In contrast, when a person or group isn't confident in their skills, they will tend to take less risk with those skills when other people are around. A practical example is the well-known tendency for the best moguls to form directly under ski lifts; good skiers actually ski better when they think other people are be watching.

To see if the social facilitation heuristic may have played a role in avalanche accidents, I compared exposure scores for parties that had met other people prior to the accident (211 cases) with exposure scores for parties that had not met anyone (97 cases). Overall, parties that had met others exposed themselves to significantly more hazard indicators than parties who had met no one. For accidents where the group size was known, the difference was marginally significant for parties of three people and parties of four people.

In accidents where the level of avalanche training was known, the difference in exposure scores was striking. As shown in Figure 7, groups with no formal training ("none" and "aware" categories) showed a marginally significant *decrease* in exposure score in the presence of others. But groups with formal training ("basic" and "advanced" categories) showed a significant *increase* in exposure scores in the presence of others. In other words, parties with no formal avalanche training took fewer risks after meeting other people than did similar groups after meeting no one. But parties with formal avalanche training took substantially more risks after meeting others. These results mirror the behavior of individuals who are utilizing the

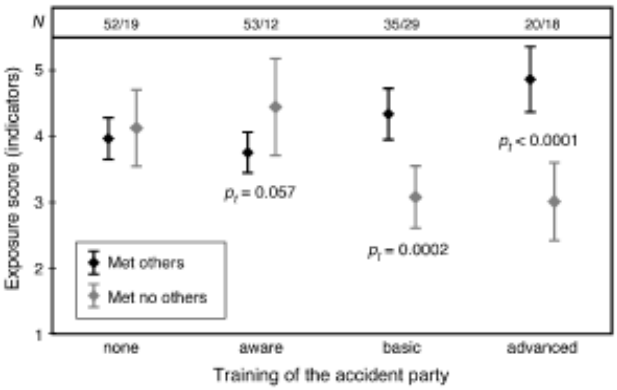

Figure 7. Exposure scores by training for accident parties that did and did not meet others prior to the accident. The bidirectional variation in mean scores is strong evidence of social facilitation effects.

social facilitation heuristic (Plantania and Moran, 2001), suggesting that it may have played a key role in certain avalanche accidents.

It is worth noting that areas where avalanche victims met others prior to the accident were probably popular, frequently-visited areas. Slopes in these areas would have received more traffic and may have been stabilized to some degree by heavy usage. Thus it seems that the social facilitation heuristic may have some basis in fact – areas where you are more likely to meet others may in fact be safer than areas where people rarely travel. But given the fact that a majority of accidents (at least 63%) occur in well-traveled areas, it is clear that such areas are not categorically safe. Like other heuristic traps, social facilitation appears to work often enough that it lulls its victims into feeling safe, even when the avalanche danger is obvious.

In the accident described in the introduction, Steve's well-trained group met another party before proceeding onto a slope that was normally heavily skied, but was now a newly-loaded avalanche path. Perhaps the presence of

the other party influenced their decision through the social facilitation trap, perhaps not. But the accident illustrates the hazards inherent in assuming that well-traveled areas with other people present are safe from avalanches.

Trap #6: Scarcity

The scarcity heuristic is the tendency to value resources or opportunities in proportion to the chance that you may lose them, especially to a competitor (Cialdini, 2001). Those familiar with the "powder fever" that descends on recreationists after a big winter storm have seen this heuristic in action, as individuals take seemingly disproportionate risks to be the first to access untracked snow.

To see if the scarcity heuristic may have played a role in avalanche accidents, I compared exposure scores of parties that had met other people prior to the accident when the slope they were headed for was already tracked (180 cases) to similar groups headed to untracked slopes (31 cases). Overall, parties that had met others and were headed to untracked slopes showed a significantly higher tendency to ignore obvious signs of hazard than parties headed to tracked slopes. The difference was most pronounced (marginally significant) among groups of 3–4 people. Importantly, there was no measurable difference in victims' behavior regarding tracks on the slope when accident parties met no one prior to the accident. This suggests that the presence of others may have played a key role in how avalanche victims perceived the stability of untracked slopes.

It is important to note that when scarcity cues were present, the posted avalanche hazard was, on average, significantly higher than when cues were absent. Thus, the scarcity heuristic works exactly contrary to personal safety; it becomes a more tempting decision-making trap as the avalanche hazard rises.

Sensitivity to Heuristic Traps

So far, we've looked at evidence that six heuristic traps may have contributed to decision errors in avalanche accidents. We've seen that the presence of cues for each trap correlates with different levels of hazard exposure depending on group size and training levels. Now, let's look at the possible cumulative effects[8] of such cues, and examine the preliminary evidence that some groups are more susceptible to heuristic traps than others.

Depending on the particular trap cue, the accident party size, and the level of training of the party, different cues appeared to elicit different hazard exposure behaviors in avalanche victims. The table portions of Figures 8 and 9 summarize the trap cues that appeared to affect each group at the 90% (marginally significant) and 95% (significant) levels. In many cases, trap cues correlated with an increased average hazard exposure by the accident party, a tendency which is denoted by a plus (+) symbol in the table entry. The single case of decreased average hazard exposure in the presence of a trap cue (social facilitation in groups with avalanche awareness but no formal training) is denoted by a minus (–) symbol in the table entry.

The degree to which mean exposure scores of the various group appear to have been cumulatively shifted by the presence of trap cues is shown in the graph portions of Figures 8 and 9. In Figure 8, we see that parties of one or two people appear to be relatively immune to the six heuristic traps, while parties of three or four people appear to be sensitive to expert halo and social facilitation traps. Larger parties (five or more people) appeared to be particularly susceptible to consistency and expert halo traps. It is interesting that larger groups seemed more prone to flawed decision making based on their goals or the choices of a leader, even when that leader had little training and made poor choices. There is safety in numbers in avalanche terrain, it seems, but only when a group has flexible goals and is lead by an experienced and

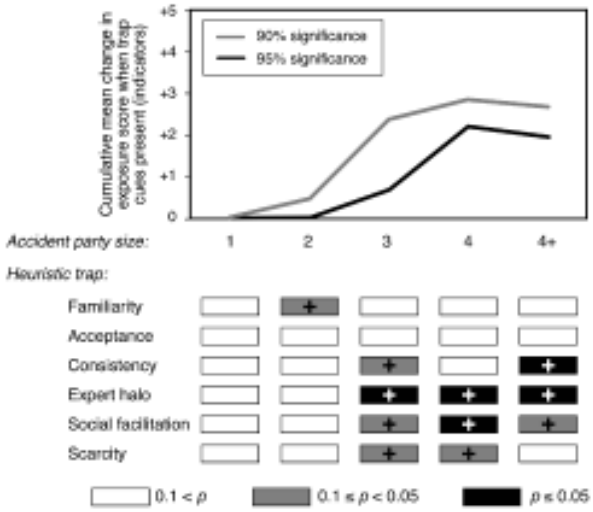

Figure 8. Cumulative mean changes in exposure scores for various group sizes when heuristic trap cues were present. The apparent influence of each trap varies, but overall sensitivity to traps appears to generally increase with group size.

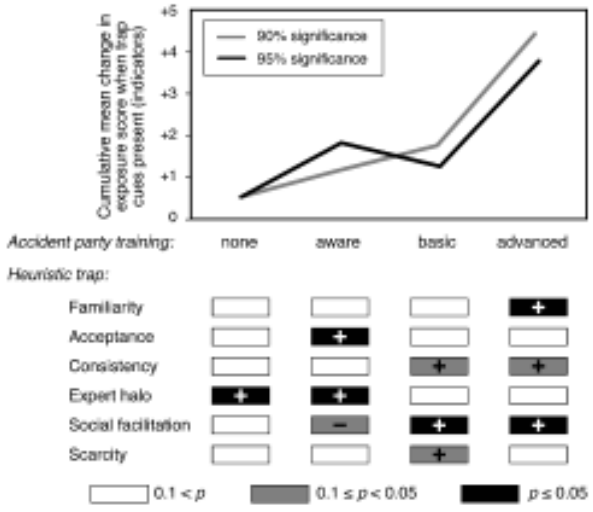

Figure 9. Cumulative mean changes in exposure scores for various training levels when heuristic trap cues were present. The graph suggests a learning process that moves from a flawed dependence on others to overconfidence in mitigation skills and local knowledge.

knowledgeable leader. We saw in Figure 2 that there is evidence of a risky shift among large parties involved in avalanche accidents. The results shown in Figure 8 suggest that sensitivity to heuristic traps may play an important role in that risky shift.

In Figure 9, we see how heuristic trap cues may have affected parties with different levels of avalanche training. Parties who had no training appeared to have little sensitivity to heuristic trap cues, save for their reliance on the "expert" member of their party. Such a low sensitivity to heuristic traps isn't surprising for these victims, since they had no hazard recognition or mitigation skills they could choose to use or not use based on their perception of avalanche conditions.

Parties with a simple awareness of the hazard but no formal training appeared sensitive to the expert halo trap and the gender acceptance trap when their parties contained women. It appears that these parties valued decisions by more experienced members and may have been concerned about impressing the female members of the party. These parties also showed a slight tendency to attenuate risk taking in the presence of others, perhaps because they lacked confidence in their mitigation skills.

Victims with basic avalanche training (the equivalent of a two-day recreational avalanche course) showed an overall decreased sensitivity to heuristic cues, but seemed to overestimate their ability to mitigate avalanche hazard in the presence of others (the social facilitation trap). It is interesting that sensitivity to heuristic traps appears to go down slightly with the advent of formal training – perhaps avalanche education has the effect of re-focusing people's attention on avalanche conditions rather than on social cues.

Victims with advanced avalanche training showed a disturbing tendency to place a lot of faith in the cues of familiarity and social facilitation. Of the six heuristic traps we have looked at, these two are the only ones where heuristic cues may in fact correlate with slightly safer avalanche conditions. What is most striking about this group is the degree to which they apparently relied on these two heuristics. In the presence of familiarity and social facilitation cues, these victims exposed their group to, on average, *three to four more obvious indicators than when these cues were absent*. This suggests that these cues may have represented informal rules of thumb for recreational victims with higher levels avalanche training, even in the face of evidence that the cues were grossly misleading[9].

"Victims with advanced avalanche training showed a disturbing tendency to place a lot of faith in the cues of familiarity and social facilitation."

The overall trend in the graph of Figure 9 implies a disquieting learning curve among avalanche victims. In the early stages of avalanche knowledge and experience, social cues seem to play an important role in determining when a slope is safe. As knowledge and experience grow, decisional heuristics appear to shift to the perceived safety of familiar terrain and overconfidence in one's abilities to mitigate or manage the avalanche hazard. If the 504 deaths represented in Figures 8 and 9 tell us anything, it is that the six heuristic cues have the power to lure almost anyone into thinking an avalanche slope is safe.

There also appears to be a cumulative effect of heuristic trap cues on exposure score. In other words, the more heuristic trap cues that were present prior to an accident, the more hazard exposure the victims appeared willing to accept. Table 3 shows the results of a Spearman tied-rank correlation between the number of heuristic cues[10] and the exposure score for different training levels. The strength of the correlation, or the degree to which heuristic cues appear to influence hazard exposure, grows with training, a result that is consistent with Figure 9. It is important to note that well-documented accidents tend to have more complete reporting of both exposure factors and trap cues, possibly contributing to the overall correlation effect. Nevertheless, the increasing correlation with training and the high significance of that correlation suggests that the relationship between the choices of avalanche victims and the presence of heuristic trap cues is more than a statistical artifact.

Training	*Spearman correlation*	*probability*	*N*
None	0.29	< 0.001	164
Aware	0.34	< 0.001	114
Basic	0.35	< 0.001	134
Adv	0.56	< 0.001	72
All	0.42	< 0.0001	715

Table 3. Correlations between the number of heuristic trap cues present in avalanche accidents and exposure scores of the parties involved. Correlations were highly significant, which is strong evidence for the influence of heuristic trap cues on decisions that lead to accidents.

At the start of this article, I described an avalanche that killed my friend Steve, and the puzzle that it presented: How could a skilled, intelligent person with every reason to live see obvious evidence that a slope was dangerous, and then act as if the slope was safe? For a possible answer, let's revisit the accident in light of the six heuristic traps we've examined.

Despite high avalanche hazard, Steve and his two friends had chosen a clear objective (a consistency cue) in familiar terrain (familiarity cue): a prominent pass that would lead to some low-angle powder skiing. Steve was viewed by his friends as being more knowledgeable about the route and avalanches in general (an expert halo cue). As their group of three neared the pass, they met another party (a social facilitation cue and perhaps a scarcity cue) and discussed the widespread avalanche hazard. Thus, at least four of the six heuristic trap cues were present when Steve's group finally evaluated their route across the slope that eventually avalanched: familiarity, consistency, the expert halo, social facilitation and possibly scarcity. In Figure 8, we see that parties of three appear to be particularly susceptible to four of these trap cues. In Figure 9, we see

that familiarity and social facilitation cues correlate with a dramatic increase in exposure score for trained groups such as Steve's. Sadly, the accident that took Steve's life does not appear all that unusual. We'll never know for sure, but because the group was surrounded by obvious signs of danger on a high hazard day, it seems very likely that Steve's real killer wasn't the avalanche that swept down on him and his friends, but the compelling heuristic traps that deceived him into thinking that the slope was safe.

Implications for Avalanche Education

Despite the preliminary nature of this study's findings, there are a number of implications for avalanche education that are worth considering:

It appears that formal avalanche education did not make victims in this study less likely to be in accidents. Across all levels of avalanche training, overall exposure scores remained about the same, suggesting that these individuals were in the business of trading off the risks of being in avalanche terrain with the perceived benefits of engaging in their chosen activity. In other words, these victims were apparently using their training to access avalanche terrain during dangerous conditions so they could more fully enjoy their sports. For these people, courses aimed at avoiding avalanche hazard would have little utility, and would probably not affect fatality rates in this population significantly. This group would benefit most from courses that provided risk management tools for balancing hazard exposure with recreational objectives. A sobering implication is that such courses might be more successful at extending students' mobility in avalanche terrain than at reducing the total number of accidents.

Formal avalanche training did not appear to equip these victims with effective tools for decision making. If these victims had used the knowledge-based decision strategies that are commonly taught in avalanche courses, we would expect very few accidents under such obvious conditions. Instead, we find that even well-trained victims appeared to ignore easily-recognized signs of avalanche hazard. Thus it appears that they were either unwilling or unable to apply what they had learned. Of course, these victims represent a very special group of people—those that were caught in avalanches—and so they may be uniquely prone to poor decisions. But if they were instead typical of many recreationists, their susceptibility to heuristic traps suggests a re-evaluation of how courses prepare students for making decisions in avalanche terrain.

Heuristic traps are attractive because they are fast and convenient for novices. Knowledge-based decision strategies generally are not. The heuristics explored in this article are fast, convenient and most of the time don't result in accidents (i.e. most of the time people don't trigger avalanches). In contrast, knowledge-based decision tools are often slow, tedious and can yield ambiguous results. Given a choice, most of the avalanche victims in this study apparently opted for the quick decision tool, even though it was not universally correct. Thus the challenge for educators is to offer practical alternatives to heuristic traps.

Teaching about human factors alone probably won't significantly reduce avalanche accidents. If trained victims were ignoring such obvious clues as recent avalanching and terrain traps, adding more information to the avalanche curriculum about human psychology is unlikely to change behavior. The problem was not that these victims didn't have enough knowledge to make good decisions; the problem was that they didn't know how to apply the knowledge that they did have.

If the goal of avalanche education is to reduce avalanche deaths, then the challenge to the avalanche educator goes beyond simply imparting information. The challenge is to encode knowledge into simple, easily-applied decision tools that can compete with the heuristic traps described here. Luckily, such tools don't need to be perfect to save lives. They just need to be more accurate than the social cues that most avalanche victims apparently rely on.

Acknowledgements

I'd like to thank Dale Atkins and Knox Williams for granting access to the records of the Colorado Avalanche Information Center. Dale Atkins, Don Sharaf and Allen O'Bannon provided valuable insights during many late-night discussions. And thanks to everybody who bought a copy of the *Snow and Avalanche Field Notebook* by SnowPit Technologies: you helped support this research.

Endnotes

[1] Despite some bad press in the early days of decision science, heuristic reasoning has emerged as the most likely theory explaining our ability to make good decisions when we lack time or expertise. Gigerenzer et al (1999) and Chaiken and Trope (1999) give excellent reviews of modern research in heuristics.

[2] Because they take place mostly at an unconscious level, the six heuristics traps studied here form the basis of many advertising messages and induced-compliance processes. They have their roots in well-known principles of social and experimental psychology. Aronson (1999), Pratkanis and Aronson (2000) and Cialdini (2001) provide in-depth, if somewhat disturbing, overviews of these principles.

[3] In this article, significant differences are defined as having a 5% or less chance of being due to random variability in the data. Marginally significant differences are defined as having a 10% or less chance of being due to random variation.

[4] This heuristic is closely related to the well-known "availability heuristic" originally identified by Amos Tversky and Daniel Kahneman (1974). This heuristic creates a tendency to base our decisions on information that is most easily recalled.

[5] The commitment heuristic seems to be a product of at least two psychological principles. The first is cognitive dissonance, which embodies our desire to be and appear consistent with our words, beliefs, attitudes and deeds. The second is cognitive conservatism, which is our tendency to preserve our preexisting knowledge, beliefs and hypotheses. See Plous (1993), Aronson (1999) or Hastie and Dawes (2001) for detailed discussions of these principles.

[6] The Kruskal-Wallis or *H*-test showed no significant difference in hazard ratings between these groups.

[7] The social facilitation heuristic appears to require only that other people be present or be nearby. Whether or not the present others are perceived to have better or worse skills or whether they are in a judging capacity does not appear to affect this heuristic. See Plantania and Moran (2001), or Zajonc and others, (1970) for discussions.

[8] This section discusses heuristics traps as if they are independent factors, unless noted in the text. It is quite possible that heuristic traps have combined effects on exposure score that are greater or less than the sum of the effects of each trap. In this case, a six-way (or twelve-way, to account for negative states) factorial analysis of variance would reveal combined effects among the 63 (or 4095) possible combinations. Such analysis was beyond the scope of the rather modest statistical methods used in this study.

[9] Sensitivity to these heuristics appears to be linearly independent for victims with advanced avalanche training. A crosswise comparison of exposure scores showed no significant differences in the contribution of either heuristic trap to the overall change in mean exposure score.

[10] The number of heuristic cues was summarized as a FACETS score, where the acronym represents each of the heuristic traps (the "T" stands for tracks, as in first; another name for scarcity). The acronym is a useful test for recognizing heuristic traps in the field, and is a valuable teaching metaphor that illustrates how faulty assumptions can dangerously undermine even the deepest knowledge and experience.

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The CAA's Oral History Project

BY CHRISTINE EVERTS

Editor's Note: *In the spring of 2003, the CAA Board of Directors decided to use money from the Art Twomey Memorial Fund to finance the creation of an oral history of the CAA. Key avalanche pioneers were selected to share their memories and insights into the growth of the avalanche industry. A steering committee, comprised of Margie Jamieson, Simon Walker and Gord Burns, helped determine the terms of reference and the individuals to interview for the project. Christine Everts was contracted to do the interviewing and write the history, while Susan Hairsine volunteered to provide overall project management and report collation and distribution.*

In the last issue of Avalanche News*, we published the project's introduction and a biographical summary of the participants. The theme of this issue is education, so we have decided to reprint the chapter which deals with the early days of backcountry skiing – exploring both the growth of its popularity and the public's increasing awareness of its risks. Hope you enjoy reading* "The Widespread Development of Recreational Pursuits".

The Widespread Development of Recreational Pursuits

"When I came to America that was the first time somebody asked me, 'Why do you climb a mountain?' That question never came up before. I didn't have an answer for that one you know… Why would somebody run around in a circle and end up at the same place where he started…"[1]

While the building of the CPR publicized the cost and danger associated with avalanches, it also gave the government the opportunity to capitalize on Canada's recreational tourism potential. To help finance the building of the railway, resorts were built along the route. Although many early visitors sought the "luxury in the wilderness" as advertised by the CPR, the more adventurous tourists came to the mountains to climb unconquered and pristine peaks.[2] Following the first major climbing accident, on Mount Lefroy in 1896, Swiss Guides were hired by the CPR to take guests safely up the Canadian Rocky Mountains. In 1899, Edward Feuz and Christian Hasler were hired as the official guides for Glacier House. After the summer season, most guides remained in Canada to spend their winters maintaining the CPR's newly built lodges and chalets. These early guides, all of whom used skis, were the first to go out into the mountains on a year round basis.

Jim Sime, retired Warden Operations Manager for the Western Region, spent time with the Swiss Guides as a young boy in Golden, BC "The Swiss Guides of course shoveled off the CPR buildings, Moraine Lake, Lake Louise, Lake O'Hara, Wapta, Yoho and Emerald Lake. In so doing, they travelled through avalanche country during the winter months. They also used skis. For the most part the wardens of the day used snowshoes… I transferred from Kootenay to Yoho in the spring of 1947…and soon after that, I went up the Yoho valley. The first thing I got was a big lecture from Edward Feuz. At the time, he was the mentor of the Swiss Guides. Edward was Chief Fact Totem and Rudolph Aemmer was second in command. They had a very structured group. Edward wanted to know if I was familiar with where I was going. You must remember that in those days people did not travel in the mountain valleys. The trappers did, but nobody else traveled in these mountain valleys during the winter months. That is in the recreational sense… Of course you had the Temple/Skoki kind of a thing and you also had Assiniboine. But apart from that people did not travel in what was called exposed avalanche country. That is the general public. There were the wardens who traveled on snowshoes and the trappers, occasionally. These people, for the most part, had to learn the hard way through observation what to do and what not to do…"[3]

Although the Swiss Guides knew what to do, even they had the occasional avalanche encounter. "In a fun way, I am going to tell you a little incident. You won't know today, but up the Yoho there used to be a CPR lodge. They had little cabins there and there was the big main lodge…anyway the guides used to stay in the cabins [when they were shoveling snow off the roofs]…I used to go up and help them shovel and do things, also making patrol and all the rest of it. And here an avalanche had come down and picked up one of these cabins with them in it…the avalanche had come down and just sort of lifted it, carted it along on top, and here it was way down by the road! Well, when I arrived, of course this is embarrassing for Edward…but nobody got hurt. The next spring Slim Rush, the CPR maintenance foreman pulled the shack back up to where it was."[4]

In 1899, an avalanche in central Switzerland killed two prominent alpinists who had been participating in the recently introduced sport of skiing.[5] Thirty-four years later, in 1933, the first recreation related avalanche fatality occurred in Canada. Skiing in the Canadian Rockies developed with the formation of the Norquay Ski Club in 1927 and the establishment of Mount Assiniboine, Skoki and Sunshine ski lodges during the 1930s. Along with brothers Chris and Joe Daem, who were killed in an avalanche near Duschenay Pass, BC in 1933, English mathematician Raymond "Kit" Paley died in a highly publicized avalanche at Skoki.[6]

Despite the growing popularity of skiing in Canada during the pre-war era, avalanche safety was not seriously undertaken until after the war when there was a steady increase in the number of visitors to the mountains. In the post-war period, the year-round use of national parks was explored and alpine ski areas expanded on a commercial basis. In their search for a "wilderness experience," the growing middle class began to pursue a variety of recreational activities, including alpine skiing.[7]

In 1951, Banff's first ski patrol was established under the direction of Chief Warden Frank Byrant. The cost was split between the federal government and the Banff Chairlift Corporation. The ski hills were said to welcome the wardens' presence due to the expert first aid they provided and their peace officer status, which allowed them to supervise areas off the main slopes.[8] While their presence

was appreciated, a fatality in Jasper National Park highlighted the need to provide wardens with avalanche training. The 1955, death of skier Charlie Dupre in Marmot Basin focused attention on the lack of avalanche control and forecasting programs. His death also illustrated the need to provide staff with training in avalanche rescue techniques.[9]

Tim Auger, Public Safety Specialist for Banff National Park noted that, "As the ski hills evolved, of course people were always hurting themselves. And since there were wardens around, some of them turned into an early ski patrol. The government eventually decided that they should probably formalize this and they created a patrol that included one or two wardens and some others that they hired because they were experienced skiers who knew what they were doing. The best example that I can think of is John Wackerle. He was from the mountains in southern Germany and he likely grew up on skis. They hired him at Norquay, and that was probably how he first started working for the wardens."[10]

Toni Klettl spoke of the wardens early involvement at Marmot Basin. "We (the wardens) were there from number one… I came to Jasper in 1952. The only way you could get up there (to Marmot) was with the bombardier. The ski area opened up, and at that time, the park was involved in everything. We did the avalanche control, we did the packing, the maintenance of the slope and the maintenance of the road…"[11] The wardens were also in charge of closing areas where the avalanche hazard was deemed high. "At Marmot, it was the same as in Banff, certain areas were closed. At Marmot, Eagle Ridge East was closed and so was the Dupre Bowl. But at that time the numbers didn't warrant the system because the number of skiers weren't there. They pretty well stuck to the back slope but things started improving… After a certain number of years Eagle Ridge East was opened up and the Dupre Bowl was opened up. We were able to stabilize it and ski it. It became part of the ski area."[12]

In 1955, the possibility of developing a ski area at Lake Louise was also being explored. Jim Sime recalled, "Walter came in 1955 and I know it was shortly after that that he and I went out and looked at Lake Louise from the point of view of setting up the ski hill. There was nothing there. The lift did not exist."[13] With the building of the Calgary International Airport in the 1960s and the arrival of commercial jet liners, there was an increase in international tourism, and alpine skiing became big business.[14]

As alpine ski areas became more profitable, they also became more accountable. Peter Schaerer credits ski areas inside the mountain parks with developing avalanche control. "Of course the ski areas always had avalanche problems. The industry avalanche control started with ski areas in national parks. Skiers were killed in avalanches at Banff and Lake Louise. Then other ski areas followed…"[15] Willi Pfisterer spoke of a later development on the west coast that had an important consequence for ski areas throughout the mountains. "At Whistler they had four fatalities... The accident happened outside the ski area… At the time, the boundaries were not established. So they had a court case up there and afterwards they established the boundaries. In all the ski areas they did that, you know. They established the boundaries, where it is controlled and where it is not controlled."[16] Prior to the establishment of boundaries, signs were put up warning skiers of avalanche areas. "There were signs Avalanche Area. Happy New Year!"[17]

While alpine skiing was becoming big business, the opportunity for adventure and exploration in pristine wilderness on backcountry skis had yet to be "discovered." When asked how has recreational activity in the backcountry changed over the years, all participants in the project noted the significant difference in the number of people going out into the backcountry. According to Hans Gmoser, "When I first came there were virtually none in the winter! Whereas now, especially in the popular places like Rogers Pass, it looks almost like Europe… When I was ski touring at Rogers Pass in the mid-1950s, there was no Trans-Canada Highway so we had to go there by train. There was nobody except us. We had the whole place to ourselves. Then when the highway opened in 1962, a few people would come in..."

In addition to the few skiers who took the train to Rogers Pass prior to the completion of the highway, members of the Glacier Ski Club skied in the area. "Oh ya, the Glacier Ski Club! Glacier was the railway station on the west side of the pass. Most club members were railway maintenance employees who lived there. We called it a ski club but it was more a social club. The club met once per week in one of the residences and played games. However, we built a rope tow close to the railway station. It happened to be at an avalanche path. The tow was at the side of the avalanche path, but of course one skied in the open path. The Park Superintendent didn't like it so we had to move the whole equipment to another area. We just cut brush and built another rope tow close to the present summit."[18] In 1960, with the opening of the partially completed highway, the club disbanded.[19]

Schaerer also remembered Gmoser coming to ski in Rogers Pass. "Hans Gmoser came with a group for a week every spring. They stayed in the Alpine Club hut. We were almost the only people who did backcountry skiing in the winter and we pioneered routes and climbs. Skiers came in the spring, and on the Victoria Day weekend the Alpine Club hut was busy. The only access was by railway before the highway was built. Then as soon as the highway was available, more backcountry skiers came. But there were many restrictions on the terrain because areas near the highway were closed to skiing due to the artillery fire for avalanche control."[20]

Pfisterer, who spent three seasons as a Snow Observer at Rogers Pass, also referred to the restrictions and explained the popularization of backcountry skiing. "What happened was there were a lot of people, you can call them the hippy type. They resented this ski hill business where they had all that expensive equipment and the tickets and all that. They wanted to go out and do something else. It so happened that all of a sudden the cross-country skis came… So then they thought this equipment is lighter. It costs less…One time we were at the top of Mount Columbia when two guys hoofed across the whole Columbia Icefield dressed like they were going fishing, a little rucksack and their lunch, with them little skis on. The weather held and they had our track to follow, so they were in and out in a day. Then we were climbing along with our heavy equipment, but soon they would have accidents. The winter snow

got heavy and they fell in crevasses and stuff like this… Then the equipment got a little stiffer and they invented the telemark skis and that was the type of skis my grandfather used, you know. So it came right around. It didn't take very long. The hair got shorter on those guys and the boots got higher…"[21]

An operation with few restrictions that combined adventure, pristine wilderness and the benefits of alpine skiing developed as interest in backcountry skiing increased. In 1965, Gmoser began his CMH heli-ski business at an abandoned lumber camp in the Bugaboos. As alpine and backcountry skiing focused attention on the need for avalanche safety, so did the development of the heli-skiing industry. "Where it really began to gather momentum was with the start of heli-skiing, because that was first time that people got into that type of terrain. By the time we started heli-skiing, I had been ski touring here for 12 years. I was out every day in the winter in the mountains, but when conditions were tricky all you had to do was find one run a day that you thought would be safe, and in almost any conditions you could do that. But with heli-skiing you suddenly had to pull five, six…10 runs out of the bag. Then we suddenly realized we don't know a hell of a lot about snow! We thought we knew something about snow. We were digging snow pits. We were probing with the ram penetrometer and things like that, jumping into slopes and testing them…but God there were so many surprises!"[22]

> *We thought we knew something about snow. We were digging snow pits. We were probing …but God there were so many surprises!"*
> *Hans Gmoser*

Such surprises led to an increased awareness of avalanche safety, not just for the heli-ski industry but also for all those involved in the backcountry. Pfisterer served as a Crown witness for the first major avalanche accident in the industry. "There were two guys…who knocked an avalanche off, and there were three groups underneath. Thirty-two people were caught in that avalanche. Only one was killed, one lost an eye, and I think Kiwi (Lloyd Gallagher) broke an arm. Anyway, I was the Crown witness for this thing here. My worry was more, 'Are they chasing each other for the snow?' That's no situation to have at all you know. My recommendation at the inquest was to say those operators should have a lease of occupation for a given area. Give them an area and then they can operate out of there without chasing each other. They took that and that's how it ended up and that's how they still operate. I didn't think that far ahead but they could chart their area out, landing set up, the avalanche slopes they had to cross… all that was charted out and the weather stations were put in place. Boy, they are highly sophisticated now. Plus after so many years most of those guys got that gut feeling now..."[23]

While guides with experience may have developed instinctive feelings regarding avalanches, the average backcountry user still has a lot to learn. The 1970s saw a rapid increase in the number of avalanche fatalities due to an increase in backcountry winter travel. During the period 1959-1974, 33 people were killed in the pursuit of recreational activities. In the following 15 years, the number had tripled to 97.[24] According to Herb Bleuer, "There has been a tremendous increase in backcountry use, especially commercial outfits all over the province (BC). That it is a bit of a problem too. There are no laws forcing commercial outfitters to be at a certain standard. They are taking a First Aid course, well that's going to help a lot if an avalanche occurs… It is still a bit of a kindergarten compared with other parts of the world where the paying publics rights are a little bit better looked after..."[25]

When asked what they feel are some of the major issues facing the avalanche industry today, a number of participants responded that it is backcountry use, specifically in regard to snowmobilers. The increase in backcountry snowmobiling and the improvement of related technology has resulted in a growing number of snowmobiling fatalities.[26] Klettl explained, "The skidoos can go anywhere in a few minutes. Machines like that can go up 40-45 degree slopes. It's unbelievable, and most of them don't have a clue. Within 15 minutes they are miles away."[27] Schaerer also mentioned snowmobiling trends, as well as the success of avalanche education programs. "Then came the snowmobilers or sledders. They had no idea and thought the machine can do anything. But they are learning now and are changing their attitude…"[28]

Pfisterer referred to a major snowmobiling accident and the subsequent development of education programs. "Right here [in Valemount, BC] we had an accident with the snowmobiles. There were four killed. Again I was a witness. What happened was they ate their lunch in the middle of an avalanche slope and it came down. So my recommendation was that on the approach road they should mark the avalanche paths so the people know not to stop there. Definitely they should designate an area where they can stop and eat their lunch in a safe place… People from the flat lands, they don't know where an avalanche comes down. The next thing, naturally, would be an educational program, what equipment they should have, etc."[29]

While avalanche related accidents increased with the number of people going into the backcountry, Schaerer made this important point: "There are always some experienced skiers, snowboarders and sledders who are knowledgeable and careful and know what to do. And there are also the other ones who see only the snow and the equipment. They will learn over the years as well. Then when they have learned, there are more young ones who will come and go into mountains without much knowledge. This is the case, probably everywhere, in every country with mountains."[30]

Ron Perla, author of the third *Avalanche Handbook*, commented with regard to accident trends, "I understand that there are just as many avalanches, if not more, than the number of people going into the backcountry. So it is true. There are probably more accidents, more fatalities but the numbers [of people going into the backcountry] are so much greater. I don't know the balance, whether we are actually running ahead, I suspect that we are… There are far more people than number of accidents, so we are actually getting ahead [in terms of] public education with the warning centres."[31]

Pfisterer also emphasized the effectiveness of public education and stressed that the priority should be on prevention. "I have taught safety almost of my life and as far as I'm concerned, 85-95 per cent has to go into prevention… Prevention, again, is one of those things there is not much glory in. I mean you can't prove how many people you saved by telling them this and that and giving them lectures…"[32]

"Prevention…is one of those things there is not much glory in. I mean you can't prove how many people you saved by telling them this and that and giving them lectures…" Willi Pfisterer

According to Gord Ritchie, a recipient of the CAA's Glacier Summit Award for Public Education, prevention through public education began with Brad Geisler of the Canadian Ski Patrol. In 1955, Geisler, a member the U.S. Army's 10th Mountain Division, came to Canada. Shortly after his arrival, he joined the Canadian Ski Patrol System and teamed up with Russ Bradley, a local ski mountaineer, to begin writing and teaching public avalanche education programs.[33] "If we look at the history of public education and teaching awareness courses to ski tourers and recreationalists…Brad Geisler started those kinds of courses in the 1950s and 1960s. There was quite a history of teaching avalanche courses to the public. In fact it was the Volunteer Ski Patrol who taught those courses. It was the sole provider of public education courses in those early days…the ski patrol would go and give avalanche courses to members of the Alpine Club and other outdoor clubs in Calgary, Canmore, Banff and so on."[34]

Schaerer also recalled early public education efforts. "The Canadian Ski Patrol System at Calgary organized avalanche awareness courses and, in cooperation with Banff National Park, issued avalanche warnings. At the West Coast, the Federation of Mountain Clubs of British Columbia gave several avalanche awareness courses every year, but bulletins were not issued."[35]
In a 1969 Conference on Snow and Ice at the University of Calgary, Geisler proposed the establishment of an Avalanche Information and Research Centre, which would serve as the headquarters for research and up to date information. He suggested that the center be supported by the National Research Council and interested universities. In addition to advising ski instructors, mountain guides, and patrollers on how to establish standards and set up snow craft programs, he reinforced the importance of offering avalanche safety programs for the public. Geisler warned that, "Western Canada is the country of mountains and snow, and its mountains are being utilized more and more every year. Unless we put our knowledge to use, the number of preventable accidents is bound to increase…"[36]

Parks Canada and other agencies affected by avalanches put their knowledge to use in the 1960s by publishing booklets for backcountry users such as the *Do's and Don'ts of Winter Travel*, in addition to giving lectures to various groups on mountain and avalanche safety. Over the years Pfisterer gave numerous lectures. "There was the annual convention of the BC Physical Education teachers and I was their guest speaker. One time I was at the Fairmont Hot Springs and there was the annual convention of the BC Coroners. I got all those old fuddy duddies. It was really good because those guys had to make all those decisions and they had no idea why those guys went climbing or skiing in the first place. It went over really well. It went on and on like this…I always feel that one of my biggest successes was in Jasper. Once a winter I would give a lecture and I would watch when the people came in. There were kids from the elementary school by themselves, not with their parents. Then the kids from the high school, and the front bench was loaded with the ladies from the old people's home. Then the businessmen and the tourists…came. I always thought that was my greatest success. I always filled the room."[37]

Geoff Freer also spoke of early prevention efforts. "Back in the 1970s, Peter Schaerer, Paul Anhorn and myself would occasionally do weekend courses for snowmobile groups. We would do weekend courses at ski hills or if there were any locals who wanted to have a weekend course, we would also do those. I would say the same of the Parks… Parks had their own internal training courses, but I think that a lot of park wardens, if they were requested by local groups, would do training sessions. I know Willi used to go and give talks in Edmonton and Calgary and do weekend courses and things like that. I think that we all, Peter, Paul, Willi, (Peter) Furhmann, Chris Stethem and myself, all that early group, we would do a lot of those one-day, two-day courses and evening talks at the local ski hill. That was really it. In terms of the general public education, I don't think that there was a heck of a lot, except when there was an accident."[38]

Accidents and the subsequent need for information and public education resulted in the 1975 establishment of an Avalanche Committee composed of Schaerer, Freer and Perla.[39] The formation of the committee represented the first step towards establishing the Avalanche Centre that Geisler proposed in 1969. By 1980, the Avalanche Committee decided to form an association. In May 1981, the CAA was established and a steering committee was elected representing organizations with an interest in avalanche safety. The organizations included the national and provincial parks, highways, ski areas, mountain guides, helicopter skiing, and the research and consulting business.[4]

When asked what led to the formation of the CAA, Freer responded, "I think probably the need for an independent body to represent the field and move a bit away from individual organizations. Like Parks Canada had their own kind of approach, the Ministry of Transportation had their own approach, the National Research Council had their own approach, although the Ministry of Transportation's approach was basically the National Research Council's approach because Peter and Paul and I worked so closely together. Some people, and some organizations, needed an independent group. In other words, Parks might not be able to do something from a political perspective, but if an independent organization like the Canadian Avalanche Association said, 'These are the standards for Canada,' then that put more pressure on Parks, the Ministry, and the guiding companies to abide by those. I think that was really the other piece, having a unified voice for the industry to work with the federal government, provincial government and others. Also it got to the point that we (staff from Parks Canada, Ministry of Transportation, and the National Research Council)

were doing so many courses and training sessions that we really needed somebody to start taking it over..."[4]

Since its inception, the CAA has focused on promoting avalanche safety by providing information to the public through public safety services, training schools and an industry information exchange™.[42] According to Sime, it is up to backcountry users to educate themselves so that they can make safe decisions when going into avalanche country. "It can be learned. It is not something that is so impossible. But you can never be 100 per cent sure. The mountains don't care, its constantly, constantly changing. For the people who travel in the backcountry, you can't sign every place, so the individual has to learn and know. It is not proper to use the word safe because there is no such thing in my vocabulary in relation to this type of life. But you can certainly minimize the situation and give yourself the best opportunity to have a long and happy life."[43]

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Christine Everts, author of the CAA's Oral History Project, was born in Banff and grew up in the mountains. She graduated from Simon Fraser University with a Bachelor of Arts in History and Anthropology and recently completed a Bachelor of Education at the University of Ottawa. In the fall she will begin teaching a Grade 2/3 class at the Chief Jacob Bearspaw Memorial School in Eden Valley, Alta. She valued the opportunity to learn from friends, mentors and co-workers about an industry loved by her dad, Keith Everts (1942-1999), former National research Council of Canada employee and Banff Park warden.

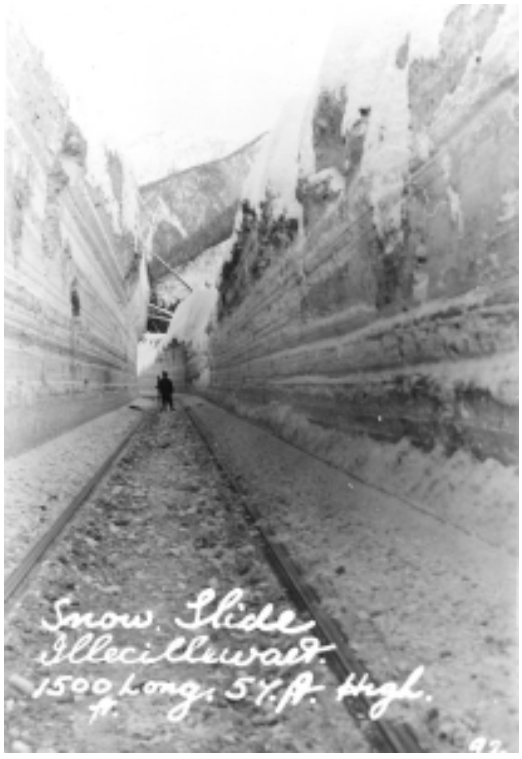
Avalanche!

BY DAVE JONES, CPR Manager of Internal Communications

Despite the essential contribution railways make to the overall health of the North American transportation network, the twin bands of steel often appear to have no more than a tenuous foothold in the vast sea of mountains they traverse — and never is that more true than when heavy snowfalls, winter conditions and bad luck conspire to humble even the most prepared railroaders.

Even as the CPR transcontinental main line was being constructed westward toward the Rocky and Selkirk mountain ranges, in the early 1880s, railway surveyors were awed by the raw power of the avalanches they observed in the direct path of the advancing rails. Major A. B. Rogers, of Rogers Pass fame, had reported the prevalence of spring avalanches to head office while conducting his initial assessment of the route through the mountains. And, in February 1885, just nine months before the completion of the historic east-west link, James Ross, engineer-in-charge, wrote to general manager William Van Horne about his serious misgivings.

"The great trouble we are labouring under at the present is that the men are frightened," Ross related. "Seven have already been buried in slides, though fortunately only two were killed. I find the snow slides in the Selkirks are much more serious than I anticipated, and I think quite beyond your ideas of their magnitude and the danger to the line."



If there were any doubts as to the disruptive potential of the millions of tons of ice and snow that could at a moment's notice tumble down a mountain side at more than 100 miles per hour, sweeping aside anything in their path, they were dispelled during the winter of 1885-86. That year, with the transcontinental line completed but unprotected from the vagaries of winter, the railway was temporarily abandoned. Observation camps, established to record the mount of snowfall and the frequency of avalanche occurrences, determined where snowsheds would be built and snowfighting equipment would be stationed to support winter operations. With annual snowfalls in excess of 50 feet in some areas, and nearly as much occasionally dumped on the main line in a single slide, it was not a pretty picture.

The worst incident occurred in the winter of 1910 as CPR workers worked to clear a slide that had tumbled down from Mt. Cheops at the west end of Rogers Pass. While they struggled to reopen the line – largely with hand shovels — an even worst deluge of snow roared down one of the long sweeping slide paths on the aptly-named Mt. Avalanche, towering on the opposite side of the narrow passage. Sixty-two men were killed. A 100-ton rotary snowplow, of limited use clearing the first slide due to the amount of broken trees and other debris that came to rest on the roadbed, now lay on its side. Hundreds of feet of snowshed had been demolished.

It was the final straw that led to the CPR's decision to build the double-track Connaught Tunnel under Mount Macdonald, thereby avoiding the most dangerous section of the pass. The five-mile (eight-km) bore was one of the most spectacular engineering feats in North America, until the 1980s, when the nine-mile (14.5-km) Mount Macdonald Tunnel was driven beneath the same treacherous peaks, just below the Connaught Tunnel.

The Macdonald Tunnel now handles heavier CPR westbound trains, while the Connaught takes eastbound traffic. The twin bores, along with the addition of hundreds of feet of reinforced concrete snowshed, have gone a long way toward making the route through the Selkirks more tenable in winter; but CPR railroaders can never let their guards down.

Avalanches have killed hundreds of railroaders over the years; they have knocked bridges from their abutments; they have closed the CPR main line for days and weeks at a time. At the same time, though, many strategies have been put in place to mitigate the effects of the giant, killer snow slides, prevent the tragic loss of workers and keep traffic moving on what continues to be an essential economic lifeline.

In partnership with provincial governments, National Parks and the men and women who labour to keep the Trans-Canada Highway open through the winter months, CPR now has access to continuous weather monitoring services, detailed snowpack observations and sophisticated sensors high about the tree line where avalanches occur. The Canadian Armed Forces fire howitzer artillery guns, under the guidance of skilled avalanche observers, to trigger slides under controlled conditions. And the railways track forces wait to clear whatever winter might throw at them – and spread it away from the roadbed to make way for the next onslaught.

In addition, CPR is proud to partner with the Canadian Avalanche Association to increase awareness and avoid the deadly consequences of one of nature's most destructive forces.

Today in the mountain passes, during the warmer months, you can see the heavy, black plows and spreaders sitting idly in the hot summer sun, like old workhorses put out to pasture. But when the snow starts to fly, they venture out from their yards in Revelstoke, Golden and Cranbrook to patrol up and down the line, fighting the fight that ebbs and flows but never ends and – when Old Man Winter does his worst – still clearing the tons of snow and ice that annually cascade down the mountains in avalanches.

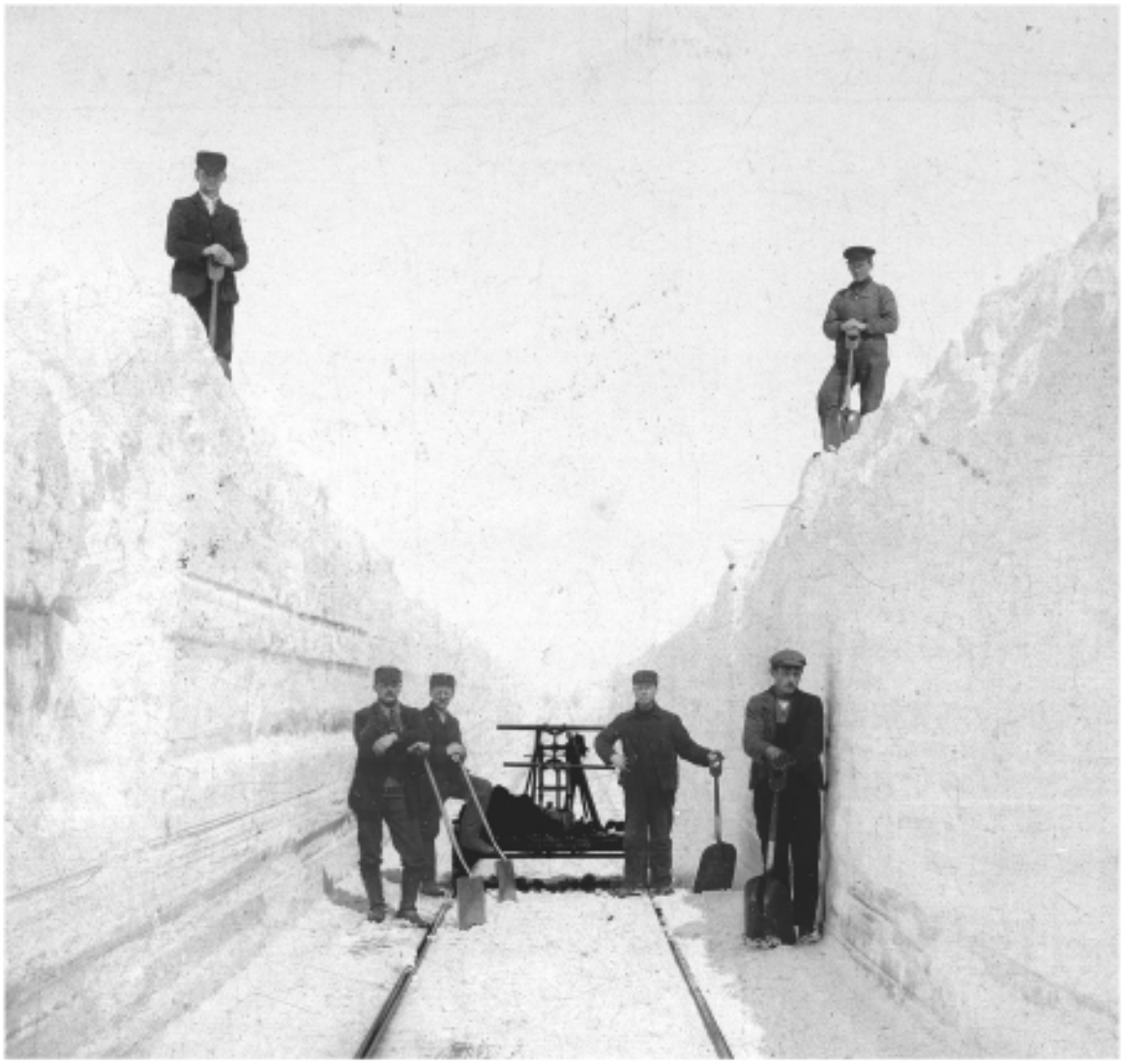


Photo: Canadian Pacific Railway Archives

Making tracks in the backcountry since 1884.

Since coming to Western Canada over 100 years ago, Canadian Pacific Railway has been a pioneer of backcountry exploration and safety. By finding the first route through Rogers Pass and opening the West. By building Mount Macdonald Tunnel, the longest railway tunnel in the western hemisphere, to avoid the avalanches and dangers of the Pass. By hiring Swiss guides to help ensure tourists stayed safe while mountaineering and exploring the backcountry. That tradition continues today through CPR's partnership with the Canadian Avalanche Association to make the backcountry a safer place for people to work and play.

To find out how you can support the Canadian Avalanche Association, please call **1-250-837-2435.**

www.cpr.ca

CANADIAN PACIFIC RAILWAY
Ingenuity.

CIL/ORION Brings Avalanche Guard to Canada

BY EVERETT CLAUSEN, Marketing Dept., CIL/Orion

In the five years since dedicating our company to the business of Avalanche Control High Explosives, the introduction of the Avalanche Guard, Pipe and Master to Canada is a major highlight for us.

The Avalanche Guard was developed in Austria by ski-hill equipment giant Doppelmayr and is the current state of the art in avalanche initiation. The Avalanche Guard unit is a robust, stainless steel magazine structure atop a reinforced steel post, well anchored to its base environment. The steel doors, the vault-type securing lugs, the electric-door opening motor and the propelling control electronics are all driven and energized constantly by large, efficient solar panels.

The stainless steel enclosure houses 10 mortar tubes, each capable of holding a six-pound (2.7 kg) Integral Cast Booster (ICB) which is projected by a propelling charge. There are 14 different charge weights to choose from to determine the booster's travel distance and trajectory. The selection and firing is made via a radio frequency controller in the form of a PC computer unit and secure program. This control operation can be metres to kilometres away from the actual Avalanche Guard site.

The steel structure and its vault-style lug locks substantially exceed magazine standards. As a result, the Explosives Regulatory Division has decided a single magazine licence is all that's required for each unit installed. These licenses are available from your local Explosives Division Regional Inspector.

The Avalanche Master unit is basically the Avalanche Guard on an angled steel post to allow for initiation of the ICB right at the unit, which allows the user to address very specific situations. The Avalanche Pipe is a single-mortar moveable unit which fires the same ICB but can be transported around the property and used whenever circumstances dictate the need.

For the upcoming season, CIL/Orion has made real advances in the Explosives Propelling Systems used in the Avalanche Guard, making it a breeze to replenish and use. Our latest research developments ensure the ICB comes ready for instant use. The ICB unit is about 18" (46 cm) long and 3.5" (9 cm) in diameter. Two Avalanche Guard Mildet fuse assembly units are inserted in the two capwells and the capwell locking nuts are finger tightened to hold the caps in place. The fuse is secured under a nylon ratchet tie that holds them in place and which has been pre-assembled at the CIL/Orion plant. A pull-wire lighter is attached to each of the fuse ends. Finally the required (trajectory determined) propellant cup is removed form its tri-laminate heat-sealed bag and the paper removed from the tacky top. The tacky top is then applied to the base of the ICB and the system is charged and ready to go. All you need do then is put the plastic cover over each mortar to ensure weatherproofness and your avalanche worries for the next 10 shots are gone. Simply wait and fire when needed. There's no need to wait until the storms are over, either. You decide—you control.

DETAILED INFORMATION, SAMPLES AND DISPLAYS OF AVALANCHE GUARD WILL BE AVAILABLE AT THE CIL/ORION BOOTH IN PENTICTON AT THE CAA ANNUAL GENERAL MEETING TRADE SHOW MAY 4-7, 2004.

Flipper: A Self-Cleaning Storm Board

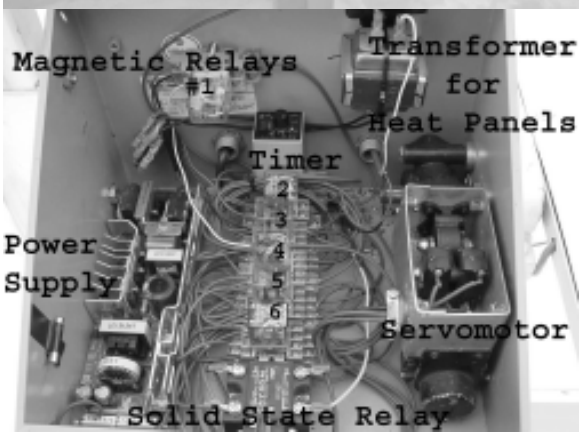
BY JOHN BRENNAN Snow Safety Director, Snowmass

Snowmass ski area has semi-dedicated four automated weather stations to providing data for the Aspen Skiing Company's *internal* website. Two of these stations record 24-hour snow totals. For many seasons, Snowmass employees installed the weather stations before October 1st, and prior to the lifts opening, any new snowfall meant daily trips to the two snow sites to clean the 24-hour storm boards. The challenge was to develop a 'self cleaning board.'

In the mid 90s, it was common to load PC208W software onto the company's Snow Reporter computers. When Campbell Scientific introduced their Real Time Data Monitoring (RTDM) software, it was apparent that it would provide a sensible solution. RTDM graphically presents data from any number of dataloggers, a function accomplished with one server scheduled to call the dataloggers on an hourly basis. While the resulting file can be uplinked directly to an internet site, marketing departments typically like to put their spin on things prior to feeding the public.

In order to provide forecasters and the public with the most accurate information, most ski areas utilize a 24-hour snow total in addition to a settled depth value. While it is certainly possible to program a datalogger to determine depth change over a given time period, settlement and other factors can skew what info is being presented. To keep matters consistent, the boards need to be cleaned at the same time daily.

Snowmass presented the challenge of designing a self-cleaning storm board to Greg Hoffman, an electrician and lift mechanic at Snowmass. His design consists of two fiberglass sheets separated by tubular steel. Laminated to the back of these sheets are heat panels originally manufactured to keep bathroom mirrors fog free, and Styrofoam insulates the void between the top and bottom panels. The ¾-inch axle rides in automotive pilot bushings and is located one inch off centre to enable the board to rest on adjustable pegs after each flipping cycle. A solid state relay takes the 5-volt pulse from the datalogger and steps the current up to the 24 volts necessary to operate the circuitry. Six magnetic relays create the logic necessary to reverse the direction of the servomotor and to heat the correct side of the board. The motor is a vintage war surplus affair originally used to crank the wing flaps on B52s. It is a super high torque unit that has built-in limit switches so the board can be stopped firmly on the pegs. While the servomotor would be the major power user, the 5-6 amp draw for less than 10 seconds daily shouldn't affect the batteries on remote sites too severely.



We have programmed the datalogger to check the 9 a.m. new snow total. If this number is above 1.5 cm, the datalogger rotates the board 180º. When the board is triggered to rotate, the heat panels on the appropriate side of the board are turned on for a preset time period to remove any residual snow. It is also possible to trigger the board remotely from a PC or laptop using Campbell software. Most of the equipment came off the shelves of the Lift Maintenance department, and we estimate 30 total man-hours to build and install it. However, all the parts are available from Grainger, and we estimate that total cost of building a similar board using parts from that source would be around $1000.

This was our prototype unit so if anyone has any questions, suggestions or modifications, contact John Brennan at jbrennan@aspensnowmass.com.

References:
http://www.clearproducts.com
http://www.grainger.com/

Beacon Basins in Canada

Backcountry Access (BCA) opened four new "Beacon Basin" training sites in Canada this winter. The newest one – installed February 20 – is in Revelstoke, at the Powder Springs ski area. The other Canadian sites are Mt. Norquay, Kokanee Glacier and the Whitewater Ski Resort.

Depending on the site, Beacon Basins feature six to 14 permanently buried transmitters wired to a central control panel. The panel consists of up to 14 switches for turning the transmitters on and off, plus a remote power supply consisting of six alkaline D cells. By permanently burying the transmitters and controlling them remotely, trainers can eliminate the time-consuming process of excavating and re-burying transmitters between searches.

The concept of Beacon Basins was originally conceived by BCA's Canadian technical representative, Dwayne Paynton, back in 2002. BCA launched its Beacon Basin program in 2002-03 with a pilot site at Loveland Basin, Colorado and there are now 12 sites in the U.S. "The growth of this program has been astounding," says Steve Christie, sales manager for BCA. "It's great to see recreational and professional users practice more and get involved in complex multiple-burial scenarios."

Paynton says he'd like to see a wider variety of backcountry users made aware of the training sites. "My main focus is the snowmobile crowd," he says. "Ideally, I'd like to see more snowmobile clubs create avalanche awareness in their area."

In Canada, the sites are hosted by locals involved in snow safety and managed by the BCA technical representative. To organize a transceiver training day at the Beacon Basin in your area, or make a suggestion for a new training site, contact Dwayne Paynton at (250) 226-7700 or e-mail paynton@netidea.com.

Contacts for Beacon Basin hosts in Canada:

Revelstoke - Clyde Newsome	(250) 837-5151
Norquay - Felix Camire	(403) 678-7710
Kokanee - Kevin Giles	(250) 354-4092
Whitewater - Kirk Jensen	(250) 354-4944

Bill Mark: Outgoing President

Bill Mark was brought up on a sheep and cattle farm in rural New Zealand. He's always had a passion for the outdoors. He attended Lincoln University near Christchurch to become a park ranger. Summers were spent in various mountain national parks as an interpreter ranger, while winters found him working as a professional ski patroller.

Ski patrolling took him to Whistler, where he became the ski patrol Manager at Blackcomb Mountain. He was responsible for the safety, emergency care and rescue of more than one million annual visitors to the mountain, managing a fulltime staff of 50, as well as over 150 part-time and volunteer ski patrollers and doctors. He held that position for seven years. Bill now works as a heli-ski guide at one of Canada's premier powder skiing paradises – Mike Wiegele's Helicopter Skiing Resort in the heart of the Columbia Mountains.

Bill has facilitated numerous programs for management retreats and leadership-development programs for clients including Canadian Pacific Resorts, Fairmont Hotels, Whistler Resort Association and Dow-Corning. Program initiatives range from classroom simulations to high ropes events. He has also instructed industry avalanche safety courses in both Canada and New Zealand since 1996.With his extensive search and rescue experience, Bill also has been directly involved with setting up helicopter rescue and safety programs for public and private organizations in BC and Alberta.

Bill joined the CAA Board in 1997 and has been president since 2000. In his spare time you will find Bill in the mountains, hiking, mountain biking or skiing, or catching wind on a sail board. If there is any time left you may find him looking after his garden at his Whistler home, during the short growing season!

From Revelstoke Times Review

February 4, 2004

John Kelly: Outgoing Treasurer

Age: 41
Lives in: Revelstoke
Employer: Parks Canada/Canadian Avalanche Association
CAA member since: 1998
Years involved in Avalanche Safety: 15
Preferred method of snow travel: Ski touring
Number of days on snow per year: 100

Short history of previous jobs:
Radiation dosimeter lab technician, ski patroller, wildland firefighter, avalanche technician. (Yeah I know, it seems like an improbable list to me too!)

Memories of being on the board of directors:
The most satisfying and productive session I had as a director was the first visioning session in Kamloops – was that in 1999? I don't remember the exact date. But I do remember sitting at the round table with the current board and the past presidents of the association and mapping out future strategies and plans. Then to watch as the plans came to life in the years following has been a very validating experience.

Pushing the recognition of intellectual properties as the key assets of the association and forming financial strategies for their upkeep and renewal was my best accomplishment as Treasurer – jeez, I sound like a bloody accountant (uh… no offence Ken).

The most stressful moment as a director was finding out the day before the AGM in 2002 that I didn't understand the financial reports since they weren't set up to mirror the way we wrote the budget. And the rest of the directors had the nerve to refuse my resignation! But a late night session with Evan and a bottle of scotch cleared things right up. In the time since we have thankfully insisted on easily interpreted financial reports–although this year should put things to the test. Watch carefully for copious sweating when I get up to talk!

Biggest challenge facing the CAA:
The CAA is challenged by growth! We have experienced five years of rapid change and expansion, and things aren't slowing down. How do we keep delivering the goods, to members, to stakeholders, to the public while keeping the close-knit feeling of the association – like one big happy family, eh? How do we remain "the little association that could" when we're not so little anymore?

I think, in some measure, we have lost the family feeling – and we should strive to get it back! But the transition to a future where the avalanche association plays a key role in the delivery of public avalanche services from coast to coast to coast is going to challenge us increasingly in this regard. Being a family has always helped us in the past to cut out bureaucracy and be efficient, after all you can't pull the wool over your brother's eyes – usually.

To counter this trend I recommend to members, especially new ones: be familiar. Come in to the office in Revelstoke the next time you drive through town and see the building you bought! Introduce yourself to the staff, "Hey, Clair, how ya doing, man?" Sleep over on the floor if you want (ok, I just talked to Clair and I guess that one's out – but there's no harm in asking!) Anyway, make the Avalanche Association your home.

Things are busy. The CAA is doing projects all over the country, products and services are expanding – take a look at the last two issues of *Avalanche News*! But we, the directors, must never forget that the membership is the backbone of the Association, and they own the house.

As Robert Frost said, "Home is the place where, when you have to go there, they have to take you in." (If nothing else, this line is worth a shot when arguing for floor space at the Centre for the night.)

New Editor of the Avalanche News

Mary Clayton accepted the job of editing the *Avalanche News* in late January of this year. She will also work as a media and communications consultant for the CAA. Her background includes both avalanche and ski industry work, as well as journalism.

From her early days as a kitchen slave/ski bum in Lake Louise, she's worked as a ski patroller at Red Mountain, an avalanche technician at Rogers Pass and a cat-ski guide at Selkirk Wilderness Skiing. Summers included jobs in rock climbing and mountaineering instruction. During that time she obtained two certificates from the ACMG – assistant winter guide and assistant rock guide.

Her focus shifted in the early 90s with a move to Calgary and a return to school. She earned a journalism diploma and a degree in political science while working part-time as a print journalist. She joined CBC Newsworld in 1994 and spent most of the last decade as a TV producer, concentrating primarily on national and international stories.

In 2001, her son Aleksander was born and focus shifted again, this time back to the mountains. With her husband, Karl Klassen, she will soon leave Calgary behind to build a house in Revelstoke this summer. Mary is very excited about living in the mountains again and re-connecting with the avalanche industry. Please contact Mary by e-mail at editor@avalanche.ca.

CAA's New Coordinator, Partner and Community Programs

BY CLAIR ISRAELSON

I am pleased to announce that Jane Mitchell has agreed to join the CAA's management team as Coordinator, Partner and Community Programs. For the past three years, Jane has been providing strategic guidance for the CAA's marketing and sponsorship activities, building the framework for strong and mutually beneficial relationships with sponsors, supporters and the public. With Todd Beernink leaving the CAA to pursue other career opportunities, Jane's responsibilities have been expanded to include marketing and sponsorship operations. In this new role Jane will report to the CAA's Executive Director.

Jane brings proven expertise in strategic planning, sponsorship and event management. She has worked on four America's Cup campaigns - from managing the media centre, to sponsorship fulfillment and building community programs. Jane has several years experience as Marketing Manager with North Shore Credit Union in Vancouver, and brings a blend of long term strategic thinking with short term tactical implementation skills to this position.

Please contact Jane by e-mail at marketing@avalanche.ca, or by phone at (604) 922-4803.

CAA featured at Vancouver MEC

In mid-February, the Mountain Equipment Co-op (MEC) in Vancouver erected a display panel focusing on avalanche awareness and featuring the CAA. The objectives of the information panels are to raise awareness among MEC members and the public about the availability of avalanche safety information and courses, as well as the CAA's other programs.

The panel is set up by the tables and chairs in the book and map department, where public seminars are taught. MEC will be using that semi-permanent display space in the future for its community partners. Kate Scholz, Social & Environmental Responsibility Co-ordinator of the Vancouver MEC, says, "The hopes are to raise community awareness about various non-profit programs that concentrate on helping people access beneficial self-propelled wilderness recreation." Scholz adds, "the CAA has been one of our strongest and oldest community partners." The display will be up until May and will likely go up again next winter.

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Send material to editor@avalanche.ca

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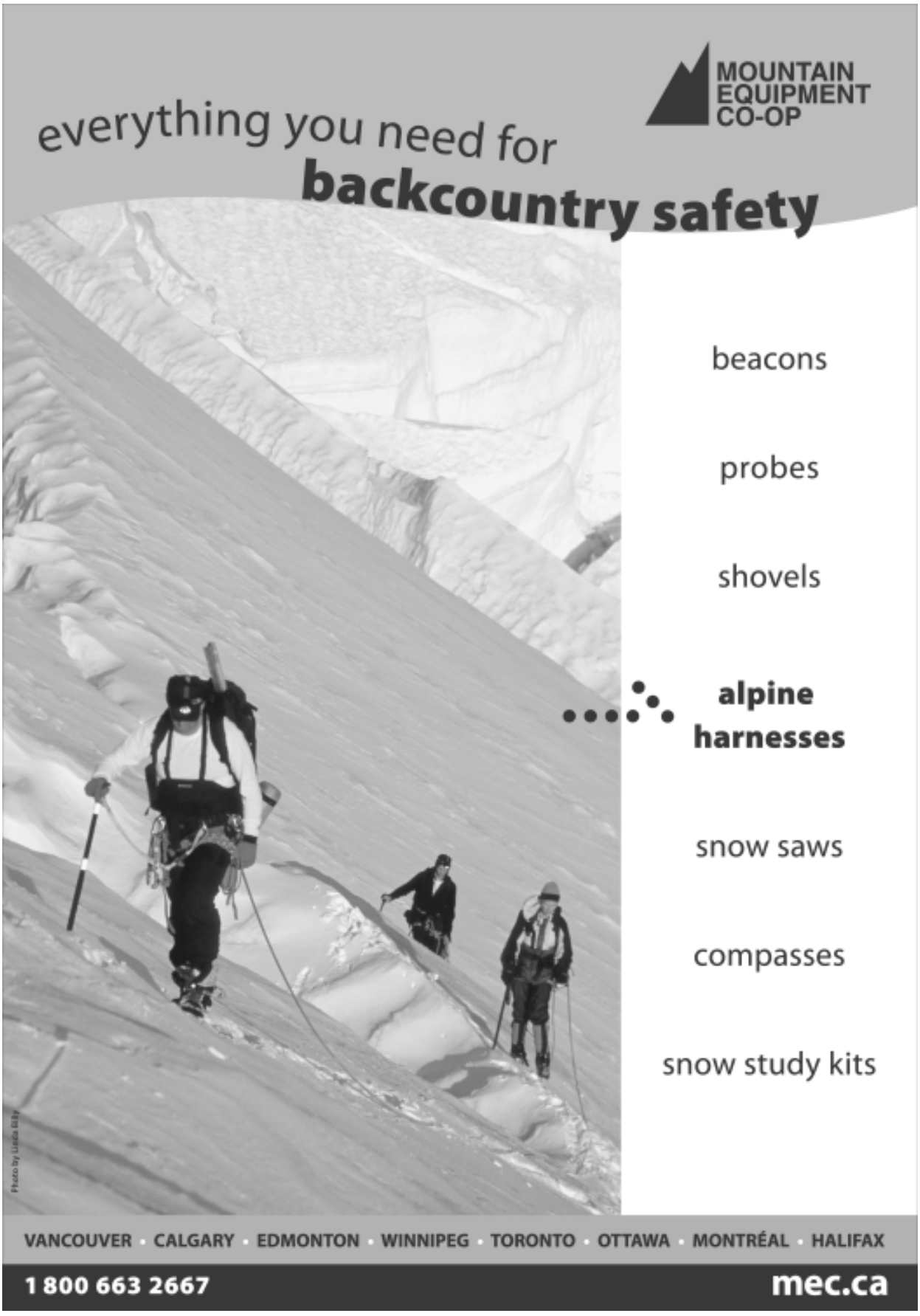

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