AVALANCHE NEWS NO. 37

FEBRUARY 1992

EDITORIAL NOTE

The intention of **AVALANCHE NEWS** is to assist communication among persons and organizations engaged in snow avalanche work in Canada. Short articles cover accidents, upcoming and past events, new techniques and equipment, publications, personal news, activities of organizations concerned with avalanche safety, education and research.

The editor welcomes and expects contributions; all reasonable comments and discussions will be printed. The articles in **AVALANCHE NEWS** reflect the views of the authors, and only when it is specifically stated do they represent the opinion of the Canadian Avalanche Association.

No paid advertisements are carried. Suppliers who wish to draw attention to their products should send information to the editor who will publish a note when the equipment has value in avalanche work and safety.

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Contributions and letters to the editor should be mailed to the address of the Canadian Avalanche Association. Requests for copies and notifications of changes of address should be made to the publisher.

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AVALANCHE NEWS
Canadian Avalanche Association, Box 2759, Revelstoke, B.C.

RESCUE TRANSCEIVERS

Peter Schaerer

In **AVALANCHE NEWS NO. 35** (June 1991) it was reported that the results of tests with transceivers, carried out at Andermalt (Switzerland) in April 1990 and at Bormio (Italy) in October 1990 are available from the Federal Institute for Snow and Avalanche Research at Davos, Switzerland.

The Canadian Avalanche Association has available a summary of the tests. Copies will be mailed (7 pages) to interested persons on request at the cost of $3.00 for copying and mailing.

Please send requests and payment to the Canadian Avalanche Centre at Revelstoke.

AVALAUNCHER INQUEST

Chris Stethem

Re: Findings of Coroner's Inquest in Avalauncher Accident at Whistler, British Columbia, Canada, April 28, 1991.

On April 28, 1991 at Whistler, an experimental avalauncher projectile blew up in the barrel of Gun #1 at Whistler Mountain, killing patrolman Sean Walsh. Two other patrollers sustained minor injuries.

Approximately 16 projectiles were tested at Whistler prior to the accident. On the day of the accident three projectiles were to be fired. Upon firing of the second round a detonation in the breech occurred.

In January 1992 an inquest was held at Whistler to determine the circumstances surrounding the death. The following is a summary of the findings of that inquest.

The theory of why the detonation occurred was explained by the Coroner in his report as follows:

"The incident took place because the pentolite charge in the prototype projectile was too narrow and not fixed within the projectile. When the gun was fired, the casing of the projectile moved forward. The pentolite charge remained stationary. This allowed the firing pin to strike the blasting cap igniting the charge and causing the explosion. The gun played no part in the incident."

Through the course of the inquiry it became apparent that the designer of the projectile, Elmo Sitnam of E.S. Mantis Corporation at North Vancouver had falsely presented himself as a Ph.D. in Aeronautical Engineering with considerable experience in the explosives and rocketry fields. He obtained government support and the cooperation of Whistler's personnel based on these supposed qualifications.

The Coroner's report further states that Mr. Sitnam's "knowledge of explosives was lacking and he conducted some extremely dangerous modifications to the charges and fuses. Many of the safety features found on a standard projectile had been removed or altered on the prototype. The handling, storage and transportation of projectiles were haphazard at best. The evidence presented portrayed a project that appeared to be ill equipped to safely bring a product such as the prototype missile to market."

The Coroner's Jury directed the following recommendations to the Canadian Avalanche Association:

1. Signage should be displayed at gun site showing firing procedure.

   Background: There was no evidence at inquest to indicate that the proper firing procedure was not carried out. This recommendation should be for information purposes.

2. Avalaunchers should be magna-fluxed or x-rayed annually by a qualified technician and signed out by a Professional Engineer of British Columbia.

   Background: Although there was no evidence that the gun malfunctioned or contributed in any way to this incident, it would be a good safety feature to have the tests conducted on a regular basis.

3. All firings of an avalauncher by operators should be from behind a protective shield where he or she can safely view the firing.

   Background: Evidence at the Inquest indicated that there have been only two fatal accidents involving this avalauncher throughout the world; this despite the firing of literally hundreds of thousands of rounds. The two fatal accidents were both traced to tampering with an experimental projectile. This recommendation should be for information purposes.

4. No testing of avalauncher or projectile prototypes to be conducted on ski mountains.

   Background: There was no evidence that testing prototype projectiles contributed in any way to the incident or endangered the public. One of the purposes of these projectiles is to make skiing on mountains safer. It would be difficult to determine this without trying them out in actual situations. This recommendation should be for information purposes.

Additional recommendations were forwarded to the Department of Energy, Mines and Resources in regards to permitting, scientific method and monitoring of research and development activities.

The most relevant recommendation to Energy, Mines and Resources in regards to everyday use of the avalauncher was "no modifications to standard avalauncher projectile or manufacturer's recommendations for assembly without Ministry of Energy, Mines and Resources approval".

Further miscellaneous recommendations were directed to Federal research funding agencies, the B.C. Association of Professional Engineers and ICI Explosives.

There was no inference of fault in the standard avalauncher round at any time during the proceedings of the inquest.

The Canadian Avalanche Association would appreciate any comments in regards to those recommendations directed specifically to the Association.

RUTSCHBLOCK TECHNIQUE AND INTERPRETATION
February 1992

Bruce Jamieson and Colin Johnston

The rutschblock (or glide-block) test is a slope test which gives useful information regarding the stability of many snow slabs. The test method was developed in Switzerland in the 1970's. This short article, which is based on Paul Föhn's analysis of rutschblocks (Föhn 1987) and on our experience with the Blue River Avalanche Research Project, describes the test technique, summarizes the interpretation of results, and comments on the limitations of the test.

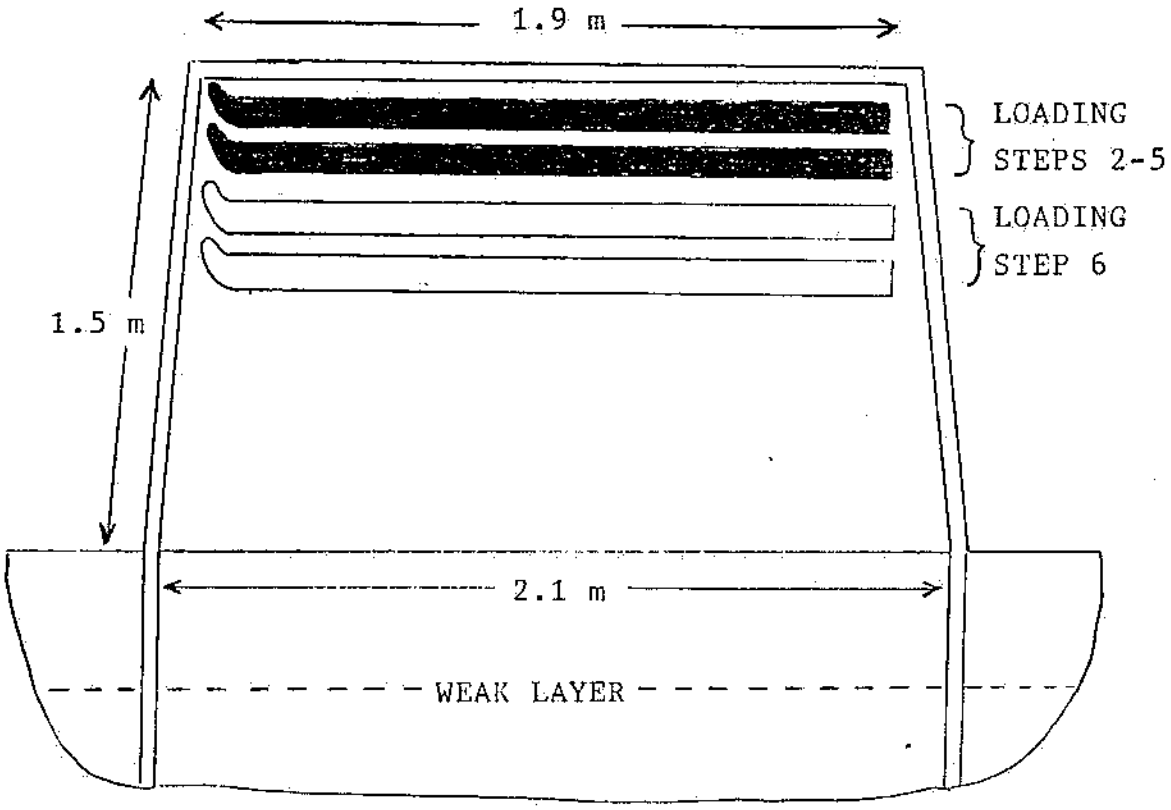
Site Selection

Test sites should be safe, representative of the avalanche terrain under consideration and undisturbed. For example, to gain information about a wind loaded slope, you need to find a safe part of a similarly loaded slope for the test. Be aware that rutschblocks done on the upper less-steep part of a slope may not be representative of the steeper slope below. The site should not contain buried ski tracks, debris, etc. or be within about 5 m of trees where the buried layers might be disturbed by wind action or by clumps of snow which have fallen from the nearby trees.

Föhn recommends slope angles of at least 30°. Our experience shows that rutschblocks on 25°-29° slopes also give useful information (discussed below).

Technique

After identifying weak layers (and potential slabs) in a snow profile, extend the pit wall until it is at least 2 m across the slope. (Don't skip the profile unless you already know the layering.) Mark the width of the block and the length of the side cuts on the surface of the snow with a ski. The block should be 2 m wide throughout if you are going to dig out the sides of the block. However, if you are going to cut the side walls with a ski, pole, cord or saw, the lower wall should be about 2.1 m across, and the top of the side cuts should be about 1.9 m apart (see diagram). This flaring of the block ensures it is free to slide without binding at the sides.



The lower wall should be a smooth vertical surface cut with a shovel. Dig or cut the side walls and the upper wall deeper than any weak layers that may be active.

If the side walls are exposed by shovelling, then one rutschblock test may require 20 or more minutes for two people. However, if the weak layers of interest are within 50 cm of the surface, you can save time by cutting both the sides and the upper wall of the block with a ski pole (basket removed) or with the tail of a ski. If the weak layers are deeper than 50 cm and the overlying snow does not contain any knife-hard crusts, both the sides and upper wall of the block can be sawed with cord which travels up one side, around ski poles or probes placed at both upper corners of the block, and down the other side.

Loading Steps and Rutschblock Scores

Load the rutschblock in the following sequence and note which loading step produces a clean shear failure:

1. The block slides during digging or cutting.
2. The skier approaches the block from above and gently steps down onto the upper part of the block (within 35 cm of the upper wall - see diagram).
3. Without lifting the heels, the skier drops from a straight leg to a bent knee position, pushing downwards (and compacting surface layers).
4. The skier jumps up and lands in the same compacted spot.
5. The skier jumps again onto the same compacted spot.
6. Either remove the skis and jump on the same spot (as recommended by Föhn) or keep the skis on and step down another 35 cm - almost to mid-block - and push once, then jump once. (We prefer the latter method since our experience with jumping without skis has been unsatisfactory.)
7. None of the loading steps produced a smooth slope-parallel failure.

Interpretation of Rutschblock Scores

1, 2 or 3 — The block fails before the first jump. Slopes with similar snow conditions may be released by a skier.

4 or 5 — The block fails on first or second jump. It is possible for a skier to release slab avalanches on slopes with similar snow conditions. Other observations or tests must be used to assess the slab stability.

6 or 7 — The block does not fail on the first or second jump. There is a low (but not negligible) risk of skiers triggering avalanches on slopes with similar snow conditions. Other field observations and tests as well as safety measures remain appropriate.

Rutschblock results can be recorded in the "Comments" section of a profile or in a field book along with other field observations and tests, e.g. 1992-01-31 1420 Back Bowl, N asp., 1900 m, R-block 4 down 35 on / \ 1.5.

Limitations

The rutschblock is a good slope test but it is not a one-step stability evaluation! Although for many conditions we prefer the information from one rutschblock to that from a few shovel tests, the rutschblock test does not make profiles or careful field observations unnecessary. Nor does it, in general, replace other slope tests such as ski cutting and explosive tests.

The rutschblock only tests those layers deeper than ski penetration. For example, a weak layer 20 cm below the surface is not tested by skis which penetrate 20 cm or more.

Rutschblock Cords and Saws

Eight metres of 4 mm or 5 mm cord with overhand knots tied every 20 or 30 cm can be used to cut the upper wall and both sides of the block at the same time (provided no knife-hard crusts need to be cut). Such cords can also be used to cut off carefully selected cornices.

Two-part saws with an assembled length of 125 cm make possible very fast rutschblock tests but weigh 1.2 - 1.8 kg (3 - 4 lbs). Such saws are also useful for cutting cornices. For ideas on rutschblock saws, contact Bruce Jamieson at (403) 220-7479 or (604) 673-8381.

Slopes Below 30°

Föhn (1987) recommends that rutschblocks be done on slopes of 30° or steeper. At the Blue River Avalanche Research Project (Jamieson and Johnston 1991) we have found that rutschblocks on slopes of 25-29° give approximately the same score as rutschblocks on nearby 30-35° slopes. However, rutschblocks done on slopes of less than 30° require a smooth lower wall and a second person standing in or near the pit to observe the small displacements (less than 1 cm) that indicate a shear failure. We are studying the effects of slope angles below 25° on rutschblock scores.

Acknowledgements

Our thanks to Mark Shubin and Jill Hughes for many hours of careful field work and to Mike Wiegele Helicopter Skiing and the Natural Sciences and Engineering Research Council for financial support.

References

Föhn, Paul M.B., 1987.
The "rutschblock" as a practical tool for slope stability evaluation. Avalanche Formation, Movement and Effects (Proceedings of the Davos Symposium, September 1986). International Association of Hydrological Sciences Publication no. 162, 223-228.

Jamieson, Bruce and Colin Johnston, 1991.
Shear frames, rutschblocks and slab stability: a progress report on the Blue River Avalanche Research Project (presented at the Technical Sessions of the Canadian Avalanche Association May 1991), Department. of Civil Engineering, University of Calgary, Calgary, Alberta, 13 p. (Available on request).

PUBLIC AVALANCHE INFORMATION BULLETIN

Canadian Avalanche Centre

The Canadian Avalanche Centre has started to put out a summary of snowpack, weather and avalanche conditions called the Public Avalanche Information Bulletin (PAIB). This is in response to requests for many years to have information available for areas outside the Rocky Mountain Parks. The parks have had well developed Public Avalanche Forecasts for many years. The PAIB is a summary of conditions in four areas of Western Canada, it includes information from the Parks Forecasts and the following three regions:

N. Garibaldi/Duffey Lake
Selkirks
Purcells

In this first year of operation the Bulletin is prepared on Thursday and Friday primarily for those planning backcountry travel on the weekend. It is not an avalanche forecast but gives current information to help people make good decisions before setting off.

The PAIB is available in British Columbia and Alberta on a toll fee number 1-800-667-1105, a touch tone phone is required to access the information for the area of your choice. The Bulletin is also sent by facsimile to a variety of retailers, government agencies and outdoor pursuits groups who have contributed to the operating costs of the program.

The Canadian Avalanche Centre would like to hear any comments about the PAIB and plans to increase the frequency to a daily summary as well as have it available on a computer bulletin board.

AVALANCHE SEARCH DOG TEAMS
BRITISH COLUMBIA AND ALBERTA
JANUARY 1992

Parks Canada

Scott Ward Banff, Alberta	Business Residence	403-762-4506 403-762-2488
Gordon Peyto Rogers Pass, British Columbia	Business Residence	604-837-6274 604-344-5041
Dale Portman Jasper, Alberta	Business Residence	403-852-3100 403-852-5071

R.C.M. Police

Cpl. Terry Barter Chilliwack, British Columbia	Business	604-792-4611
Cpl. Gordon Burns Cranbrook, British Columbia	Business	604-426-8422
Cpl. Jim Brewin Courtenay, British Columbia	Business	604-338-1321
Cpl. Wayne Murphy Kamloops, British Columbia	Business	604-828-3000
Cpl. Cec Brandt Nelson, British Columbia	Business	604-354-5144
Vacant Prince George, British Columbia	Business	
Cst. Bruce McLellan Port Alberni, British Columbia	Business	604-723-3428
Cpl. Luther Bretfield Terrace, British Columbia	Business	604-635-4911
Cpl. Tim Boal Vernon, British Columbia	Business	604-545-7171
Al Soneff Ft. St. John, British Columbia	Business	604-785-6617

Provincial Emergency Program

Anton Horvath Whistler, British Columbia	Business Residence	604-932-3434 604-932-1110
Yvonne Thornton Whistler, British Columbia	Business Residence	604-932-3434 604-932-5196
Bruce Watt Pemberton, British Columbia	Business Residence	604-932-2300 604-894-6262
Pat Coulter Whistler, British Columbia	Business Residence	604-932-3434 604-932-5068
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Craig McDonald Whistler, British Columbia	Business Residence	604-932-3141 604-932-3761
Tim Quinn Blue River, British Columbia	Business Residence	 604-673-8273
Russ Hendry Invermere, British Columbia	Business Residence	604-342-4225 604-437-6575
Doug Fenton Maple Ridge, British Columbia	Business Residence	604-979-6628 (pager) 604-467-0393
Sue Boyd Wardner, British Columbia	Business Residence	604-429-3958 604-429-3958
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Bill Shumka Whistler, British Columbia	Business Residence	 604-932-1863

Alberta

Duncan Daniels Calgary, Alberta	Business Residence	403-932-2970 403-242-5702

INTERNATIONAL SNOW SCIENCE WORKSHOP

The first announcement for the ISSW was made in October 1991. It is to be held at Breckenridge, Colorado on October 4 to 8 1992. Persons interested in making submissions should submit an extract by June 1, 1992 to:

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ISSW 1992 Papers Chairman
5155 East Aurora Avenue
Boulder CO, USA 80303

Registration address:
ISSW 92
Box 733
Fort Collins CO, USA 80522

IMPORTANT NOTICE TO AVALANCHE SAFETY INDUSTRY

Canadian Avalanche Center

As a result of a recent inquiry from a British Columbia mountaineering equipment retailer, it is apparent that confusion still exists regarding the phasing of transition from 2.2275 to 457 kHz avalanche rescue transceivers. The Canadian Avalanche Association wishes to reiterate its position regarding this transition.

In 1986 the International Commission of Alpine Rescue, of which Canada is a member, voted to implement a five year transition period during which production of 2.275 frequency transceivers would end. During this period, the production of dual frequency transceivers was permitted. After 1991, all manufacturers and retailers from the member countries are expected to market single frequency 457 kHz avalanche transceivers. The Canadian Avalanche Association supported this timetable. Compliance with a standard frequency is imperative. The effectiveness of these emergency devices depends entirely on the compatibility of all the units available at the accident site.

The five year transition period is now over. In the interest of safety, the Canadian Avalanche Association recommends that all single frequency 2.275 kHz transceivers be recalled and destroyed to prevent them from resurfacing into use. Only dual frequency and single 457 frequency beacons should be used from now on.

As stated in the Canadian Avalanche Association notice of August 8, 1990, Canadian retailers are requested to sell only 457 single frequency units after January 1, 1992. Retailers are encouraged to market the single 457 frequency transceivers with a notice stating that the United States is behind the rest of the international community in their implementation of this change of frequencies, and that the United States transition will not be complete until 1995. Canadians planning travel in the United States should be aware of the potential for incompatible avalanche transceiver frequencies and plan accordingly.

Thank you for your cooperation in this regard.
