AVALANCHE NEWS NO. 18

JUNE, 1985

EDITORIAL NOTE

The intention of AVALANCHE NEWS is to assist communication between persons and organizations engaged in snow avalanche work in Canada. Short articles cover reports of accidents, upcoming and past events, new techniques and equipment, publications, personal news, activities or organizations concerned with avalanche safety, education and research. Contributions are expected from the readers.

AVALANCHE NEWS is issued three times per year, usually in February, June and October. There is no subscription fee. Requests for copies and notifications of changes of address should be sent to the publisher.

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SNOW AND AVALANCHE CONDITIONS
1984-1985 WINTER

The significant features of the weather of the 1984-1985 winter in Western Canada were as follows:

The accumulation of snow on the ground started unusually early. Record amounts of snow fell in October and November, but the snowfall decreased to about average for December.

January was very dry with temperatures slightly below normal. Many areas observed new record low total snowfall amounts for January.

The mid-February snowstorms, which have become a usual occurrence the past few years, arrived between February 7 and February 25 and were accompanied by strong westerly winds. The storms, moving in a northerly direction west of the Rocky Mountain Trench, deposited deep snow in northern British Columbia and the Yukon but little in the southern Rocky Mountains.

Precipitation was below normal and the temperature was above normal in March, but the weather reversed to cool conditions with above normal precipitation in April. The total amounts of snowfall for the winter were close to normal for the South Coast, decreased to below normal in the Columbia and Rocky Mountains, and were above normal in northern British Columbia.

The avalanche season began unusually early. During the second week of November avalanches had reached highways even at low elevations. The early snow fell on warm ground or warm old snow and ice surfaces. Probably low temperatures between storms created a strong temperature gradient in the thin initial snow cover producing low strength snow consisting of facetted grains. Numerous early winter avalanches were observed to slide on the ground, old snow surfaces, and glaciers as a result of this layer. The snow cover stabilized rapidly, however, under normal temperatures and deep snow by mid-November. Surface instabilities created by moderate snowfalls and wind only were encountered in December and January.

The February storms caused extensive avalanche activity west of the Rocky Mountains when the snow accompanied by strong wind fell on a re-crystallized weak surface. The avalanches were particularly large and violent in northern British Columbia. In the Rocky Mountains the shallow snowpack produced avalanches in pockets only.

High temperatures in March produced weakening of the snowpacks and spring avalanches by the middle of the month, but cold weather and extensive snowfalls in April extended the avalanche season longer than usual.

AVALANCHE INCIDENTS IN CANADA
1984-1985 WINTER

The Avalanche Centre of the National Research Council received reports of 35 incidents with persons or equipment caught by avalanches between November 1st, 1984 and April 30th, 1985. We suspect that this is not the total number of avalanche involvements in Canada, as numerous incidents go unreported, particularly when they concern backcountry skiers and do not result in injury.

Number of reported incidents

8	incidents involved skiers in a ski area - ski patrollers, avalanche control personnel, and skiers entering closed areas.
4	incidents involved skiers on slopes adjacent to ski area boundaries.
11	incidents involved backcountry skiers.
9	incidents involved road and rail traffic.
1	incident involved snowmobilers.
2	reports concerned damage to structures.

Total 35 reports

Persons involved

12	persons were caught and remained on the surface.
13	persons were partially buried, not injured.
2	persons were completely buried and rescued alive.
6	persons were completely buried and found dead.

Of the two skiers completely buried and rescued alive, one was located by an object on the surface and the other by probing with ski poles.

A slide from a roof in Stewart, B.C. buried two children completely and two children partially. They were recovered alive by shovelling.

Vehicles involved

3	vehicles on roads were trapped.
5	vehicles on roads were partially buried.
1	train was derailed.
1	train had minor damage.
2	snowmobiles had minor damage.

Fatal accidents

On December 27, 1984 two ski area employees were skiing in the WaWa Bowl near the Sunshine Ski area at Banff. After their first run they made a second one closer to the centre of the bowl. The first skier reached a safe place. When the second skier was approximately halfway down the slope, an avalanche broke off at the top, and caught and buried the second skier. His companion found him by probing in about 15 minutes, but he had died from suffocation.

On December 29, 1984 two members of a helicopter skiing party died at Mount Neptune near Rossland, B.C. The group skied with one skier on the slope at a time. The guide went first, tested the slope, and then waited at the bottom. When the second skier was in the lower part of the slope, an avalanche started to the side of the run. It buried the skier as well as the guide waiting below. Both victims were found rapidly by transceivers. One skier died from suffocation and the other from a chest injury.

Another accident involving a helicopter skiing party occurred on February 18, 1985 at Blue River, B.C. The group was instructed to cross an avalanche path one by one. The guide and four clients crossed safely. The next two skiers were in the avalanche path at the same time when an avalanche fractured about 150 m above them and buried them. The buried victims were found by transceivers but both had died from suffocation.

On March 2, 1985 several snowmobiles started an avalanche above them when they crossed a slope north-east of Sparwood, B.C. Two machines were caught and carried down about 100 m. One operator was completely buried and was recovered dead after 40 minutes. The party members used small trees for probing and their hands for digging.

Property damage

The total estimated property damage for the winter was $700,000.00, mainly from two events. On January 5, 1985 an avalanche from the Mount Stephen glacier in Yoho National Park hit a freight train on the C.P. Rail main line. Two gondola cars loaded with sulphur were hit directly and pushed 200 m down the slope to the edge of the highway. Another eleven cars derailed. The line was closed for 24 hours.

On February 17, 1985 an unusually large avalanche broke a tower of the electric transmission line of ALCAN between Kemano and Kitimat, B.C.

Acknowledgement

We wish to thank those who have reported avalanche incidents, often with detailed information about the avalanche and the circumstances of the accident. Others who have something to report but have had no time to do so as yet are requested to send a completed reporting card or a note as soon as possible. Statistics such as those presented here draw the attention of the public, industry, and government to avalanche hazards and the need for safety measures. This attention in turn will assist our own work.

Peter Schaerer

REVIVAL OF AVALANCHE VICTIMS
INTERNATIONAL COMMISSION FOR ALPINE RESCUE (IKAR)
INFORMATION 1984/10

On October 6, 1984 the Medical Subcommittee of the IKAR met at Malbun, Liechtenstein. Dr. Alfred Thomas, physician for the Association of German Mountain and Ski Guides presented a most interesting paper on the subject of revival methods in the mountains during rescue operations carried out by companions. Excerpts of this paper are presented here.

An ever increasing number of mountaineers use rescue transceivers, and this enables companions under favourable conditions to find those buried within five to fifteen minutes. Even considering the rather short period of burial, some of those rescued show signs of clinical death. Suffocation must be considered if there are no serious injuries caused by mechanical action. Reasons for quick suffocation in avalanches are blockage of the respiratory tract through snow, vomit, or the tongue. Breathing may also have been impaired or made impossible due to snow pressures on the chest or the diaphragm.

All obstructions have to be cleared immediately and artificial respiration must be started. If lack of oxygen has already resulted in circulatory collapse, the chances of survival have probably diminished a great deal. When hypothermia has not had time to set in companions should not delay external heart massage to provide the victim with a chance of survival.

Hypothermia must be considered if the victim has been buried for periods longer than an hour. Such victims, who may appear to be dead, can indeed be deceased. On the other hand, their serious hypothermic condition may only make them appear to have died. Breathing and pulse cannot be detected, but minimal circulation could be sufficient to provide the brain with oxygen. There is great danger that the heart of this hypothermic victim may go into a state of fibrillation. This usually occurs through insufficient ventilation and further cooling. In order to sustain life, the immediate measures to be taken by the survivors at the accident site are:

1. Immediately clear obstructions from the mouth cavity and administer artificial resuscitation, such as mouth to mouth - nose.

2. Protect the victim from further cooling. This can be accomplished through the use of special sleeping bags, rescue bags or rescue blankets. Additional warming is not recommended (when the victim is unconscious no Hiebler package, no medication).

3. Transport the victim immediately by helicopter, ensuring that further cooling cannot occur. This also applies to transport by Akja or improvised toboggan, if that is the only way to transport the victim to a medical facility. Artificial respiration should be continued during the transport.

Cardiac massage for the seemingly dead hypothermic victim should only be started by the companions if it can be continued without interruption throughout transportation to a medical facility. This is usually only possible during helicopter transport with a physician available. It is likely that fibrillation will occur when massage on a cold hypothermic heart is applied. Transport by Akja in such a case for example would not be possible because long interruptions of the cardiac massage would have to occur.

Death of a hypothermic victim can only be confirmed in a hospital after the victim has been rewarmed.

Translated and submitted by Peter Fuhrmann

HOW CAN AVALANCHE ACCIDENTS BE AVOIDED?
INTERNATIONAL COMMISSION FOR ALPINE RESCUE (IKAR)
INFORMATION 1985/2

At the IKAR meeting of delegates in October 1984 specialists in snow research and avalanche rescue, after analyzing fourteen accidents in various countries, made the following recommendations of interest to the general public:

1. General Rules: Closed areas outside controlled ski runs must be avoided. Advice from local people should be followed. The effects of wind, changes in temperature, and slope exposure to sun must be considered.

   Avalanche rescue transceivers and avalanche shovels are a must for every ski mountaineer.

2. Rules to observe prior to entering avalanche terrain: The snow and layering must be checked and the stability evaluated if one suspects that the snow cover could be unstable. Avalanche accidents occur on slopes that were judged to be safe from avalanches or even where avalanches have never been observed.

   Avalanche rescue transceivers must be checked for proper functioning prior to the trip and must be set to transmission mode. In a number of fatalities, the transceiver had not been switched on, the transceiver had not been used properly, or its batteries were dead.

3. Rules to observe while crossing or descending an avalanche slope: Safe distance between the skiers is to be maintained. One should ski carefully, avoid falling, and make gentle, smooth turns. Jump turns on the slope should be avoided. Safety straps should be removed and hands should not be in ski pole loops.

4. Action after the avalanche has stopped and one realizes that a party member is missing: Companions should immediately start the rescue which means - a) Avoid panic, develop a plan and act systematically. b) - Switch transceivers to the receive mode. Immediately start a hasty search of the avalanche debris to determine if objects or persons can be detected. c) - Start the systematic search in the lower area of the deposit, below the last seen point. d) - The avalanche has to be

checked thoroughly if help is not immediately available or can be called for and if there are only a small number of companions available. The search should be carried out with transceivers, or by probing with ski poles or avalanche probes in a systematic fashion. Speed is of the essence if the victim is to be rescued alive. e) Mark the slide with flagging or packs, and also note the location on your map if assistance has to be brought in from far away.

It should be pointed out that according to statistics of the Swiss Snow and Avalanche Research Institute, the only live rescues recorded during the last ten years in the Swiss Alps have been achieved by companions. No one buried in an avalanche has been rescued alive when the party had to request assistance from organized rescue crews.

VARIATION OF SNOW WITH ELEVATION

by Peter Schaerer

In Avalanche News No. 17 the results of a study to determine the maximum water equivalent of snow on the ground for variable elevation above sea level were reported. The note neglected to mention that information about the water equivalent of the snow on the ground in the mountains of Western Canada is available from Snow Surveys of the British Columbia Ministry of Environment and Alberta Environment.

The snow surveys consist of measuring the water equivalent and depth of snow several times during the winter at carefully selected snow courses. The results of one or several snow courses for an area should be entered into the equations presented in the Claus, Russel and Schaerer (1984) paper. In applying the results from the snow courses one should be aware that the water equivalents were usually obtained using the Federal Snow Sampler. The Federal Snow Sampler overmeasures the water equivalent of the snow (Western Snow Conference Metrication Committee, 1983). Consequently, it is recommended that the reported water equivalents be multiplied by 0.92 in order to obtain true values and snow loads.

The results of the snow surveys are reported in Snow Survey Bulletins and summaries which can be found in University and College libraries, as well as in some public libraries under "Government Publications".

Reference:

Claus, B. R., Russel, S. O. and Schaerer, P. A.; 1984: "Variation of ground snow loads with elevation in Southern British Columbia". Canadian Journal of Civil Engineering, Vol. II, No. 3, pp. 480-493.

Western Snow Conference Metrication Committee, 1983: Metrication of manual snow sampling equipment, 106 p. Western Snow Conference, P. O. Box 14884, Spokane, WA 99214.

TECHNICAL MEETING OF THE CANADIAN AVALANCHE ASSOCIATION

by Paul Anhorn

The meeting was chaired by Fred Schleiss.

Review of Different Operations

Dave Skjonsberg reported on the Rogers Pass avalanche operation. In an average winter 800 rounds are fired from a 105 mm howitzer into 180 targets. The highway is closed 75 times with most closures under two hours. A stationary worksite (C.P.R. tunnel entrance in the middle of Rogers Pass' largest avalanche path) has added a lot of extra work for the avalanche section.

Geoff Freer outlined B.C. Ministry of Highways Snow Avalanche Section operations. Their major work involves safety on mountain passes with a small amount of time spent on reviewing avalanche hazards to other developments. Forty avalanche areas with approximately 1000 avalanche paths are checked by Highways personnel. Weather observations are taken at over 100 sites.

Alan McDonald reported for Jasper National Park. The warden service controls 35 active avalanche paths on the Banff-Jasper Highway with an avalauncher. Their work also includes a safety and control program in Marmot Basin as well as providing information on avalanche hazard for the backcountry in Jasper National Park.

Clair Israelson explained the Lake Louise avalanche control program. The program is broken down into three parts: ski area, highway, and backcountry. Their backcountry forecast goes to 20 media outlets.

Chris Stethem reported for Whistler and Blackcomb ski areas. Whistler employs 25 men to control 120 sites with four avalaunchers and hand charges. Blackcomb's 15 men use two avalaunchers. They control 53 sites, most of them with hand charges.

Dave Aikens from Fernie used their ski hill's avalauncher 20 times firing 140 rounds during November and December. In an average season 200 rounds are fired. A second avalauncher will be set up this summer.

Private Avalanche Dogs

Margie Jamieson reported that two private dogs are ready for certification as avalanche dogs. The R.C.M.P. will certify the dogs.

Avalanche Courses

Clair Israelson reported on Non-Professional Avalanche Courses. Two course outlines (Introduction and Advanced) are now published by the Canadian Alpine Club. It is recommended that the advanced course only be taught by Canadian Avalanche Assocation active members, ACMG full guides and instructors screened by the Educational Committee of the Canadian Avalanche Association.

Helicopter Bombing

Clair explained some of the regulations with helicopter bombing. A list of all helicopter companies qualified to do the work will be sent to Peter Schaerer to be published in the next Avalanche News.

Computers

G. Freer suggested that the avalanche industry as a whole look into compatible computers, and discuss systems such as "electronic mail" for better information exchange.

CANADIAN AVALANCHE ASSOCIATION

The Canadian Avalanche Association held its Annual General Meeting on May 10, 1985 in order to carry out business as required by its by-laws.

The Directors elected were:

Fred Schleiss	President
Willi Pfisterer	Vice President
Peter Schaerer	Secretary-Treasurer
Jeff Boyd	Membership Committee Chairman
John Tweedy	Director at Large
Brian Leighton	Director at Large
Garry Walton	Representative of the Associate Members

The Membership Committee consists of Jeff Boyd, Art Twomey and Roger McCarthy.

The Association resolved also:

- to become a sponsor/supervisor of the avalanche courses organized by the British Columbia Institute of Technology;
- to adopt the Code of Ethics;
- to state to the Minister of State for Science and Technology the benefits to the industry of the National Research Council avalanche research;
- to request from the Atmospheric Environment Service improvements to the weather forecast.

AVALANCHE COURSES NRC/BCIT

During the 1984-1985 winter avalanche courses for professional staff were held as follows:

DATE	LOCATION	TYPE	NUMBER OF PARTICIPANTS REGISTERED	PASSED
Nov. 26-30, 1984	Creston	Transportation and Industry Level 1	24	21
Dec. 3-7, 1984	Creston	Transportation and Industry Level 1	21	20
Dec. 9-15, 1984	Whistler	Ski Operations Level 1	22	22
Jan. 13-20, 1985	Mt. Assiniboine	Ski Operations Level 1	20	20
Jan. 20-27, 1985	Mt. Assiniboine	Ski Operations Level 1	19	17
March 18-23, 1985	Kananaskis Park	Ski Operations Level 1	11	11
Total participants			117	111

As can be seen from the table, all courses were concerned with Level 1 training. The two planned Level 2 courses (in January at Whistler and in March in Canmore) had to be cancelled due to a low number of registrations. The Avalanche Control course in January and the Avalanche Terrain course in March were not held due to lack of interest.

FORTHCOMING MEETINGS

Study Tour on Snow and Avalanche Problems

September 15-20, 1985

Study tour in Switzerland, Italy and Austria on snow, avalanches and forests, organized by the International Union of Forest Research Organizations Group on Forest Hydrology.

Information:

Dr. Hans Keller
Swiss Federal Institute for Forestry Research
CH - 8903, Birmensdorf
Switzerland

Avalanche Weather Seminar

October 25-27, 1985
Snowbird, Utah

Introduction to weather forecasting in mountains with application to avalanche hazard forecasting.

Information:

American Avalanche Institute
Box 308A
Wilson, Wyoming 83014
U.S.A.
Telephone (307) 733-3315

National Avalanche School

November 3-7, 1985
Reno, Nevada

The National Avalanche School is a two-phase, professional level training opportunity. The school should be of most value to people who have had some previous avalanche training and up to one season of avalanche-related field experience.

The Phase I five-day classroom session consists of lectures, small group workshops, exhibits, and discussions. The instructional staff of about 25 people includes both research scientists and operational avalanche experts. Attendance is limited to 200 students. Tuition for Phase I is $400.00.

Phase II is a three-day field session. The field sessions are offered in several different locations between December and February following the classroom session of the School. Participants in the field sessions must have previously completed the classroom work. Tuition for Phase II is $150.00.

Information and application:

National Avalanche Foundation
2638 Dapplegray Lane
Walnut Creek, CA 94596-6699
U.S.A.
Telephone (415) 937-9338 or (415) 933-3560

International Snow Science Workshop

October 22-25, 1986
North Lake Tahoe, California

Another workshop for merging theory and practice similar to the 1982 workshop at Bozeman and the 1984 workshop at Aspen.

Information:

ISSW
P.O. Box 567
Homewood, CA 95718
U.S.A.

PUBLICATIONS

Fredston, Jill and Fesler, Doug, 1984

Snow sense, a guide to evaluating avalanche hazard. Division of Parks and Outdoor Recreation, Alaska Department of Natural Resources, Pouch 7-001, Anchorage, Alaska 99510, U.S.A.; 45 p. Price U.S. $2.50 plus $.50 postage.

The pocket book summarizes the most significant considerations for recognizing, evaluating, and avoiding avalanche hazards in backcountry travel. It discusses snowpack characteristics and how to observe them, the most important weather factors, terrain features and decision making. Additional tips cover safety measures and self-rescue.

Proceedings of International Snow Science Workshop, A Merging of Theory and Practice; October 24-27, 1984; Aspen, Colorado. ISSW Workshop Committee, c/o Mountain Rescue Aspen Inc., Post Office Box 4446, Aspen, Colorado 81612, U.S.A.; 218 p.

The publication contains 35 papers presented at the Workshop. The papers cover a wide variety of topics including studies of avalanche frequencies, avalanche travel distances, snow stability and hazard forecasting, instrumentation for weather and snow observations, snow cover properties, search methods, effect of control work, and litigation. The book is a valuable reflection of the present "state-of-the-art" and informs the practical person about the ongoing studies aimed at increasing an understanding of the complex nature of snow and avalanches.

A limited number of copies are available at a cost of $12.00 U.S. Additional copies will be printed if the demand for them is sufficient. Copies may be ordered from the above address.

CHANGE OF TELEPHONE LISTINGS

Note the following changes of telephone numbers:

1. Avalanche Centre of the National Research Council of Canada, Vancouver, B.C.

Peter Schaerer	(604) 666-6741
Dave McClung	(604) 666-8046

2. Snow Avalanche Section, British Columbia, Ministry of Transportation and Highways, Victoria, B.C. (604) 387-6361

The mailing addresses of the two agencies have not changed.