

ASARC – the prequel

Bruce Jamieson

It was weird. Every time I asked Clair for something, he said “Yes.” I was a wanna-be MSc student at the University of Calgary and Clair Israelson was the Parks Canada warden in charge of avalanche forecasting at the Lake Louise Ski Area. With coaching from my future supervisor, Dr. Colin Johnston, I had a plan to measure the tensile strength of snow. I was asking Clair for advice on study sites, lift tickets, as well as regular chats with the forecaster on duty since I was also interested in making measurements of slab strength at recent slab avalanches.

Every day the first winter, 1986-87 — at least every day that I was not attending a class — I drove from Calgary to Lake Louise or Kananaskis Country, made some strength measurements, and learned about test techniques, consistency and recording. Towards the end of the winter, Peter Schaerer came into the field with me. When he saw my technique for testing the tensile strength of snow, he said I needed a sharper tool to cut the notches in my snow specimens more gently. I doubted him (never should have!) but was soon back in the field doing tests, alternating between the older cutter and a new sharper one. Based on a statistical comparison of the results — that was also new to me — the newer sharper cutter gave higher (less disturbed) and more consistent strength measurements. I adopted the new cutter and discarded my first winter of field data!

With this experience and some engineering courses completed (the math and physics courses from my undergraduate degree were insufficient), I was ready to enter the MSc program in Civil Engineering. Well, not quite. I had Colin Johnston as a potential supervisor but no funding to study snow strength. Fortunately a research grant application I had written was funded by the Alberta Government – not because it was a good application (it wasn't) but likely because avalanches were in the news in spring 1987 when the committee met to review applications.

After more courses and a second winter of field studies with better measurement technique, I wrote a MSc thesis, learning a lot from Colin about scientific writing. That fall I gave a forgettable presentation on snow strength at an avalanche conference in Edmonton. After the presentation, Mike Wiegele enthusiastically approached Colin Johnston and me, wanting to host avalanche research at his heli-skiing operation in Blue River, BC. Doors that I didn't know existed were opening for avalanche research!

After my MSc, while I was working as a weather station technician for a Calgary company, Colin and I teamed up with Mike Wiegele's operations manager, Ivan Somlai, to write an application to NSERC (research arm of Industry Canada) for three years of funding. This included some industry funding from Mike Wiegele, which — in hindsight — was a game changer.

NSERC approved the grant in December 1988 and I became employed as a research associate. We soon started field studies in Blue River with Mark Shubin as the first research technician. Mark and I observed and then later began to participate in the morning and afternoon guides' meetings. Peter Schaerer visited to coach us on the rutschblock and shear frame tests. Most days we spent hours getting an aging snowmobile up the Mt St Anne road to the study area. (In one of my stupider decisions, I chose to work weekdays in Blue River, drive to Calgary Friday night and then back to Blue River on Sunday afternoon and evening.) At the spring 1989 meetings of

the Canadian Avalanche Association, I presented first results from field studies with the rutschblock test — which later resulted in the nickname, Reverend Rutschblock.

The next winter, Colani Bezzola from Canadian Mountain Holidays (CMH) approached Colin and me, asking if there would be a role for CMH in the research program. Well, yes! Initially CMH, and then the association of helicopter and snowcat operators began to contribute funds and advice.

In spring 1992, Colin and I wrote an application to NSERC with financial support from Mike Wiegele, the Canadian Avalanche Association, and the helicopter and snowcat skiing operators. When the avalanche community heard the words “avalanche research” and “field studies,” they stepped up to the plate. Soon avalanche researchers from other countries were remarking on the participation of industry in Canadian avalanche research.

The main research objective of this proposal was to track persistent weak layers with profiles, shear frame and rutschblock tests. The term “persistent weak layer” was new and starting to replace “old snow instability”. In addition to continuous field studies in Blue River and at CMH Bobby Burns, weekly observations were planned at Jasper, Yoho, Banff and Glacier National Parks as well as at the BC highways operation at Kootenay Pass. Each of these operations was to observe a weekly profile and do a couple of rutschblock tests on a study slope. I was to visit each operation once per month. It was a demanding schedule requiring widespread field supervision — with which I had limited experience — and way too much driving! When NSERC and others reviewed the proposal in August 1992, they identified one major weakness: no graduate students! The application deadline for graduate school had passed but Colin Johnston worked some supervisory magic and I became a PhD student. That included taking more graduate engineering courses. What I needed was a course in time management!

I struggled to supervise two technicians in Blue River and rotating technicians and volunteers in the Bobby Burns (Colani Bezzola organized the volunteers), and make monthly visits to the national parks and Kootenay Pass. (Also I had been elected CAA president in spring 1992, but it was too much for me. CAA board members Jack Bennetto, Colani Bezzola and Dan MacDonald frequently filled the gaps until I stepped down in 1995).

At the field stations in the Bobby Burns and Blue River, we were tracking persistent weak layers and developing new techniques. Perhaps more importantly, an assortment of avalanche practitioners (too many to name) were working for the research program, spending a winter or two with their heads and hands in the snow, and discussing their results twice a day with guides. Many of those practitioners are now guiding, forecasting or managing avalanche operations. The integration of research with operations worked so well thanks to the commitment of managers and operational staff at Mike Wiegele and CMH heliskiing, as well as the patience of the support staff for oddball researchers.

Throughout the winter of 1993, ‘94 and ‘95, it was the remarkable people and field work that kept me going. I’d roll into a cheap hotel in a small wet BC town, get some sleep, usually meet the field staff for a big breakfast and too much coffee, then ski tour, sled or fly to treeline. There we would observe snow profiles and test the snowpack, and talk about weak layers, slabs and avalanches, before skiing down to the road. I was learning from the mountain snowpack and many remarkable guides, forecasters and technicians.

I recall one snowy day at Kootenay Pass with Will Geary. We were at a treeline study slope doing rutschblock tests. In the afternoon the snowfall picked up. Willy became eager to patrol the highway and check on a particular path that was “loading up.” I didn’t see anything critical in our tests and started yet another rutschblock test. Then I heard Willy snap into his bindings and say “I gotta go.” His experience with the local weather and terrain trumped the results of a few closely spaced rutschblock tests. The patrol from the highway, looking up through the snowfall into the start zones, was the appropriate scale for observations and a decision about closing the highway. Although I considered myself a practitioner with experience at two ski areas, these field days in many snowpack conditions with experienced practitioners from diverse operations were shaping my outlook and the research program.

Doors were opening internationally as well. During a visit to Alta, I stayed at the famous Lower Guard Station with Binx Sandahl and Duane Bowles. They shared amazing stories about avalanches and explosive control in the Little Cottonwood Canyon. During dinner one evening, Rod Newcomb dropped in, and the remarkable tales about avalanches shifted to Wyoming. Throughout this visit, I wasn’t allowed to pay for a lift ticket or a beer, largely because Mike Wiegele had “made a few phone calls”. I also met with Peter Lev and Bruce Tremper, who talked about forecasting and its challenges. Tremper drove me to the Salt Lake airport. When I confessed to having forgotten my passport, he was worried that this poor Canadian graduate student wouldn’t be leaving Utah!

In the spring of 1992, I was back in Utah for a small conference at Alta, mostly to celebrate the retirement of Ed LaChapelle and Binx Sandahl. Ron Perla spoke about the questions for avalanche research, one of which was the need for a “slab bug” that could be tossed onto the start zone, where it would detect the onset of instability. Twenty-three years later, small interconnected geophones are finally close to meeting Ron’s vision.

The results from winters of 1993 to 1995 included tracking persistent weak layers, refinement of the rutschblock test and the shear frame stability index for skier triggering as well as the first arrays of rutschblock tests. Looking back at the presentations from these years, it was clear that the conversations with practitioners had us thinking about a couple of questions:

- The variability in snowpack tests on a slope — which we were excited to have mapped on a few slopes — wasn’t telling us much about the variations in stability between different aspects and different drainages, which was important to the decisions of lead guides and forecasters.
- There was an important difference between a fracture starting in a weak layer under a skier and that fracture propagating away from the skier. The appearance of the fracture, sometimes called fast or slow, clean or dirty (which later evolved into fracture character) was telling us something about the potential for fractures to propagate.

These were formative years for what would later be called the ASARC program. Practitioners were sharing their experience and observations; the Canadian avalanche community was providing logistical and financial support; and international avalanche researchers were taking note of the remarkable collaboration between industry, government and university researchers.

In the sequel to this prequel, I’ll talk more about the growth of the ASARC program and collaborations that made it work.

** The following two figures are not cited in the text. I suggest they simply be placed with the text “newspaper style”.



Peter Schaefer demonstrates a Swiss rutschblock test during one of his early visits. Bruce Jamieson photo.



An array of rutschblock tests on a weak layer of surface hoar from 1991. Mark Shubin and Bruce made the third row of tests after the photo was taken. Note that a single test in the top left part of the array gives a misleading indication about local stability. Bruce Jamieson photo.

**** Bio for Bruce**

From 1986 to 2014, Bruce worked on field studies of snow and avalanches at the University of Calgary. Now, when not riding a cross-country bike or sliding on snow, he consults and is co-writing a book on methods for assessing and mitigating avalanche risk.



Jordan Stiefvater photo.