

# Snow Man

Civil engineer Bruce Jamieson studies the threat of avalanches

**B**ruce Jamieson, P.Eng. was spending a rare day in the office when I called in January. The avalanche expert and University of Calgary associate professor in the Department of Civil Engineering is mostly in the mountains at this time of year.

He begins talking about the winter's wacky weather. It is "beyond my experience in the last 15 years. We have not seen rain at those elevations in the Columbia Mountains in January."

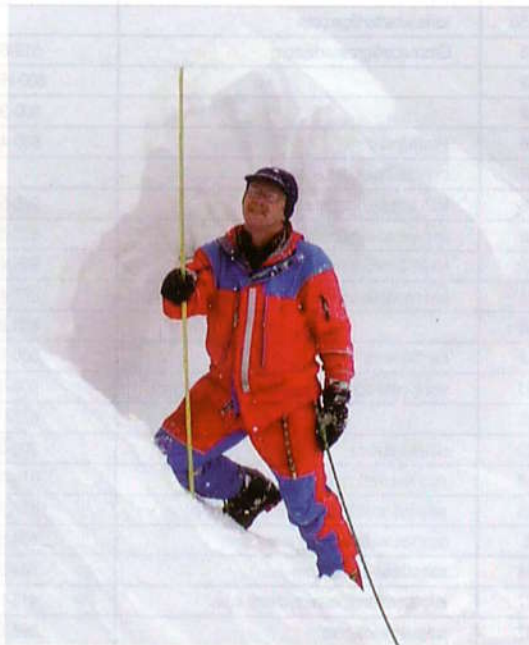
Jamieson, who also consults for Calgary engineering companies, has spent over two decades trying to improve avalanche forecasting. From study sites in Blue River and Rogers Pass in B.C.'s Columbia

Mountain range, he works with graduate students, backcountry ski operators and Ministry of Transport forecasters to come up with improved snow-testing techniques for avalanche prevention.

Jamieson's passion for the mountains goes back to the 1970s when he wanted some outdoor work after graduating from the University of Waterloo in Ontario. He climbed in the mountains of Peru and Bolivia before returning to Canada and joining an avalanche forecasting team in Fernie, B.C. Five years later, he headed to the University of Calgary to complete his master's and doctorate degrees.

Why did avalanches appeal to him? "Because they were outdoors and there were lots of things we didn't understand about them," he says.

"There is a misconception about avalanches: that they are rare and large. In fact, they are common and some are very small — they run around your ankles," he explains. An astounding 1.5 million avalanches occur each year in western Canada, in mostly uninhabited areas. Ninety per cent of the avalanches that result in deaths are triggered by people, and Jamieson and his research team have been working on the best predictors for this type of snow slide. Knowing the weather conditions for the day unfortunately



Jamieson high on the slopes.

does not help. "The weather on the day of human-triggered avalanches is very much the same as the weather on the day that human-triggered avalanches don't occur," he says.

Slab avalanches present the greatest threat to backcountry skiers. They are generated by descending skiers cracking weak snow layers below the top and causing the overlying slab to slide. Predicting whether or not an avalanche will progress, and how far, are key questions for the researchers. Snow pack levels are the best predictors, but they still leave lots of room for improvement.

"The tests that avalanche professionals and researchers have been using for the snow

pack in recent years are useful for telling us if fractures are likely to initiate over short distances, like 50 centimetres. But they are not very good predictors of whether that small fracture is likely to advance far enough to release an avalanche," Jamieson says. He is hoping to have a practical field test for snow slides available for use in the backcountry within the next three years.

He is also studying the effect of warming on snow stability, which varies dramatically depending on which way a mountain slope faces the mid-winter sun. Jamieson is developing a measurement that would show critical areas of warming that forecasters and guides could use in their morning meetings when making decisions on a day's excursions.

Human errors in judgment remain the major challenge in preventing avalanche accidents, says Jamieson. "When we are in the mountains we are not as rational as we should be: there is the thrill of powder skiing that is very strong and can sway our decisions. And under a blue sky, we don't feel as vulnerable as in fact we are travelling in avalanche terrain."

**CCE**

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