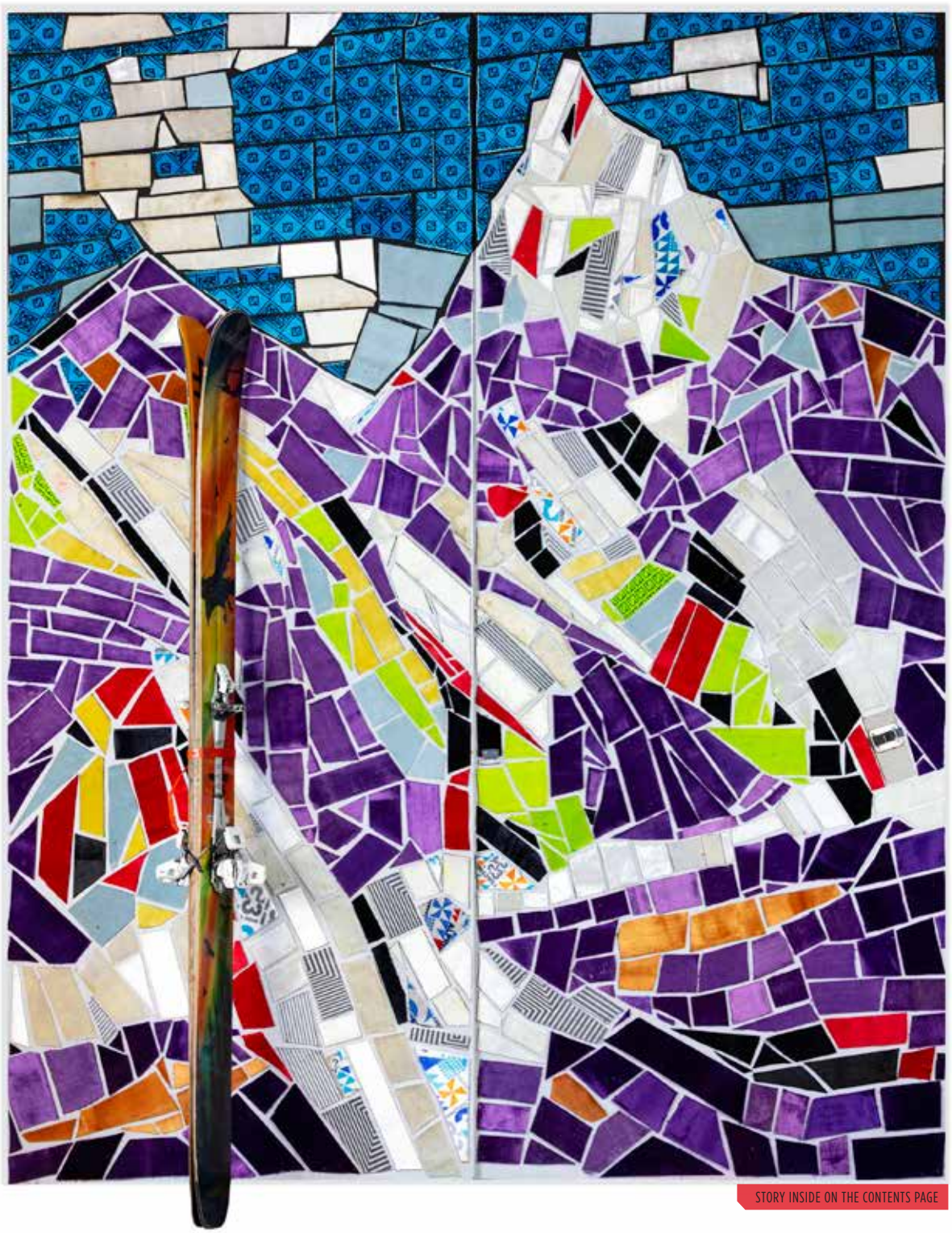
the avalanche journal



STORY INSIDE ON THE CONTENTS PAGE

WWW.CILEXPLOSIVES.COM

C·I·L

Explosives EXPERTS Explosifs

FOR REMOTE AVALANCHE CONTROL INFO CONTACT BRADEN SCHMIDT : 250-423-3302

FOR ALL YOUR AVALANCHE CONTROL NEEDS CIL/EXPLOSIVES AND IT'S PARTNERS HAVE IT.

C·I·L

AVALANCHE GUARD

FOR AVALANCHE CONTROL PRODUCT INFO CONTACT DAVE SLY : 250-744-8765

WHEN YOU REQUEST

CIL/EXPLOSIVES PRODUCTS

YOU ARE SUPPORTING

YOUR INDUSTRY

3% OF ALL PURCHASES

GO TO THE

canadianavalancheassociation

FOR TRAINING PURPOSES.

- *Aerodynamic designed product*
- *Secure threaded system for tight tailfin connection*
- *O ring protection to tailfin connection*
- *Payload of 2 ¼ kg of high explosives*
- *Best value per KG available*
- *7 Sluggers per case*

SLUGGER SNOWLAUNCHER

SNOWLAUNCHER (CLASSIC & OTHERS)

the avalanche journal

CANADIAN AVALANCHE ASSOCIATION BOARD OF DIRECTORS

President Walter Bruns
Vice-President Lisa Porter
Secretary/Treasurer Mark Bender
Director at Large Ryan Buhler
Director at Large Scott Garvin
Director at Large Steve LeClair
Director at Large John Martland (public representative)
Director at Large Matt MacDonald
Director at Large Ken Saldern (public representative)

COMMITTEES

Complaint Investigation Committee
Paul Harwood (Chair)
Peter Amann
Rod Gibbons
Al Matheson
Nigel Stewart
Chris Turner
Kenzie Wade

Discipline Committee
Lisa Larson
Kevin Maloney
Tom Morin (External)
Bree Stefanson

Education Committee
Steve Conger (Chair)
Cam Campbell
Tim Haggarty
Andrew Nelson
Tim Ricci
Rick Schroeder
Craig Sheppard
Iain Stewart-Patterson

Ethics and Standards
Brendan Martland (Chair)
Aaron Beardmore
Walter Bruns
Ryan Buhler
Steve Conger
Steve Robertson
Tony Sittlinger
Scott Thumlert
Doug Wilson

Explosives Committee
Steve Brushey (Chair)
Kyle Hale
Rob Hemming
Andre Laporte
Marc Lomas
Kevin Marr
Jesse Percival
Braden Schmidt
Nigel Stewart
Mark Vesely
Rupert Wedgwood

Governance Committee
Robb Andersen (Chair)
Mike Boissonneault
John Buffery
Phil Hein
Lisa Paulson
Debbie Ritchie (Active)
Chris Stethem (Honorary)

InfoEx Advisory Committee
Brad Harrison (Chair)
Chris Argue
Tim Haggarty
Ryan Harvey
Anton Horvath
Bruce Howatt
Karl Klassen
Niki Lepage
Tanya McKinney (Asc)
Josh Milligan

Information Technology Committee
Scott Garvin (Chair)
Eirik Sharp (Co-Chair)
Kristin Boucher (Associate)
Andrew Grasmuck (Associate)
Brad Harrison
Andrew Jones
Tanya McKinney (Associate)
Josh Milligan
Mike Smith

Leadership Identification Committee
Robb Andersen

Membership Committee
Ryan Buhler (Chair)
Nick Dykshoorn
Jock Richardson
Jan Tindle
Shannon Werner

Past Presidents Committee
Bruce Allen
Aaron Beardmore
Jack Bennetto (Honorary)
Steve Blake
Phil Hein
John Hetherington
Bruce Jamieson
Bill Mark
Peter Schaerer (Honorary)
Chris Stethem (Honorary)
Niko Weis

Technical Committee
James Floyer (Co-Chair)
Rob Whelan (Co-Chair)
Scott Garvin
Bruce Jamieson
Dave McClung
Bob Sayer

All committee members are CAA Professional Members unless noted otherwise.

Contact *The Avalanche Journal* editor: editor@avalancheassociation.ca
Return undeliverable Canadian addresses, change of address and subscription orders to: Canadian Avalanche Association PO Box 2759, Revelstoke BC V0E 2S0 Email: info@avalancheassociation.ca
Publications Mail Agreement No. 40830518 Indexed in the Canadian Periodical Index ISSN 1929-1043

CAA Executive Director
Joe Obad

CAA Operations Manager
Kristin Anthony-Malone

Comptroller
Eiri Smith

InfoEx Manager
Stuart Smith

IT Manager
Luke Norman

ITP Manager
Emily Grady

ITP Coordinator
Katherine Dalman

ITP Student Services
Audrey Defant

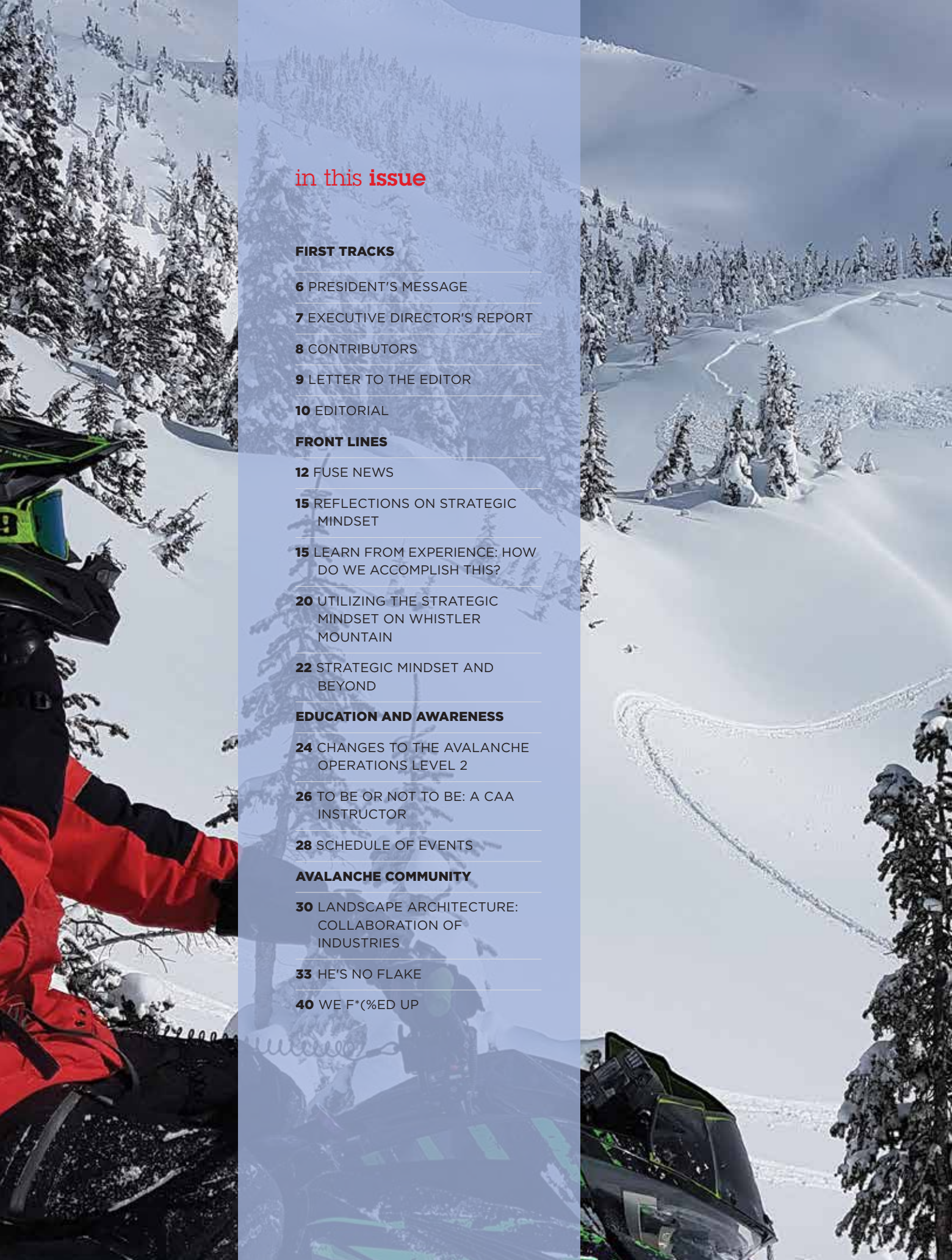
ITP Logistics & Administrative Assistant
Jess Landing

Managing Editor & Communications Specialist
Jill Macdonald

Membership Services
Andrea Lustenberger

Publications & Properties
Brent Strand

Software Developer / IT Support
Ben Clark



in this **issue**

CONTENTS
SPRING 2019

COVER IMAGE THESE SKINS WERE MADE FOR WALKING
ROB BUCHANAN HAD AN IDEA. HE ENVISIONED A MOSAIC OF MT SIR DONALD, MADE FROM CLIMBING SKINS. NEXT THING HE KNEW, SOME LEGENDARY STRIPS OF DIFFERENT COLOURS AND TEXTURES STARTED TO PILE UP IN HIS STUDIO. OLD ONES, NEWER ONES, NEVER USED ONES. ANTIQUES. PROTOTYPES. A TANGLE OF STORIES.
DONATIONS CAME FROM SOURCES LIKE AVALANCHE PIONEER FRED SCHLEISS' GLUELESS SKINS TO ONE OF GREG HILL'S WORLD RECORD SETTING 2 MIL SKINS. PRO FREESKIERS, A FORMER NATIONAL RANDONNÉE TEAM MEMBER, PARKS CANADA AVALANCHE CONTROL AND PUBLIC SAFETY, RMR SKI PATROL, CMH, ACMG, FOLKS FROM THE CAA AND AVALANCHE CANADA. IT'S A MOSAIC OF THE MANY PEOPLE, ORGANIZATIONS, ADVENTURES AND HISTORY THAT DEFINE BACKCOUNTRY SKIING AND SNOWBOARDING IN THIS AREA. INSTALLED AT THE ROGERS PASS DISCOVERY CENTRE. IF THOSE SKINS COULD TALK.

CONTENTS FROZEN PIRATE SNOW SERVICES

Remote Avalanche Control Systems

Proven gas-blast technology used worldwide

gazex®

Parks Canada - Banff - Bourgeau Gazex Avalanche Path Control

Images: Ian Jackson

SAFETY • SECURITY • RELIABILITY

daisybell®

gazex®

O'bellx

nas Natural Hazards Control Solutions

Remotely controlled hazard reduction devices using powerful gas airblast technology.

- Fixed and mobile solutions for every need
- Combines ease of use with 24/7 reliability
- No residue or duds
- No explosive storage or transportation issues
- ***Daisybell*** – mobility and efficiency – 50+ shot capacity
- ***Gazex*** – powerful and permanent
- ***O'Bellx*** – small footprint and self contained – 30 shot capacity
- **2500+** Gazex exploders in use worldwide
- **50+** DaisyBell's in active use worldwide

AVATEK Mountain Systems

AvaTek Mountain Systems Inc.

250.344.2122 www.avateksystems.ca

Golden, BC, info@avateksystems.ca

President's Message

Walter Bruns
CAA President

AT TIME OF WRITING, winter was definitely hanging in there. Is there a glimmer of light at the end of the tunnel?! By now, your entire strategic mindset might be just one word: "SPRING!!"

Yes, our spring conference is just around the corner. Hopefully you will be able to join us and take part in many interesting sessions over the course of the week. [Joe outlines details on pg 7]

You have been bombarded by email blasts and posts on our website regarding the upcoming election. Let me briefly acknowledge the outgoing directors.

When John Martland took his seat on the board, I remember being in the audience wondering why we needed such a high-powered lawyer (and former president of the Alberta Law Society) for our modest organisation. Well, how little I knew then. John has provided sage advice and wise counsel on countless complex and sensitive matters these past six years. He was instrumental in our transition to a federal society. Thank you so much John! We still have your cell number…

Steve LeClair is a retired Whistler RCMP Detachment Commander who represented active members on our board over the last four years. Before last October, he didn't bust anyone to my knowledge! Steve remains a director and active member of the Whistler SAR team. He is stepping down in order to devote himself to his other commitments. Oh, did I mention that he spends most of every summer on his sailboat on the east coast? That means he'll be sailing into the sunrise out there… fair winds and following seas…thanks Steve!

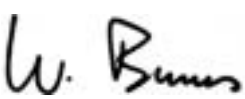
Revelstoke local Mark Bender is an ACMG ski guide, ITP instructor and Avalanche Canada forecaster. Mark was Chair of the Membership Committee and joined the board in 2015 to serve most recently as Secretary-Treasurer. He stopped in frequently to confer with CAA staff and provide oversight of our financial affairs. Thank you, Mark!

Kelvin Caldern (public representative appointed by the board last fall) is standing for election. Finally, Lisa, Ryan and I are standing for re-election for another two-year term.

Please attend the AGM and exercise your right to vote. The final slate of all candidates was communicated after nominations closed on April 7. If you missed that chance, consider putting your name forward for a seat on one of the numerous committees working diligently on your behalf.

For any CAA board or committee role, the time commitment is reasonable, satisfaction is guaranteed, and compensation is zero – how's that for a sales pitch?!

Looking forward to seeing you in Penticton!



Walter Bruns, CAA President

Joe Obad
CAA Executive Director

Executive Director's Report

THE DAYS ARE LONG - THE YEARS ARE SHORT

SPRING IS RACING TOWARD US and soon the culmination of our CAA work will be on display for members, with board, staff and committees on hand to celebrate, elaborate and explain. This annual milestone has been driving staff for months. Time since we last met with at the 2018 AGM seems to have disappeared in an instant. Indeed, the days have been long but the year since the last AGM gone past in a snap.

First, a tip of the hat to Andrea Lustenberger, Membership Services lead, and Operations Manager Kristin Malone. They have worked hard to revamp the model for delivering CPD in both the spring and fall. Fall CPD has been delivered regionally, allowing more practitioners to attend. This change allows us to carry over some topics from fall to spring and vice versa. Andrea and Kristin have also worked to dovetail our efforts with the ACMG, allowing both of our memberships to enjoy the benefits of our partnership on CPD.

Video recordings of this year's spring sessions are scheduled once again and will be posted during the weeks following the conference. Check these out if you are unable to make it to Penticton. Links to previous CPD and case study sessions can be found in the members only section of the website. Reminder that viewing these sessions counts toward your CPD.

On the InfoEx front, it has been a busy year. We launched a new InfoEx service internationally. Run entirely separately from the Canadian InfoEx, the international model features a "Tinder" style approach allowing its subscribers to define their sharing networks. Kudos to InfoEx Manager Stuart Smith for spearheading the initiative, and developers Luke Norman and Ben Clark for holding up the technical end.

A frequent question/mantra around the office when discussing international work is: "How does this support our goals in Canada?" Our focus remains on the sustainability and affordability of InfoEx. We continue to work within the goals of the Board-approved business plan to generate international revenue to support the product at home.

The Industry Training Program remains our largest and most complex program. ITP Manager Emily Grady and Program Coordinator Katherine Dalman have ably led the charge, with support from Students Services' indefatigable Audrey Defant and logistical support from newcomer Jess Landing. The good news is that ITP worked incredibly efficiently in its course delivery, from a financial perspective. However, there were strains in properly resourcing courses with instructors.

We have begun the process of clearly identifying the barriers to instructor availability and strategies to mitigate these shortages. Although we are not there yet, we have determined that a multipronged approach will be required to match instructors with suitable courses. I'm pleased to say the Board is committed to supporting our best strategies with a newly created fund to support instructor training.

On the project front, Emily Grady continues to oversee the overhaul of ITP curriculum to match our competency profiles. This work is often referred to by its NSS funding application title, CAARAT— Competency Aligned Avalanche Risk Assessment Training. Running parallel to CAARAT is a broader effort to revise new member criteria and ongoing professional development. In the fall, subject matter experts Bill Mark, Lori Zacharuk, Chris Dyck, and Tony Sittlinger helped us develop a competency portfolio for testing. The portfolio is to act as workplace evidence to complement course work for membership criteria. Ten brave individuals volunteered to test the portfolios. Tester feedback has affirmed some assumptions and challenged others. We thank the volunteers for assisting us in this important work.

Project manager Kathy McKay was brought on the guide the competency project forward. Also joining the team is Brendan Martland, as a subject matter expert. As Brendan is about to step down as Ethics and Standards Chair, he is well situated to contribute a well-rounded perspective to this project. Brendan and Kathy will update the membership in Penticton on the work to date and the direction ahead.

On behalf of all staff, we look forward to seeing many of you at the Spring Conference.

Joe Obad, CAA Executive Director

Contributors

TIM HAGGERTY
From Onterrible to Sunshine Village and NZ, Tim has settled into the BBQ's and heated Dominos games on the Whistler ski patrol. He has been Anton Horvath's partner in crime for the last couple seasons as the "Avalanche Senior Specialist". Tim also instructs CAA Level I courses.
20 UTILIZING THE STRATEGIC MINDSET ON WHISTLER MOUNTAIN

ANTON HORVATH
Anton's bio comes in bullets. He gets straight to the point.
- Whistler Mtn Avalanche Forecaster, Snow Safety Supervisor
- Avalanche Rescue Dog Handler with CARDA; Carda instructor and board member
- Currently with 4th SAR dog, Zeus.

20 UTILIZING THE STRATEGIC MINDSET ON WHISTLER MOUNTAIN

NADINE OVERWATER
Registered professional forester Nadine got her first taste of both the avalanche and forestry worlds when she moved to Revelstoke in 2008. As the planning forester at Downie Timber, she manages forest development and winter avalanche safety. Her professional snowmobile guide and freerider qualifications come in handy at work and in her spare time, when she runs women specific skills clinics through her La Niña Sled Camp. If there is ever a dull moment, she surfs, oceans not the web.
30 LANDSCAPE ARCHITECTURE COLLABORATION OF INDUSTRIES

GRANT GUNDERSON
Grant founded *The Ski Journal* where he served as Photo Editor for over six years. From Iceland to Patagonia, Grant routinely produces unique deep powder imagery and authentically documents the lifestyle and culture of skiing. He currently serves as a Senior Photographer for *Powder Magazine* and Field Editor of *The Ski Journal*. He skis close to 200 days a year.
40 WE F*(%ED UP

ROGER ATKINS
Roger has a background in the physical sciences and a passion for powder skiing. This led to curiosity about the physics of snow and avalanches, a certain negligence at office work, and more than thirty years as a helicopter ski guide. Roger's goal has been to find methods that balance technical knowledge with positive human attributes to improve backcountry avalanche risk management. Competence depends on who you are as well as what you know; becoming competent involves personal development.
15 REFLECTIONS ON STRATEGIC MINDSET

KIRSTEN ROWLEY
Kirsten is a firefighter and outdoor adventurer from the Hood River area that loves to ski and mountain bike. She was adamant that this story be told, and insistent on the importance of questioning our partners on protocols and plans.
42 WE F*(%ED UP REFLECTION

Letter to the **Editor**

DEAR CAA,

On the cover of the latest *Avalanche Journal* we find a photo ripe with intrigue. The provided caption reads, "Full Situational Awareness-?" with some interesting punctuation. I think the take away from this photo is supposed to be 'hey, maybe this person should check their six'. But now we see the caption added at the bottom, and the story becomes much richer. The three emotions triggered are layered like a box of Neapolitan.

Vanilla: Impressive storm. A little awe mixed with reverence.

Strawberry: "Lol, check out Buddy." Curiosity, with a hint of anxiety.

Chocolate: Full Situational Awareness"-? WT? Is that a statement or a question?

What's in that statement-question? Why the hyphen? Well here we go… Professor Phaedrus said that there is meaning in everything, even punctuation. This particular statement-question instantly got me focused on perception, in particular the perception of people prone to prosecute a person poorly. I feel compelled to discuss the three topics most prominent on the cover page; avalanches, tornadoes and lawn mowing.

Let's break the statement-question down; if we see it as a question, this is incredibly judgemental. And I think most of us saw it as a question when we first set eyes on the cover. Full Situational Awareness? Obviously not. There are lingering implications that we as spectators and laymen, know best. Surely we do because we can see that the person in the picture is ignorant of the fact that they are about to die. Because tornadoes kill you, right? The person is clearly unaware of the hazard; otherwise they would be running for the root cellar… right? Hang on. There's a hyphen before that question mark. Could this be a statement that is questioning our awareness?

PERCEPTION.

What if I were to inform you that the person in the photo is Colonel John Daniels of the Tennessee Weather Regiment? The greatest meteorologist of our time with a doctorate in interior plateaugraphic anomalous circular pressure patterns. Wait, what's this?! The high pressure that we see pressing in from the North West is clearly the weather pattern break that was predicted. The tornado's heading the other way. You might say that he has **"Full Situational Awareness!"** Impressive. A good time to mow the lawn.

The play on perception is that as avalanche professionals, we have the public's eye on us. They see us sitting on the ridgetop quietly enjoying a nice ripe mandarin during a massive avalanche cycle. Or merrily skiing that beauty little 25 degree tree run at the south end of the tenure while the size 3.5s take half the mountain to valley bottom. The public gets worried- "Who is this joker with complete disregard for my safety?" And while the roots are getting ripped from the earth, we are calmly mowing our proverbial lawn. And sometimes the public pressure to leave the mower in the garage might mean missing out on those perfect, north facing, over the shoulder lawn mowing days. Perception.

So take a look at the cover again, and at every cover again and let your perception change, and maintain your psytuational as well as your situational, awareness.

Thank you for your punctuation and the ensuing Zen.

Sincerely (and with a little reverence),

Eric Chevalier,
CAA Professional Member
Aspiring Lawn Mower
Perceptionist

Strategic **Mindset**

Jill Macdonald
Managing Editor

STRATEGIC MINDSET STARTED out as an intangible feeling. It was a combination of data and intuition based on experience. Roger Atkins observed this process in himself and put a name to it: strategic mindset. He went on to explore how it could be used to help guide teams approach each day with a simplified and collective decision-making process. He coined terms that identified specific circumstances and gave people common language to help understand and acknowledge an individual's mindset with less assumptions being made. In turn, the process could help influence decisions to stay in character with other team members' mindsets and identify for discussion any large discrepancies. In a nutshell, strategic mindset is "a predisposition that influences actual decisions."

In other words, a filter. A process that's meant to help frame the situation at hand and apply collective learnings to it, to make good decisions and avoid traps many have fallen into previously. Having an informed predisposition would be a vacation from impulse buys, irrational decisions, and a multitude of poor health habits, not to mention repeating any of our usual mistakes. Logical, simple. A shopping list that sticks to the budget.

One assumes that with a slight application of discipline to keep this mindset front of mind, it could be easily adopted as a daily practice. We'd soon find ourselves becoming familiar with the set of terms, what they mean, how they look in context and how to bring them forward at the necessary moment. We could refer to the list and keep it in our pocket. Enter the tricky part. Or two tricky parts.

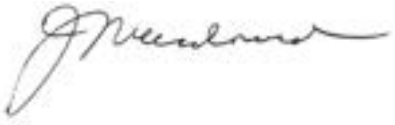
To a non-professional reading articles and observing the avalanche industry from outside the inner circle, the significance of language is startling. Nuances are layered into concepts that are complex in themselves. People banter around terms like heuristics, Bayesian analysis and feedback loops that confirm biases. Heady stuff. There is so much precision coupled with concept. It's like poetry—crystal clear when you have years of experience reading and interpreting the lines; at best a lifting fog during the first years of a career. Opportunities for miscommunication and misunderstanding appear to be scattered like landmines.

The single biggest problem with communication is the illusion it has taken place. George Bernard Shaw

The first tricky part is to establish, or feel, that we have grasped the issues and are referring to the same concerns with an established method to address them. *Example: Jan 19th layer @ 1700m: ski around unsupported features and avoid shallow terrain. Mindset is Stepping Out.* Got it. We're are all on the same page. Or are we? For myself, I can freely admit to having left significant meetings with the distinct and sometimes fearful sensation that I understood nothing. Is what I think the same as what others on the team think when we say Stepping Out behaviour?

Enter challenge number two. Suppose that we are naturally biased toward actions that fulfill our desires. We want what we want and too often, we're not interested in what stands in our way of fulfilling that want. We ignore clear warning signs, we toss aside contradictory information, we forget prior knowledge. In the heat of the moment, we forget to recall our filter, we stray from the list. Our strategic mindset is rendered ineffective in this scenario. But it happens.

The mountains can present significant consequences when we fail to adjust our desires to the current conditions. Coming home happy with the day requires calibrating expectations or objectives to the situation at hand. At times that means toeing the line, transforming frustration into acceptance, recalling simple satisfactions. One of the first rules of shopping is not to go when you're hungry; you'll end up with too much in your cart and nothing to eat. Keep the list handy .



Jill Macdonald

front lines

15

REFLECTIONS ON STRATEGIC MINDSET

in this **section**

Fuse News

Steve Brushey - CAA explosives committee chair

LAST FALL A GROUP of avalanche sector representatives and other blasting industry stakeholders were invited by WorkSafeBC to participate in a proposal to amend Part 21 of the Occupational Health and Safety Regulation – Blasting Operations. The purpose of the proposed amendments is to:

- Address changes in blasting technology and associated safe work practises
- Ensure consistency with recent changes to the federal Explosives Act and Explosive Regulations
- Clarify regulatory requirements
- Simplify language

Stakeholders were generally supportive of the proposed amendments to the Part 21 definitions and expressed support for the proposed language clean up. Without going into detail, the intent of the text edits was to provide better clarity for the regulator, employers, and workers.

Certification of blaster: In general, support was expressed for the proposal to require candidates seeking a blasters certificate to have completed eight hours of annual training. There were differences in opinion as to what annual training could look like and WSBC suggested each blasting sector could have its own guidelines.

Storage of explosives: Stakeholders generally supported the proposed changes intended to clarify language to both section 21.16 (storage of explosives; and 21.21 (separate handling of detonators). Although not part of the minutes we received, attendees also discussed how a blasting operation pre-plan (section 21.2.1) will become a requirement when the new regulations come into effect. This likely won't affect any operations except for those that don't already have it recorded into their morning evaluation or documented elsewhere. In addition, although not documented, WSBC does not at this time need to be informed of all misfires that an operation may have. It is required that WSBC be informed of any trends that result in an increase in the rate of misfires or any other anomalies however, it is not clear to whom or how this trend should be reported to WSBC.

Transportation of explosives: Under discussion was vehicle operation (section 21.22). Some stakeholders felt this was already addressed by federal regulation and wondered how section 21.22 would be enforced. There was consensus that the requirement to have two locks on the compartment containing the explosives (rather than only one) was unnecessary. Stakeholders also recommended that the qualified person in charge of the explosives during transport be designated by the employer rather than by the blaster on record. Vehicle load limit (section 21.30) had no proposed amendments, however all agreed on removing the 80% requirement on the basis that it is outdated. Overnight parking (section 21.35) was discussed in detail, without resolution. One manufacturing representative did suggest adopting different requirements for different types of explosives as is the case in the US and Mexico.

Handling explosives: Proposed working amendments to sections 21.37 (defective explosives) and 21.39 (abandoned explosives) were supported. Containers (section 21.41) discussion centred on the proposal to change, for clarification purposes, better wording for empty explosive containers. Stakeholders expressed concerns about the environmental impact of burning and municipal bylaws. The revised regulation also appears to be considering guidance on the recycling of emulsion boxes. Safety fuse assembly; Initiation had overall support for the prohibition against the use of ignitor cord (section 21.57 (3)) and for changing the term "safety fuse" to "safety fuse assembly" wherever it appears. Under section 21.66 blasters responsibility, there was good support for renaming the section *Responsibilities of the blaster and employer* in order to place some of the onus on the employer. WSBC staff explained that the ultimate responsibility would lie with the employer to ensure the requirements of section 21.66 are met.

Returning to the blast site: There was unanimous overall support for the proposal to change *blasting area* to *blast site* in both sections 21.71 and 21.72.

Lastly, there was an (undocumented) discussion regarding a proposed requirement to have blasters maintain and keep up to date a lifetime log of their blasting activities.

[1]Professional members Anton Horvath, Johann Slam attended the meeting along with the CAA's ED Joe Obad.

This is a highlight of the topics that were discussed and is only intended to be a high-level overview. It is by no means conclusive and there may be some inaccuracy in the reporting. Although the explosive committee did not attend the meeting[1] explosive committee was tasked by the CAA board of directors to:

Monitor WSBC communications for the release of revised draft blasting regulations in 2019. Following the release of the draft regulations:

- *the committee should offer an opinion of the regulations to the board of directors and any change that would be in the interest of the public and CAA members*
- *the committee should consider recommending a generic procedure that ensures prior to igniting the fuse on double- primed charges that steps are taken to ensure the lit fuse is not confused with explosives for deployment in the same mission*

There will be more to come on this topic. Hopefully by the time of the spring meetings in Penticton, the explosive committee will have received a draft copy of the proposed changes. WorksafeBC does plan on having online consultation during winter/spring 2019 and the project will go to a public hearing in the fall of 2019. Explosives remain a vital part of the avalanche tool kit. Our committee looks forward to providing CAA members with perspective to comment on WSBC's proposed changes. Together we can ensure any changes in regulations support safe and effective avalanche operations.

// WREN MCELROY

Reflections on **Strategic Mindset** Introduction

Walter Bruns

KOBI WYSS WAS CMH Guiding Operations Manager back around 1990. He came to me one day and said (almost a direct quote – something like): "Hey, there's this guide from Utah who wants to work here. He's a physicist and really good with computer stuff. Even built a database for snow observations. Do you think we should hire him?"

The name Roger Atkins was familiar. His work in the avalanche patch was already well recognized. His experience at Wasatch Powderbird Guides was extensive. I replied on the spot: "If we can get a work permit, HIRE HIM!"

So this soft-spoken, somewhat shy, square-jawed, broad-shouldered guy shows up in Banff. There was a lively intensity and unbounded intellectual curiosity about him. He went to work in BC. He brought his computer with his guiding gear. He loved all things Canadian. He made a career and a home here.

"Snowbase" evolved dramatically over some 30 years. Roger built on his original concept, adapting it continuously to the needs of a complex operation. He did a lot of this work while guiding full shifts, in his spare time, or on his own time. He collaborated closely with CMH Snow Safety Director Colani Bezzola. Oh to be a fly on the wall in the room where Roger and Colani were debating their (rather strongly held and often quite distinct) views on what the software could do, should do, would do, or not; depending!

Roger's creation grew out of the environment that he grew into. He'll be the first to acknowledge the influence and contributions of so many of his colleagues and peers. Snowbase was truly ground-breaking work, showing the way for development of related systems such as the CAA's InfoEx and Avalanche Canada's public interfaces.

But lively intensity and unbounded intellectual curiosity do not rest. Roger still guides at Galena. As Werner Munter once observed: "My god, you people LIVE IN THE SNOW!" Yes, when you dig steps down to your front door, or wallow to the study plot, and spend most days out in the mountains, you very much become a product of your environment.

Roger looked into the minds of the guides he worked with, and he looked within himself. He saw patterns of attitude, belief and behaviour emerge. Ever the physicist, he identified, categorized and sought functional relationships. He implemented ideas and tested them with the team. He has given us the concept of "Strategic Mindset".

What we do with it is up to us.

Reflections on **Strategic Mindset**

Roger Atkins

I FIRST WROTE ABOUT STRATEGIC MINDSET in an appendix to my CAA Level 3 project. Some years later I presented strategic mindset in Banff at ISSW 2014 in a paper entitled "Yin, Yang, and You." I am surprised by the amount of interest these papers received from professional guides, but also among people doing other types of avalanche safety work. Some guiding operations chose to formally incorporate strategic mindset into their meetings; this is now common practice in North America and elsewhere. The strategic mindset idea originated in the context of guided helicopter skiing, but the concept can be adapted to other endeavours.

During a helicopter skiing operation's morning meeting, the guides discuss and assess hazards and other considerations for the coming day and produce a 'run list' - a binding agreement that excludes some runs from consideration for the day and identifies which other runs are open for guiding. The run list is only the first level of the day's decisions; many hazards remain on open terrain and actual travel and risk treatment decisions continue throughout the day. I noticed that I automatically take something less tangible than the run list but equally important away from the meeting, something that strongly influences my remaining decisions. I recognize this as a mindset: a personal perspective on the day. This perspective (or filter) makes me wary of certain terrain characteristics. It also establishes a desire for select rewards to seek and attracts me to terrain that offers those experiences.

"When we change our mindset, we actually change the way we see the world." - Shelly Carson, Harvard Brain Researcher

As implied by the following definition, a mindset results in an inclination that influences decisions, but it should not be considered a recipe for making decisions.

MINDSET:
1. A fixed mental attitude or disposition that predetermines a person's responses to and interpretations of situations.
2. An inclination or a habit.
(The American Heritage Dictionary, 2009)

Although strongly related to the discussion around hazard assessment, I also noticed how my mindset is influenced by other factors. Some are personal, such as fatigue or desire; some are operational, such as terrain maintenance through skier traffic. Over time I identified that certain situations repeatedly led to familiar mindsets. It occurred to me that perhaps there is value in identifying familiar situations and in strategically adopting a corresponding mindset.

Guiding operations do not willingly add anything without value to their daily routine, so what does strategic mindset provide that was not there before? One standout benefit is that strategic mindset is a communication tool. The language of strategic mindset can help guides express how they feel about the approach to the day. We have always informally shared our feelings but adding strategic mindset to the meeting agenda makes this more consistent. During the day, it also provides a clear and concise way to communicate if our mindset is changing or if our actions seem inconsistent with the mindset. This communication can help us work better together as a team. Strategic mindset is also useful for communication between operations. Some guides use strategic mindset to communicate with their guests.

Strategic mindset is a deliberate biasing strategy. Although it is typically reflected in the daily run list, I find that my mindset is most relevant to on-the-spot guiding decisions during the day. When approaching a potentially critical terrain feature, we must decide whether to avoid it, to stop and manage the risk, or to just ski right over it. This happens

tens of times per day and we are quickly overwhelmed by a detailed analysis of every decision; strategic mindset can simplify many of these decisions. Choices that fit the mindset often require relatively little effort while choices that are out of character with the mindset demand more careful assessment.

Decisions in avalanche terrain are high consequence risk vs reward decisions that are made under uncertainty. Traditional methods and education tend to focus on the hazards and associated risks and completely ignore the reward part, but the potential rewards are the only reason we even accept any risk. We cannot account for our humanity without considering the rewards. Even at the best of times, our written assessments tend to read like a horror show, only identifying hazards and not speaking to positive aspects that enable us to satisfy our desires without unacceptable risk. Strategic mindset is more balanced in that it includes the idea of adjusting one's desires to fit the situation. Some familiar mindsets bias us toward actions that keep us safe in difficult times while other mindsets enable us to capture our dreams when the opportunity arises.

We are naturally biased toward actions that fulfill our desires. Part of strategic mindset is to adjust our desires to fit the situation, thus creating a motivational bias toward actions that fit the situation. One of my fellow guides summarized a past close call nicely:

"It was a stupid idea...I mean, it was a good idea, but it was the wrong day."

There are potential downsides to the operational use of strategic mindset. Strategic mindset is a deliberate bias. An appropriate bias is beneficial, but what if we get it wrong? Interestingly, when we make the wrong choice of mindset, I find that it is usually easier to recognize the mistake, change our mindset, communicate the change and adjust our decisions than to re-analyze the hazard assessment and adjust accordingly. Maybe this is because the mindset manifests itself as a feeling rather than the conclusion of an analysis. Nevertheless, it is critical to keep open eyes and an open mind to combat confirmation bias, both for hazard assessment and strategic mindset.

My original list of familiar mindsets is not intended to cover all situations and it can be an undesirable distraction to try to select the right choice from such a list. As implemented at CMH, we are not forced to choose a mindset. We can leave it undetermined or coin a phrase that captures a new strategic mindset, for example High Alert or Spring Transitional. Worthy additions that are concise and self-explanatory will persist; others will naturally die. I encourage expanding the list of familiar mindsets and adapting it to suit your needs. Allow the language of strategic mindset to evolve.

The use of strategic mindset is not a substitute for diligent observation and assessment. Strategic mindset is intentional manipulation of human behaviour to our benefit. It is intended to work in conjunction with a solid foundation based on the fundamentals of avalanche hazard assessment.

// KRISTIN ANTHONY-MALONE

Learn from Experience: **How Do We Accomplish This?**

Clair Israelson

CHANCE AND UNCERTAINTY are inherent in our efforts to manage risk in avalanche operations. Compare the following definitions of risk. The 2016 Observation Guidelines and Recording Standards for Weather, Snow and Avalanches (OGRS) defines risk as: *"The chance of injury or loss as defined as a measure of the probability and severity of an adverse effect to health, property, the environment or other things of value. CSA, 2002."* The International Organization for Standardization (ISO) defines risk as: "The effect of uncertainty on objectives."

Our community has embraced data analysis to quantify hazard and risk, but little has been stated about the experiential learning that underpins our analytical expertise. If we are to reduce the effects of chance and uncertainty on our decisions, I suggest we need to develop a lexicon that quantifies the learning curve and effects of experiential learning and then incorporate that lexicon into our risk management guidelines and strategies.

How do we learn from experience? What is the role of experience over time on the decisions we take to manage avalanche risks in the workplace? OGRS defines how we collect and record a comprehensive set of data relating to our respective operations, but does not describe how we draw meaning (operational conclusions) from that data. To extract meaning from operational data we need experience. The critical role of experience and its derivative, intuition, in avalanche risk management has not yet been examined objectively and systematically by our community.

Intuition develops when experience is combined with reflection, a mental sorting process where we ask ourselves what those data mean in the context of today, the current winter season, and all prior seasons that we have notched up in our careers. Reflection is our Bayesian process of generating a mental model or forecast of the conditions we expect to encounter. Reflection generates pattern recognition: similar data and their observed results in the mountain snowpack, based on experience. Sample size matters because the more events we experience, the more powerful those patterns become in anchoring our future decisions. Without context provided by experience-primed intuition, avalanche forecasting would be impossible.

We know about our divided brain and dual processor theory. Our conscious, analytical brain encodes its information in words and numbers so it can talk to colleagues, lawyers and the cops to demonstrate due diligence. Our experiential, intuitive brain encodes different, often subtle information as feelings, emotions and images that are hard to quantify or articulate to others. It is widely accepted that our intuitive brain is the biologically older and more dominant of these two processors. The problem is that our dual processors speak different computing languages; one speaks analysis, the other whispers feelings or images, and together they comprise our human intelligence, our toolbox for managing risk. If our experiential, intuitive brain is the master processor and the conscious analytical brain is its servant, how can we responsibly manage the chance and uncertainty in our definitions of risk without understanding more about our experiential, intuitive processing systems?

For avalanche workers, neuroscience and psychology explain our decision processes and instincts very well, yet these social sciences remain largely overlooked by our community. We are all in the business of assessing complex risks and taking professional decisions that affect the lives and property of others. Expertise from outside of our community offers important insight that can help all of us be better at what we do. I suggest the following three books to every manager and worker with avalanche decision responsibilities. Read them, and keep them on your bookshelf beside Vick's *Degrees of Belief*.

1. *The Master and his Emissary. The Divided Brain and the Making of the Western World* by Iain McGilchrist
2. *The Feeling of Risk. New Perspectives on Risk Perception* by Paul Slovic
3. *Thinking, Fast and Slow* by Daniel Kahneman

The Canadian avalanche community is already adopting some of this social science thinking. At the 2014 ISSW in Banff, Roger Atkins gave a paper titled "Yin, Yang and You," in which he argues that subjective judgement and rational analysis must be balanced to achieve optimal avalanche risk management decisions. At the Breckenridge ISSW in 2016, Roger Atkins and Pascal Haegeli presented "Managing the Physical Risk from Avalanches in a Helicopter Skiing Operation – Merging and Contrasting GPS Tracking Data with the Operational Guiding Perspective," in which they posit that avalanche risk is managed by analysis of snow, weather and avalanche data, and intuitive evaluations of terrain and travel procedures to mitigate hazard.

Analysis and Experience
The Yin and Yang of
Avalanche Risk Management?

I now think of intuitive and analytic thinking as my pilot and co-pilot, controlling my actions and we don't want to crash. They both have similar experience, and serve complementary roles. One is better at some things, the other is better at different things, and our reliance on analytical versus intuitive thinking changes over time as our careers progress with accumulating experience. We need to determine the strengths and limitations of both systems of thinking in order to optimize our risk management efforts.

I contend our avalanche community has focussed almost entirely on articulating conscious, analytical guidance (e.g. OGRS, CMAH) for managing risk and has largely ignored relevant social sciences research regarding experiential, intuitive reasoning. In particular, the work of Kahneman and Slovic appears to be highly relevant to the work that we do.

To reconcile these two perceptions of risk we need to create a plausible narrative that satisfies both processor systems. All human beings naturally possess

Risk as Analysis vs. Risk as Feelings

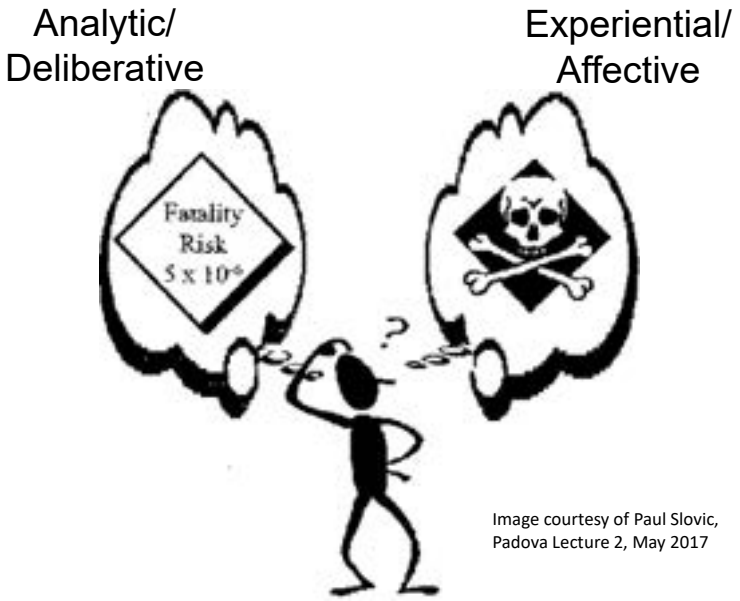


Image courtesy of Paul Slovic,
Padova Lecture 2, May 2017

these sophisticated risk management instincts; they're not perfect, but they do a reasonably good job for us most of the time. If we are to comprehensively manage avalanche risk we need to understand how these dual processors operate independently and collectively, and then create guidance or rules of thumb to optimize our risk management strategies so that the strengths and weaknesses of both types of thinking are acknowledged and factored into our decision processes as stated preconditions.

We owe it to ourselves to educate ourselves about what the social sciences have to tell us about dual processor theory and our avalanche risk management decision strategies before some plaintiff does it for us. We're doing a good job already, and I'm convinced our industry could do even better if we were to articulate and implement good principles of psychology and decision science in concert with our existing operational expertise. Google, Facebook and the advertising industry have done it, with spectacular success.

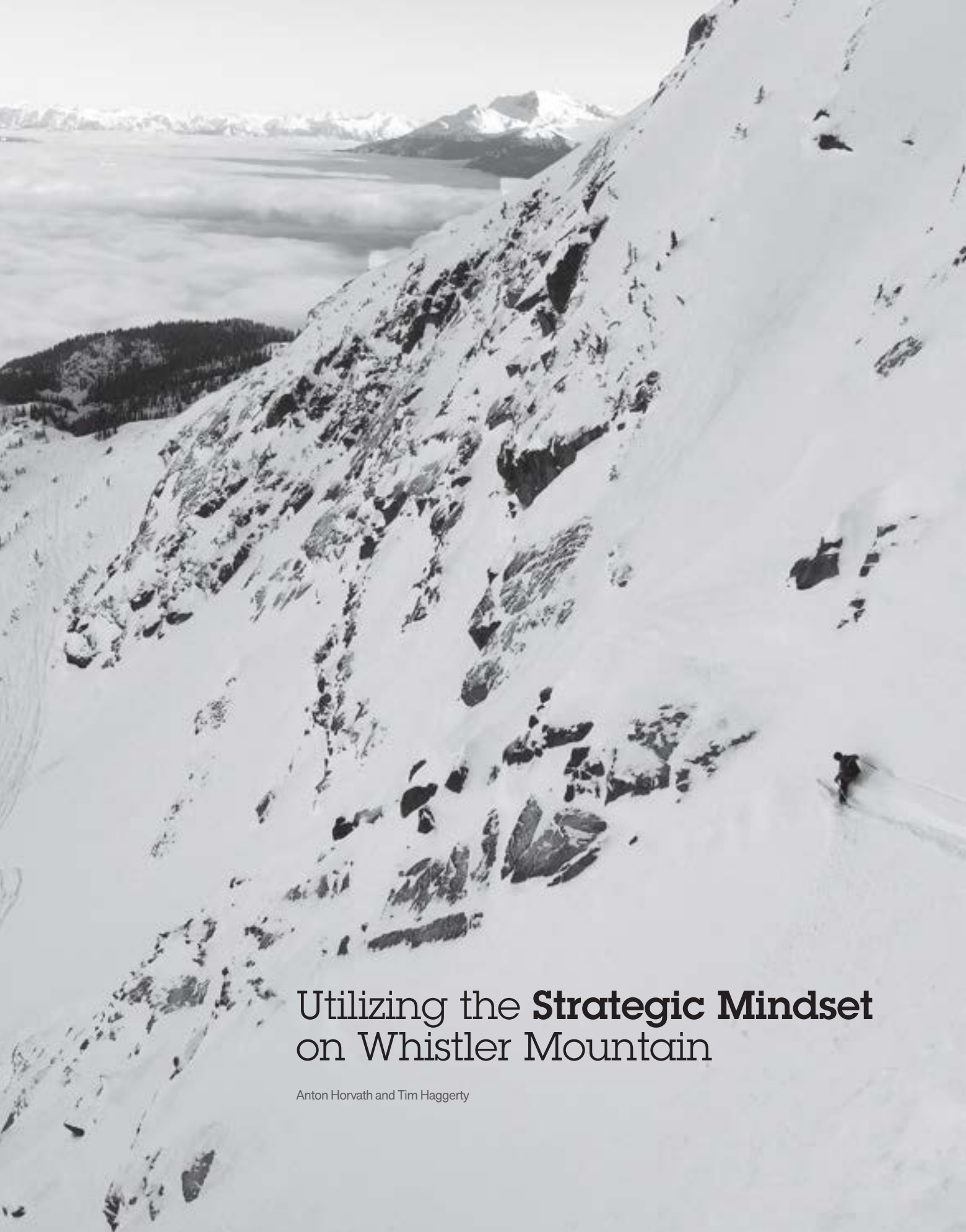
Our avalanche community has created an OGRS and the CMAH to guide our analytical processing. We all acknowledge the important role that experience and intuition play in avalanche risk management, yet we don't have useful conceptual guidance to identify the strengths and weaknesses of experiential problem-solving processes in avalanche work, nor how the relative significance of these processes change over time as our careers progress. This despite widespread acknowledgement that our intuitive, experiential processor often dominates our analytical system. The social sciences evidence is everywhere. The overwhelming strength and weight of evidence from leading experts tell us it's the way our human brains have evolved over millions of years.

I believe that if I had been exposed to principles of risk psychology and best practices for intuitive (experience-primed) thinking earlier in my career. I would have been a better guide, a better mentor and done many things differently. If we're going to play the poker game of avalanche risk management and hope to succeed, we should at least be aware of all the cards that are in play, and what they really mean in this game we call our profession. Could there be an equivalent to ORGS and the CMAH for our experiential, intuitive processors just waiting to be articulated by our community? Analysis and intuition, the yin and yang of avalanche risk management. We use both, we need both, in proper balance. Let's try and understand how they can best be combined to optimize our professional decisions.

> The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift.
>
> *Albert Einstein*

The CAA has a long history of problem solving and innovation. We have standing education and ethics and standards committees. We have world renowned research scientists and highly experienced practitioners from all avalanche related endeavours within our membership. We have annual meetings and CPD days where we could start to explore what social sciences research has to tell us about analytical and intuitive thinking. How do we learn from experience? I think exploring this trail of inquiry could help reduce chance and uncertainty in our work of avalanche risk management.

Clair Israelson (Somewhat Retired)



Utilizing the **Strategic Mindset** on Whistler Mountain

Anton Horvath and Tim Haggerty

DARREN SAUL SKI CUTTING WEST BOWL // TIM HAGGERTY

CORNICE WORK AT THE TOP OF FLUTE // TIM HAGGERTY

MORNINGS CAN BE QUITE BUSY for the snow safety team on Whistler Mountain, with 6km of cornice lines and 5000 acres of openable terrain to deal with. The resort terrain has over 200 slide paths that can produce size 2 or bigger avalanches in all three elevation bands. There can be a lot to contend with on any given day.

We use the strategic mindset in a way that allows us to set objective goals for our operational period. This way pressure, biases and human factors cannot influence our decision making during that period.

We utilize the same mindsets as presented by Roger Atkins in his 2014 ISSW paper "Yin, Yang and You," but we have defined them in a way that works best operationally for our ski area.

- Open Season
  - Willing to ski anything (including permanent closures), 1/1/1
- Spring Diurnal
  - Open season to stepping back through day with warming
  - Passive control with closures
- Stepping Out
  - Hazard rating decreasing, confidence increasing
  - Active limited control work
- Status Quo
  - Same as yesterday, could be during a storm cycle, but still planning on opening all terrain
  - Active, passive or no control needed
- Maintenance
  - A possible PWL is about to be or has just been buried within our tenure
  - Active control, Sc or Xe to disturb layer so it doesn't develop into a widespread PWL in future
- Stepping Back
  - Hazard rating increasing or closing operational terrain due to building hazard or partial re-assessment of conditions needed before opening terrain
  - Active and sometimes passive control through day may be required
- Assessment
  - Early season or after big storm cycles, confidence low to moderate, more info needed
  - Active control to open terrain, passive control if informational gaps persist
- Entrenchment
  - PWL buried, unpredictable results occurring during control work, continued assessments needed
  - Active and passive control, operational terrain limited, often only time or big warm storm systems will heal or clean out the PWL

We typically determine our initial mindset during the hazard assessment process early each morning in our Snow Safety office. Once any field assessments and mitigation measures (if required) are completed, we can then reassess our mindset based on our observations. Typically to step up a level during our operational period we would need significant evidence to prove our initial assessment to be too conservative. In this case our snow safety team and the patrol supervisor of the day would have a discussion to determine if the change of plans is in line with other operational objectives.

Strategic Mindset and Beyond

Larry Stanier

I HAVE HAD THE PLEASURE of sitting in LOTS of operational meetings in many different backcountry ski lodges, highways operations and ski areas. It is always fascinating to see how various groups of people work through these meetings. The ones that really stand out for me are well organized and have clear and open risk communication. They rely on a combination of all the intelligence in the room, the best available data and evidence, terrain images, terrain knowledge and experience-based intuition while considering the consequences of every decision to really clarify how the operation will manage their day.

The strategic mindset concept is a relatively recent step forward for risk communication in mechanized ski operations and it is great to see variations of it being applied in ski areas and other avalanche operations. It adds another "layer of safety" and is a great help to ensure everyone is working within the same operational risk band.

So where do we go from here? Where are further holes in the layers of safety and how can we make them smaller? Three areas that both concern and interest me are:

Uncertainty. At various times in different operations this could be uncertainty in our data, our terrain knowledge or in our decision-making ability. How do we manage uncertainty? Can we simply lower our expectations of our own performance during periods of uncertainty?

Feel/experience-based intuition. How can we harness, improve upon and communicate what we feel intuitively as we gain more extensive experience in the environment?

Risk communication and consequences. Are we clear with ourselves and our elements at risk about the consequences of our actions and its likelihood?

As I write this, several of my friends and peers are dealing with the aftermath of an avalanche accident that eventually lead to the death of a person who was out doing what they loved to do. We do need to consciously remember events like these when we are making decisions. It can be a glorious life in the mountains, but we are often putting ourselves, our peers and our clientele in harm's way. We must do everything we can to minimize that risk. The human costs are simply too high.

To all of you— who has ideas to help us make better decisions? Step forward, we're listening.

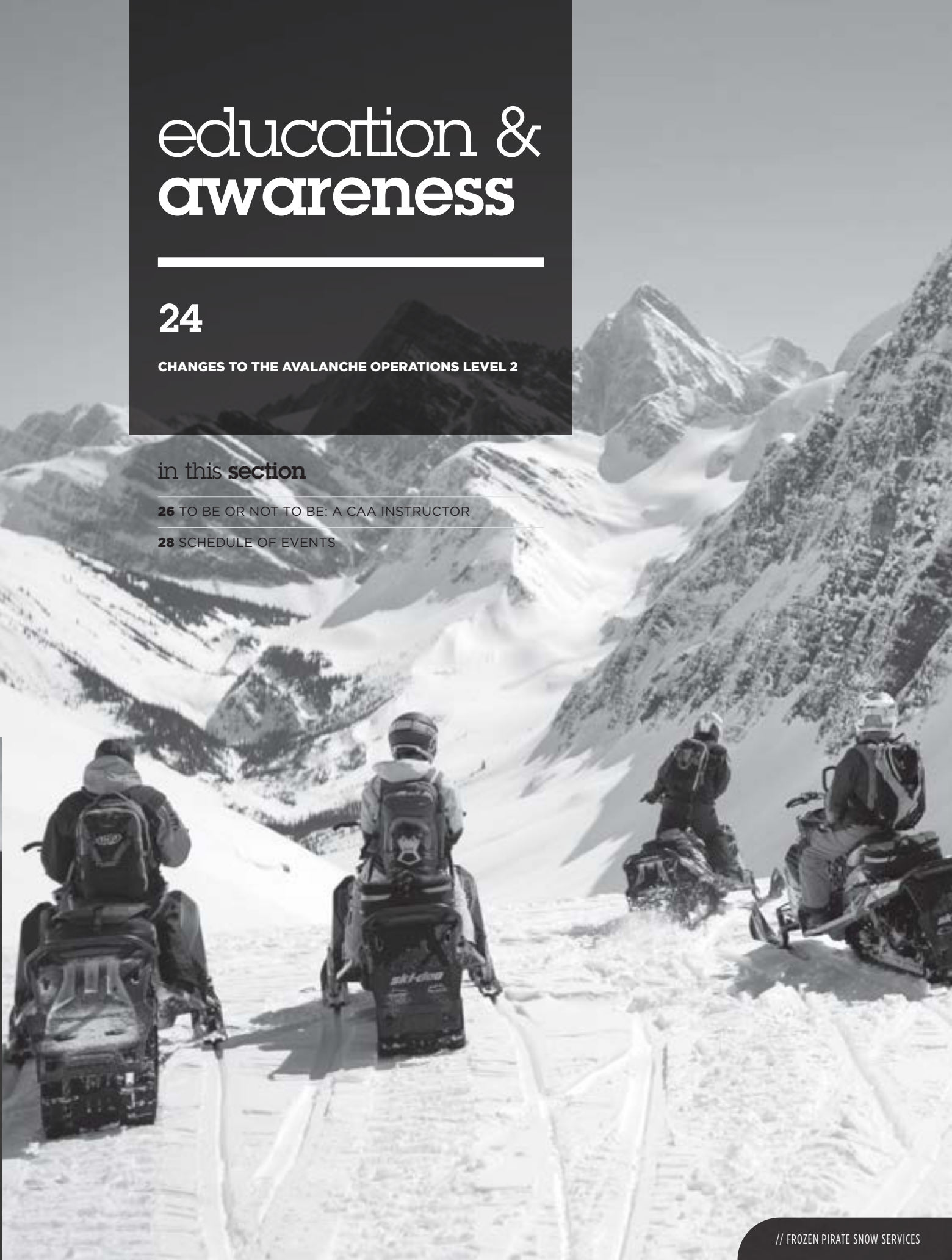
// JAMI KRUGER

education & **awareness**

24

CHANGES TO THE AVALANCHE OPERATIONS LEVEL 2

in this **section**



Ch-Ch-Ch-Changes, to the Avalanche Operations Level 2

Emily Grady

NEW STRUCTURE

Beginning in winter 2020-21, the Avalanche Operations Level 2 program assumes a new configuration. Instead of the current three module system, we move toward two components: Avalanche Operations Level 2 and Avalanche Operations Level 2 Assessment.

The first component, named Avalanche Operations Level 2, is a combination of the current modules 1 and 2. The second component, named Avalanche Operations Level 2 Assessment, is the same as the current module 3 where students' skills and competency, in both technical knowledge and practical application of Level 2 concepts, are evaluated (see Fig. 1).

Given the changes, there will be benefits, challenges and implications for current students.

WHY?

The driver behind the Level 1 and Level 2 curriculum development and course delivery modification is the Competency Aligned Avalanche Risk Management Training (CAARAT) project. For the past three years, we have worked to align curriculum to the competency profiles. The project is also an opportunity to improve, revise, update, and revisit courses that normally only see small scale changes on an annual basis.

CHANGES

The idea of combining Modules 1 and 2 was proposed by a Level 2 working group during a CAARAT project meeting in June 2018. This group is composed of CAARAT project members, representatives from the industry, CAA students, ADAPT project members, and Industry Training Program instructors. The proposed idea was then approved by the CAA's education committee later that summer.

As with any change, there are benefits and costs as well as implications for current students. Below are some of the benefits and costs that were identified by the Level 2 working group.

Benefits:

- More fluid learning progression from concepts to application
- Better continuity and opportunity for instructors to provide feedback
- A mix of indoor and outdoor activities to break up classroom time
- Integration of theory with practice
- Reduced time spent reviewing prior learnings
- Less expensive for students (fewer sessions, less travel)

Challenges

- Students must attend a 7 to 8-day course during the winter season
- Shifts between field and classroom days (i.e. continuity of weather and snowpack tracking)
- Enrollment per course limited to 18 students (vs. 30-36 on current Module 1)

Ultimately, it is recognized that more time off during the winter months comes at a cost to both students and employers. However, it was deemed that the benefits outweigh these costs.

BLAST FROM THE PAST

The Avalanche Operations Level 2 program began in the late 70's and was originally delivered as an 8-day course which included several assessments. In 2002 the CAA implemented a significant change in the Level 2 program where it went from being an all-in-one course to three modules. The outcomes of the three-module course delivery were excellent: a more comprehensive curriculum, additional time for feedback and coaching in a non-evaluative environment, interactive student exercises, and an opportunity for career professional development.

Over time, it became evident to Level 2 instructors that there is a disconnect between the Module 1 classroom concepts and actual application of that learning during the field-based Module 2 (for example linking Module 1 lessons on situational awareness to field work objectives on the Module 2). The time between Modules 1 and 2, at least 1 month and up to a year, made it difficult for students to retain key learnings. Changes to the Avalanche Operations Level 2 training are coming into effect to create an environment that better supports learning, application, and retention.

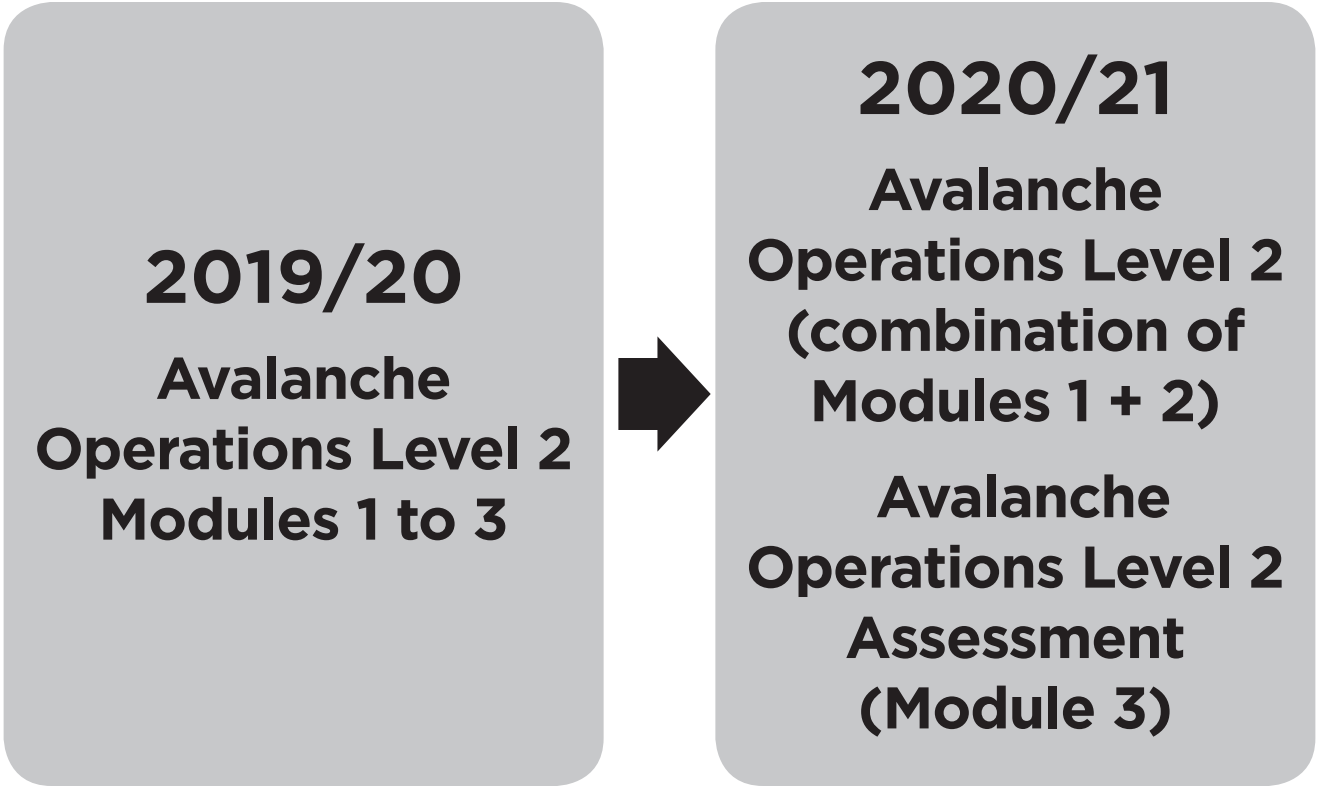


FIG. 1: COMPARISON OF AVALANCHE OPERATIONS LEVEL 2 COURSE STRUCTURE.

IMPLICATIONS FOR CURRENT STUDENTS

At this point, we will be running Avalanche Operations Level 2 courses as per usual for winter 2019/20. However, there is a caveat. Newly approved applicants must complete both Modules 1 and 2 during the 2019-20 season. If these applicants are unable to complete both modules in the 2019-20 season, they must defer registration until the following winter.

Level 2 students who are in the program already (e.g. they've taken a Module 1 or 2 this winter 2018/19) must complete the remainder of their modules next season (2019/20).

In brief:

- Level 2 students who have taken a Module 1 or 2 this winter (2018/19) must complete the remainder of their modules next season (2019/20)
- Newly approved applicants (2019/20) must complete both Modules 1 and 2 during the 2019-20 season. Those unable to complete both modules in the 2019-20 season must defer registration until the following winter

SUMMARY

The Avalanche Operations Level 2 program has stood the test of time. This is the first large-scale change in 17 years and, although there are challenges associated with this change, we believe that these are outweighed by the benefits of increased course quality and educational experience.

We're excited to see the Level 2 outcomes of the CAARAT project come to fruition in winter 2020/21. In the meantime, project team members are working hard behind the scenes to revise, update, and improve upon existing curriculum.

If you have any questions, please contact Emily Grady, Industry Training Program Manager.

Each year the CAA's Industry Training Program modifies its courses based on new research, student & instructor feedback, and current best practices. At times, these modifications are more substantial and involve external funding. For example, over the past two years an ongoing project is working to align the Avalanche Operations Level 1 course curriculum[1] with the CAA's competency profiles.

[1]https://cdn.ymaws.com/www.avalancheassociation.ca/resource/resmgr/itp_/avalanche_operations_level_1.pdf

To Be or Not To Be: A CAA Instructor

WHAT IS IT LIKE to be a CAA instructor you ask? We went to the streets and asked a couple of pros, then rounded out their input with insights from your current membership committee chairman and all-round keen avalanche practitioner, Ryan Buhler. The responses may surprise, enlighten and entice you to make this addition to your career in our industry.

SYLVIA FOREST

I started teaching in '98 and have taught most years since. Being an instructor is interesting and provides me with an excellent opportunity to stay current, be a leader and influence new generations of avalanche professionals. I find that teaching helped me become a better teacher/instructor/communicator. You really learn material when you explain back to people with less experience and different learning styles.

It is cool to see folks progress from Level 1 through to Level 2, and then to become professionals (usually guides, but not always). I enjoy being more involved and engaged with the CAA and over time, appreciated the chance to give back to my community, by sharing my knowledge. I have enjoyed teaching and the connections I make with students. It's a small world.

LARRY STANIER

The most rewarding aspect of my years of teaching CAA courses has been the opportunity to exchange ideas with practitioners from differing backgrounds. This exchange of ideas between avalanche professionals from ski areas, highways, industry, guiding, mountain rescue and research from Canada and other alpine countries has always been one of the great strengths of the CAA itself and the ITP program. It continues when the courses are well staffed in a good venue and full of interested/interesting students.

CAA courses in Japan, Iceland and with the Canadian military have been highlights for me and have opened up lots of other interesting work opportunities. I am grateful!

THE LAST WORD GOES TO RYAN BUHLER

For me, the highlights of being an instructor on the Operations Level 1 has included working with instructors in different areas of the avalanche industry, solidifying my conceptual knowledge base, and watching the skill progression of the students, especially with snow profile skills.

Each course I've taught has featured a unique mix of instructor disciplines including highway forecasting, ski area management, ski guiding, public forecasting, industrial safety, and search and rescue. I've found I'm constantly learning new things. Now that my career has become focused on the industrial sector, I really appreciate the opportunity to work with ski guides, ski area forecasters, and highway forecasters. This ensures my skills and knowledge base remain well-rounded as my career path becomes more specialized.

Being an instructor is also like being a student. When I present a new topic, I go back to basics and re-learn the fundamental concepts and theory. Students ask many interesting questions which ensures the instructors remain sharp and up-to-date on all the relevant material. Obscure questions, where I have to look up the answer, those ones add information to my knowledge base, making me a better instructor and practitioner. The same applies to fundamentals of snowpack, weather and avalanche observations. Instructors strive for consistency and accuracy of observations which means constantly referring back to the OGRS standards. As a result, my observation skills have become stronger and more consistent with each course.

Lastly, I find watching student progression over the week to be very satisfying. This is especially true with the fundamental snow profile skills including craftsmanship. In four to five days, you observe students progress from their first profile, which can be very rough, to a well-crafted profile that meets all the industry standards.

Our aim is to ensure existing and future instructors can share more of the kinds of rewarding experiences described by Sylvia, Garth and Ryan. The CAA is looking at a suite of options to improve course availability while meeting the needs of instructors and students. Stay tuned for more details from Emily Grady, ITP Manager

SKIER RESCUED ALIVE ON A DEPTH OF 3 METERS AFTER ONE HOUR BURIAL IN AVALANCHE IN SWITZERLAND

A person was rescued alive on January 14 in Jaun, Switzerland with the help of avalanche dog and RECCO Rescue System.

According to Linus Buchs, in charge of the rescue operation and former Head of Rescue in Jaun, three skiers were skiing in a steep off-piste area on Monday last week when the avalanche occurred. A 22-year-old man got buried completely in a 50 meters wide and 250 meters long avalanche. The avalanche risk was 3 (considerable) out of 5 on the European Avalanche Danger Scale, and none of the skiers were equipped with a transceiver, shovel or probe. A witness called immediately for emergency assistance and a rescue team from REGA (Swiss Air-Rescue) came by helicopter with an avalanche dog and a RECCO detector.

"The avalanche dog marked a zone after 10 minutes, but the probing was unsuccessful. The rescue team immediately got a signal nearby with the RECCO detector and was able to pinpoint the victim. The position of the victim was confirmed with the probe and after 40 minutes of digging, the skier was found alive and conscious on a depth of 3.20 meters. He was rescued about 1 hour and 10 minutes after the burial and transported to the hospital. He is fine today," says Buchs.

The skier was wearing an Arc'Teryx jacket with an integrated RECCO rescue reflector.

RECCO rescue reflectors make you searchable to professional rescuers. They and are not a substitute for a transceiver, shovel and probe used for companion rescue.

Schedule of Upcoming **Events**

ANNUAL EASTERN SNOW CONFERENCE MEETING

June 4-6, 2019
Fairlee, Vermont
76th Annual Meeting
For more information:
www.easternsnow.org

SARSCENE 2019

Fall, 2019
Sydney, NS
For more information:
www.tulmar.com/2019/01/01/sarscene-2019/

35TH INTERNATIONAL CONFERENCE ON ALPINE METEOROLOGY

September 2-9, 2019
Riva del Garda, Italy
Contributions on all aspects of meteorology and climatology.
For more information:
www.emetsoc.org/events/event/icam2019/

INTERNATIONAL MOUNTAIN CONFERENCE

September 8-12, 2019
Innsbruck, Austria
Comprehensive international conference on mountain research.
For more information:
www.uibk.ac.at/congress/imc2019/

ICAR 2019 CONVENTION

October 9-12, 2019
Zakopane, Poland
For more information:
www.alpine-rescue.org

WILDERNESS RISK MANAGEMENT CONFERENCE

Oct 30-Nov 1, 2019
Albuquerque, NM
Facing Challenges Together
For more information:
https://www.nols.edu/en/about/risk-services/wilderness-risk-management-conference/

avalanche **community**

30

LANDSCAPE ARCHITECTURE
COLLABORATION OF INDUSTRIES

in this **section**

// FROZEN PIRATE SNOW SERVICES

Landscape Architecture
Collaboration of Industries

Story and Photos Nadine Overwater, RPF

COMMON AVLANCHE AREA SIGNAGE TO PROMOTE WORKERS NOT TO STOP ON ACCESS ROADS IN AVALANCHE THREATENED AREAS.

THE PATCHWORK ARTISTRY OF FORESTRY; we're all familiar with cutblocks and recognize that they are the visible signs of resource extraction, like mine sites, hydroelectricity and its structures, and transportation corridors which move both people and raw materials. The cutblock is smaller but can have an impact on slope stability or open the possibility of avalanches in terrain that was not previously susceptible. Do foresters recognize, pay attention and care about the implications of creating these openings and corridors and the possibility of new avalanche terrain that may affect the workers, public and the environment?

By law, forest professionals are required to consider aboriginal interests, species at risk, old growth retention, wildlife corridors and connectivity, migratory birds, species and ecosystem diversity, visual quality, forest health, wildfire mitigation, terrain stability; the list of parameters to be considered in land management is long and complex. In a rugged and mountainous landscape, a winter site visit to a newly harvested block makes it evident that avalanche hazard is clearly a factor that also needs to be considered.

There is no legislation that specifically requires a forest professional to consider the possibility of creating avalanche terrain when designing cutblocks. The Forest Planning and Practices Regulation (FPPR 4:1(37) requires that forest professionals must design forest development considering terrain stability, which may also be interpreted to include snow stability. There is also *The Land Managers Guide to Snow Avalanches in Canada* (CAA, 2002) which outlines methods for recognition and planning of avalanche terrain, a helpful publication but lacking the rule of law. Obligations may be partially captured in the bylaws governing the Association of BC Forest Professionals which cites criteria to uphold the public interest, and practice professional duties with competency, integrity and due diligence. This means that the public has trust in forest professionals to be able to undertake their job with the knowledge required. Areas where crown infrastructure exists or may be placed at risk, for example above a highway, are placed in a category where a qualified registered professional must complete an assessment to ensure the slope will not be problematic in the future. The Ministry of Transportation brokered this deal and is described in a technical bulletin Snow Avalanche Assessments: the basic facts (ABCFP, 2002).

I am a forest professional who is directly responsible for cutblock and road design in the heart of the Columbia mountains both north and south of Revelstoke, BC. In my opinion, a strong knowledge of avalanche terrain is required to work in many parts of our province (BC). Opening up steep hillsides above roads not only poses a threat to public and employees travelling below, but it makes it difficult for the newly planted trees to establish when they are prone to slide activity and snow creep continuously acting on the

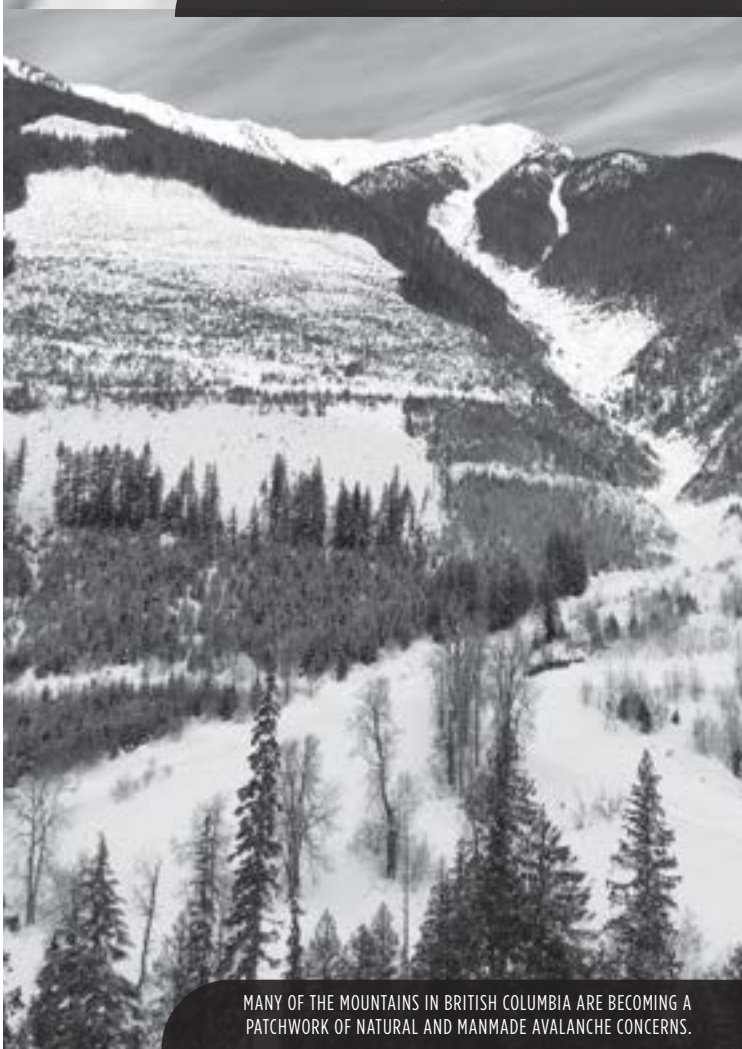
seedlings. There is the consideration of downslope resources as well, which very often include fish habitat and/or standing timber. It does not benefit the licensee or the public to create cutblocks that are prone to sliding.

Despite the legislative gap that does not require their consideration, it is my hope that most forest professionals doing work in avalanche territory reflect on the creation of new avalanche hazard when designing roads and cutblocks. There are mitigative strategies as well, that can be implemented when steep slopes cannot be avoided. One of these strategies is leaving behind high stumps - well beyond the threshold snowpack levels. This method has been successful in anchoring the snowpack until a new plantation is established and avalanche hazard is removed. The only downfall of this method is the wasted timber, left behind as two metre stumps. Cutblocks that are designed to be longer across the slope but have shorter length upslope, minimize the mass and velocity of any potential avalanche. Avoiding existing avalanche paths and the trim vegetation (or forest) along edges and above or below existing paths, helps prevent the creation of larger avalanche paths.

The Columbia Valley typically experiences a deep snowpack and regular avalanche activity. For those of us who work here, we travel through the landscape as professionals and as recreationists, so our awareness of avalanches becomes a subconscious element in our design decisions. Do all forest planners consider the creation of new avalanche terrain? What about foresters in the Okanagan, where the snowpack reaches one metre on a good year? How are areas with drier climates and lower annual snowpack being considered at the planning phase? What about the compounding effects of wildfires opening up the forest landscape? Suppose they are hit with an extreme winter and higher than normal snowpacks. What then? It is highly probable that avalanche activity could occur in areas that have not previously seen this type of disturbance. Hopefully, a design flaw like this can be caught at the geotechnical analysis stage; many terrain instabilities are related to slope and if it is recognized that the ground can move, then it becomes obvious that what sits on the ground can also move (disregarding ground roughness).

A major concern and problem that is faced by many forest planners today is the fact that the resources are getting further into the valleys and further up the slope. The generations before us have taken the “cream of the crop” and accessible timber. We are now faced with developing land that consists almost entirely of steep slopes and cable harvesting. I am not certain that all forest professionals have the knowledge of avalanche behaviour to be able to develop this type of terrain moving forward. I think that there is room for professional development to ensure that we are designing sustainable and safe forest openings. An idea that can be

HARVESTED CUTBLOCK THAT HAS MINIMAL ANCHORS LEFT ON SLOPE. IS THIS NOW A MANMADE AVALANCHE PATH?



MANY OF THE MOUNTAINS IN BRITISH COLUMBIA ARE BECOMING A PATCHWORK OF NATURAL AND MANMADE AVALANCHE CONCERNS.

jointly approached by professional foresters, geotechnical engineers and avalanche technicians.

Steep slopes are an obvious concentration point, but what about those lower angle slopes? A final thought, and something that I feel may not be approached by all forest professionals, is the unfortunate creation of surface hoar farms, those lively sections of terrain created by the development of low and mid elevation cutblocks in sheltered valleys. Frequently we see cutblocks on low angle slopes with signs of natural slab avalanches in them, mostly size one, that terminate close to where they initiated. It is difficult to avoid making these cuts, but it is a problem, nonetheless. I'm uncertain if there are design measures that can be utilized to mitigate surface hoar farms, and because they are low consequence events, they do not necessarily appear on the radar of the forest professional hanging ribbons and traversing boundaries through waist deep brush in the summer months. It could also be a topic worth pursuing moving forward in the world of professional development.

This is a personal take on the intersections of forestry and the avalanche industry. I cannot speak for anyone other than myself. However, I do believe that we have been successful in managing cutblock design when it comes to the creation of new avalanche paths. When I am driving, touring, hiking or flying through our valley I don't find myself looking at failed designs and appalling scenes of recurring avalanches where they have never been before. Yes, there is the odd one and yes, I believe that there is room for education and advancement, especially in the face of climate change. I do know that as forest professionals, we are bound to forest management objectives that best serve the public and the environment and that snow and slope stability are considered directly or indirectly in the planning process.

REFERENCES

Canadian Avalanche Association. 2002. Land Managers Guide to Snow Avalanche Hazards in Canada. Jamieson, J.B., C.J. Stethem, P.A. Schaerer and D.M. McClung (eds.). Canadian Avalanche Association, Revelstoke, BC, Canada

ABCFP & APEGBC Joint Practices Board, May/June 2002. Technical Bulletin Snow Avalanche Assessments: the basic facts. Forum. https://member.abcfp.ca/WEB/Files/publications/FORUM-2002-3_avalanche.pdf?WebsiteKey=4b6af123-da4f-4a97-a963-579ada9e5955&=404%3bhttps%3a%2f%2fmember.abcfp.ca%3a443%2fWEB%2fabcfp%2fFiles%2fpublications%2fFORUM-2002-3_avalanche.pdf

LOG HARVESTING ON THE MOUNTAIN SIDE DURING THE WINTER SEASON

HE'S NO FLAKE

Rob Buchanan is an award-winning professional photographer, artist, designer and editorial cartoonist. Follow him @buchananstudio3

WHAT DREW YOU TO DRAW FLAKES IN THE FIRST PLACE?

I started drawing cartoons for the Journal in 2004. I had been drawing weekly editorial cartoons for the Revelstoke Review since 1995 as well as some for the David Suzuki Foundation and I think some of those scribbles might have just tickled the original Journal editorial staff of Mary Clayton and Brent Strand enough to ask me to come on board as a contributor. It was Brent who created the name "Flakes".

YOU'RE AN ARTIST IN A SMALL TOWN. DID YOU STUDY CARTOONS, OR FINE ARTS, OR HOW DID YOUR ART PRACTICE BEGIN?

I've been a commercial artist for 25 years. I went to school for journalism and photography – skills I still use today. But I also work in many different mediums from painting to sculpture to interactive installation art. Ironically, I don't think many of these skills would have developed if I was in a city. I credit working in a small town as my impetus for learning new creative disciplines. To survive as an artist in a smaller setting, it helps to have a lot of different tools in your tool belt.

As for cartooning, I just always drew. From a little kid scribbling superheroes to a teenager doodling caricatures of my teachers from the back of the class, I was never far from a pencil. As a boy, I remember being totally mesmerized by the shading and cross-hatching of Duncan Macpherson's cartoons for the Toronto Star (even if I didn't understand the humour yet). I was hooked.

ARE YOU SURPRISED AT HOW MUCH MATERIAL THERE IS TO WORK WITH REGARDING THE AVALANCHE INDUSTRY?

I like to think that humour can be found in every topic. Sometimes, the more earnest the topic, the easier it is to find the 'chink in the armor' of 'seriousness'. Every subject is vulnerable to satire or irony. The challenge to cartooning about avalanches is to lampoon certain aspects of this theme while still being extremely sensitive to the tragedies of the subject. Thankfully, the avalanche industry has a very colourful vocabulary to inspire cartoons. It's a place where science and academic terms can be used alongside ski-bum dirt-bag slang, and nobody bats an eye. Where else can "basal facets" be "super manky"?

HAVE YOU EVER BEEN CENSORED?

I've never been censored for my work at the Revelstoke Review, but probably should have. I've been threatened with lawsuits twice. Ha. And yes, one Flakes cartoon was censored because I tried to... (we're sorry, this comment has been censored)…

ARE WE LOSING OUR SENSE OF HUMOUR THESE DAYS?

No. I would argue that collectively, society is embracing humour more than ever. Perhaps it's the ease of sharing funny things through social media or maybe, in a world with so many alarm bells going off, it's an outlet, a natural way to stay grounded. Humour may put a smile on your face, but it has another purpose – to see things from a different perspective. And the goal of satire is awareness and change.

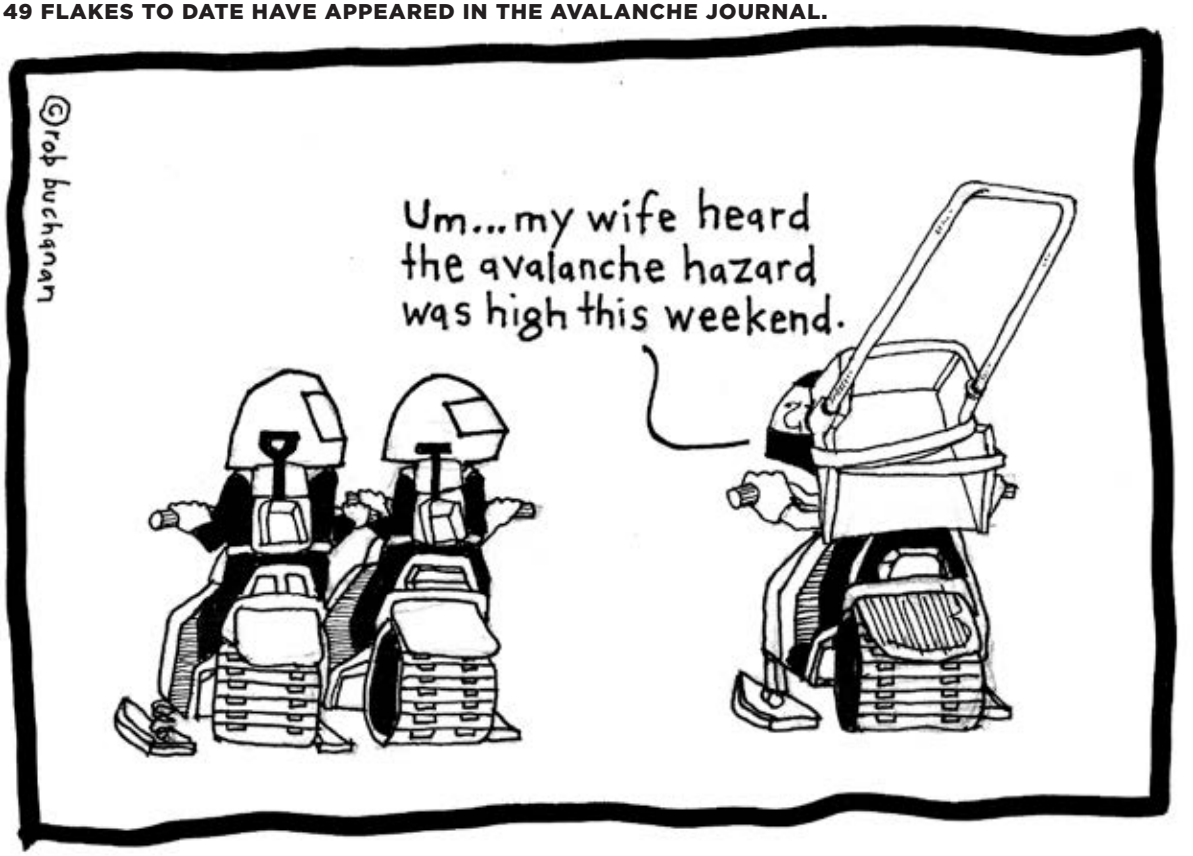
WHAT'S YOUR FAVOURITE PART ABOUT DOING FLAKES?

From snow scientists to practitioners, I have the utmost respect for the work that our avalanche specialists do. Their work has direct impacts on the Canadian and global economy in terms of transportation of goods. Winter tourism and our mountain lifestyle choices wouldn't be the same without them. The Journal showcases the work of these professionals. To have my doodles and scribbles included among the pages of some of their leading-edge thoughts and innovations puts a smile on my face.

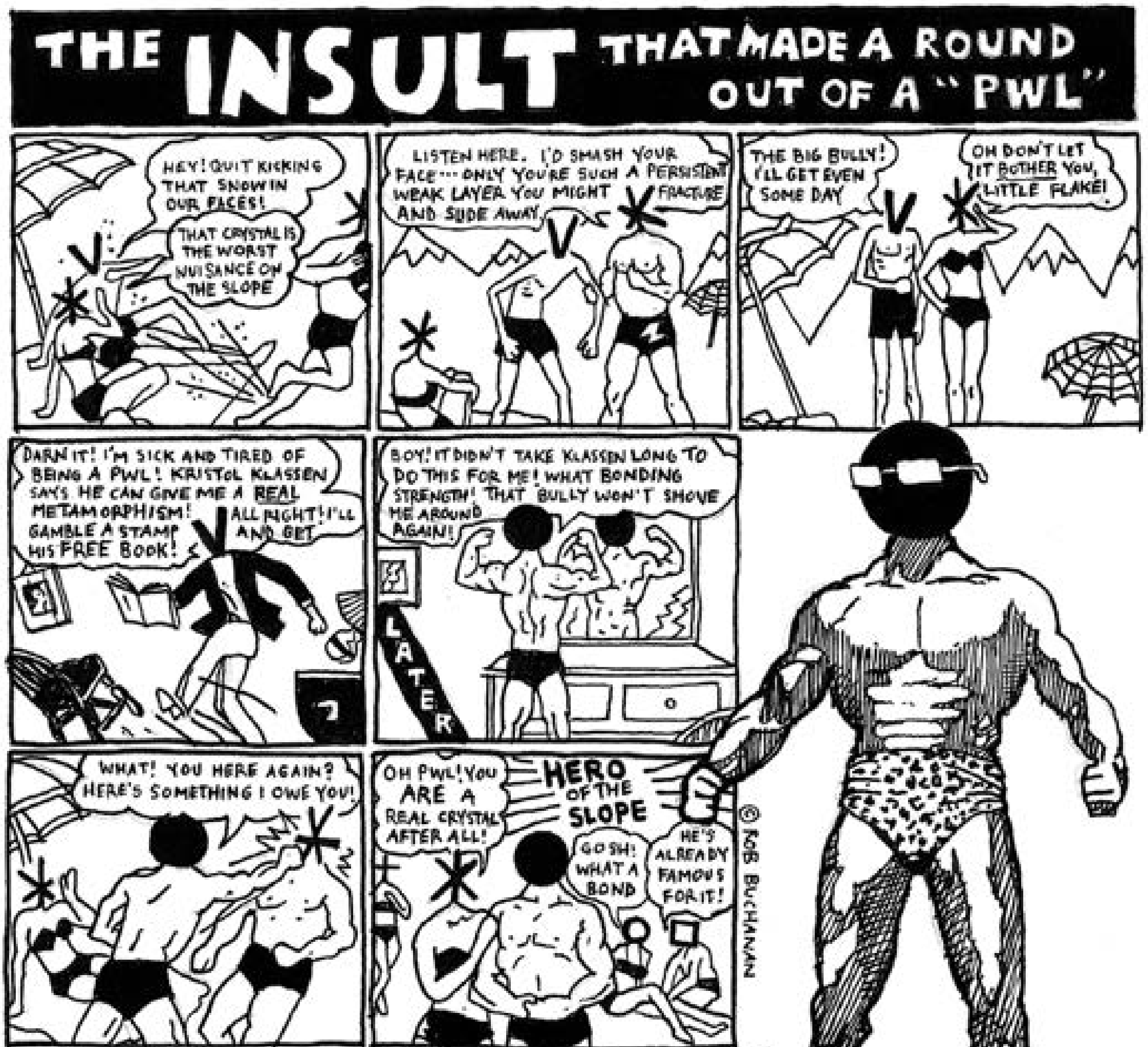
On the following pages are a collection of some favorites from the past years.

ROB'S FIRST SAMPLE CARTOON TO SHOW US WHAT TALENT HE TRULY HAS!

THE FIRST FLAKES WAS PUBLISHED IN VOLUME 72, SPRING 2005.
49 FLAKES TO DATE HAVE APPEARED IN THE AVALANCHE JOURNAL.




Finally - a stability test that solves the mysteries of the deeper snowpack...
"THE RORSCHACH REUTSCHBLOT"
-interpreting the sitzmark-
Dude, is it safe to ski?
I don't know but it looks like a dream I had about Wendy telling Peter Pan to sell his van and get a real job 'cause she wanted to get married, have two kids and join the P.T.A.
©r.buchanan

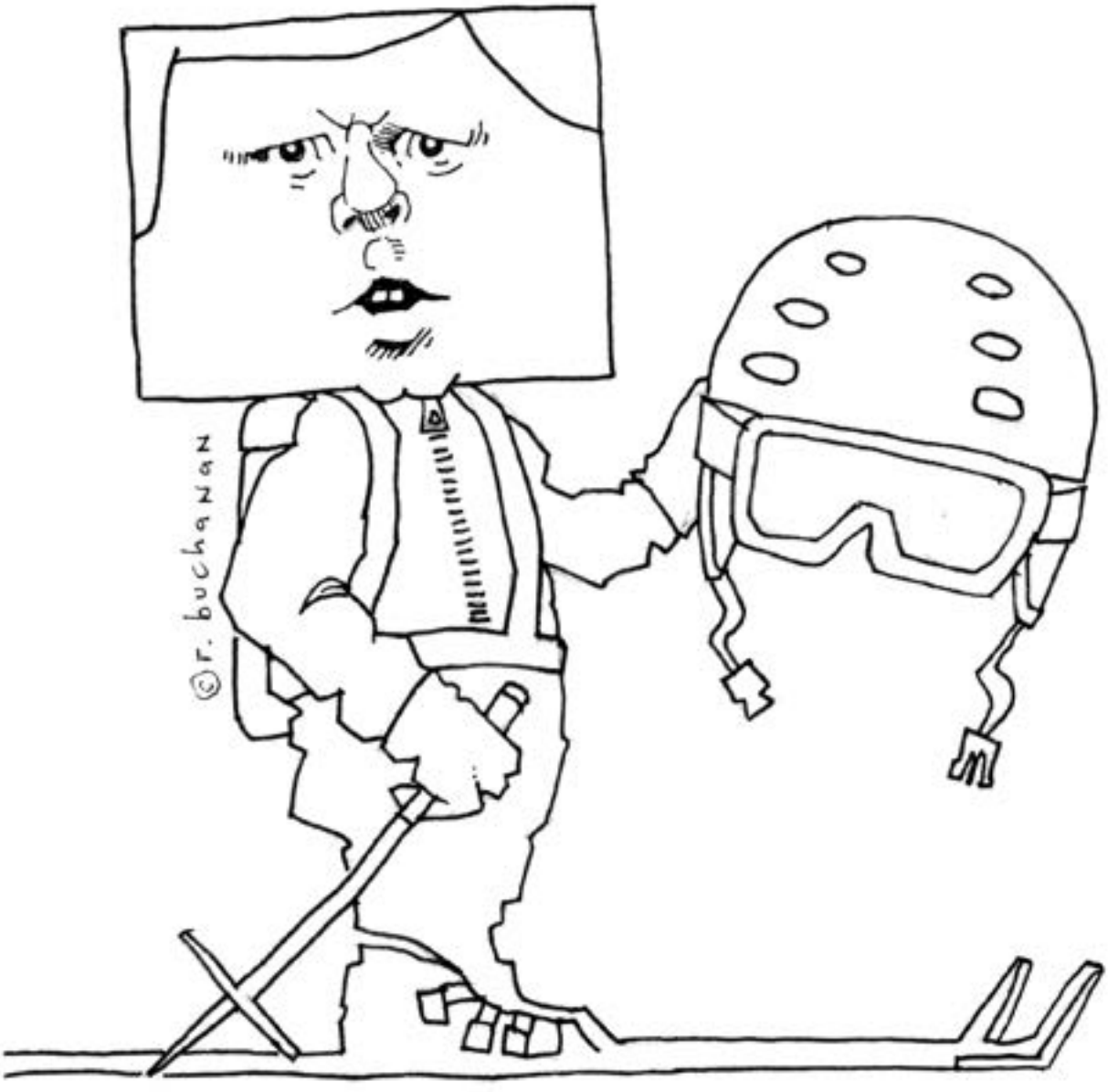


Let Me PROVE I Can Make YOU A NEW CRYSTAL!

A persistent weak layer (PWL) is so called because it does not strengthen over time, and in some cases it even becomes weaker over time. A PWL can remain unstable for weeks or even months and is often the cause of avalanches long after it originally forms and is buried.

But when outside temperatures are moderate or when the snowpack is deep, the temperature gradients within the snowpack will be small. Let me show you how to change your crystalline snow structure by my patented process I call "rounding".

Why heliski guides don't wear helmets: Reason #5...




Considerable? Considerable? To heck with the Avalanche Bulletin. If you don't take out the trash, you're in extreme danger of getting a moderate to considerable whumpfing.
©rob buchanan


Honey, have you seen my truck keys? I've searched everywhere...
SAR
Search & Rescue
©Buchanan

We F*(%ed Up

Story and Photos Grant Gunderson

2018-04-04 YESTERDAY A SKIER named Kirsten Rowley and myself were up at Mt. Baker on what started off as a high overcast day with a few sun breaks. We got to the top of Chair 8 and decided that we would go for a mellow tour out the arm and ski the Heli Line. With the occasional sun breaks we figured that if we happened to see something that looked good and had light we would stop and maybe shoot a turn or two on the way, but our main intention was to simply go for a mellow tour to get some exercise.

The day before we had been freeskiing together all afternoon along with another friend. The new snow appeared to be well bonded to the crust from earlier in the week and despite ski cutting some steeper rollovers, we did not have any slide activity, so we figured that the new snow was pretty well bonded.

We started our tour out the arm with some knowledge of the conditions from skiing the previous day and following the weather from the last week. When we reached the bench above the sun cliffs, we saw that an area the locals call Hollywood Spine looked good with filtered skim light. We stopped, talked about the line, and about the stability. We both thought the slope was okay, especially after seeing other groups ski bigger, steeper lines without incident. We chatted about what to do in case it did slide and discussed how I would spot the run from the top of sun cliffs where I could easily see the entire slope and runout, and easily and quickly make it down in case something did go wrong. I also reiterated that I didn't want Kirsten to feel like there was any pressure to ski because I had my camera gear, and that if she changed her mind and didn't like it, we would just move on and stick to the original plan of heading out to the Heli Line. We double-checked that we had good radio communications and she skinned over to the top of the line. While Kirsten was getting into position, pulling skins and getting ready, the line was receiving some very filtered indirect sun, despite the cloud deck that had started to lower; a few snowflakes even floated around in the air. There was a slight but cold breeze, enough that we were not warm while skinning, and the snow felt cold and soft, and at least where I was, did not feel like it had any slab to it.

On her third turn the slope cracked above Kirsten. Within three-tenths of a second the slide propagated to nearly 300 feet wide. The crown was 12 inches deep. Luckily she was able to ski out of it, exactly as how we had discussed previously. The debris finally caught up to her in the flat runout well past the bottom of the slope and partially buried her to her waist.

After this incident we discussed what happened, her decision to not pull her airbag (and why we think it was the right one in this case), what we did right prior to the incident (had a worst case scenario plan), what we did wrong (instead of spotting her with my skins still on, I should have pulled them). We discussed how it is safer to be in a group of three or four in case something goes wrong in the backcountry. Most importantly we chatted about how we got fooled into thinking the slope was going to be okay; why this slope slid when none of the larger and steeper lines that were getting skied that morning did. We believe that we got fooled by how much effect the filtered sun was having on this slope since it was April, when the sun is stronger than it feels. This was compounded by the cold breeze that led us to believe that it was colder than it was, and was still keeping the snow cold on our skin up.

It goes to show why it is always smart to discuss a worst case scenario and have a plan even if you think a slope isn't going to slide. This is also a good reminder that a slope can propagate farther then you expect. Anyone that spends the majority of their time in the mountains is going to have a close call at some point. We all make mistakes.

NOTE ON AIRBAG

Many people have asked about Kirsten's decision not to pull her airbag. Kirsten and I discussed this after the incident; she was concerned that pulling it would have slowed her down, impeding her ability to ski out of the slide. Since she was on top of the slide and managed to get ahead of it while skiing out, I trust that she made the right decision. It was hers alone to make, in the heat of the moment.

Editor's Note: This article first appeared in 37.1, October 2018, *The Avalanche Review*, a publication of the American Avalanche Association.

We F*(%ed Up **Refelection**

KIRSTEN ROWLEY

Grant and I had planned several days at Baker to shoot some photos. That Thursday morning, after discussing the weather, we intended to get some good turns in and put away the camera. We figured if something seemed worth taking the camera out for, we would, but we were focused on a fun, safe hike and a good ride on Heli Line together.

As we were hiking up, a line that locals call the Hollywood Spine was looking good to ride. Since my first year visiting Baker, I have wanted to ride this line but conditions never offered me the chance. Considering the conditions and stability of neighboring lines others were riding that day, Grant and I agreed that it seemed to be stable and a good opportunity to ride the line.

We had a full discussion about the line's conditions, how to ride it, different what-if scenarios, and double checks of our gear before I headed to the top of the spine.

In my experience, people often forget the importance of a detailed double check and going through a safety checklist before anyone rides down any sort of slope, hikes across a snowfield, or leaves the parking lot. Especially important is communicating with your partner/team so that everybody is on the same page. The the fact that Grant and I had this conversation prior to me dropping helped insert an emergency scenario in the back of my mind, so that I was ready to respond if necessary. We discussed response strategies for both me as the skier and for him as the spotter.

I hiked up to the line away from Grant; he was staged in a safe area with good visuals. At the top I double-checked my gear, thought about my line and how I wanted to ski it. I also pursued a separate mindset of how I would ski the line if things were to go south. I do this every time before riding a line, to rehearse the mindset of the best-case scenario and worst-case scenarios.

I used to downhill ski race. Before pushing out of a start gate onto two miles of bulletproof ice, where I anticipated reaching 75mph, I was always a little bit terrified, aggressive, focused, and calm. As my stomach dropped, I would focus on balance. I have always figured that balance would help me switch mindsets should a run ever actually shift into "oh shit" mode.

Once my gear was good to go, I radio checked with Grant and called in my drop. I was stoked and ready for some good turns. Four turns into the rollover, I was just situating over the front of my boot for the steeper pitch when I saw the crack. My stomach dropped and right away, I switched into downhill ski race mode, calm and focused, pointing straight down the spine as we had discussed.

There was not a lot of time to think. This is why it is so-so-so important to talk about and visualize what-if scenarios before dropping in. As I reached the bottom of the slope, I became caught in the debris and pulled to a stop buried up to my thighs. Immediately, Grant was on the radio, urgently telling me to remain standing upright and strong in case any further debris was to continue to push from behind.

Everything stopped quickly. I was pretty freaked out about what had just happened; I also wanted to get out of that zone as soon as possible considering surrounding slopes. I confirmed with Grant over the radio that I was okay, and we agreed I would ski out the gates below and ride back up the chair to meet him up top, then we'd make our way back to the Baker Lodge and call it quits for the day. We were both shaken.

We messed up by not doing a re-evaluation of the sun effect that occurred during my hike up to the top of the line. There had been a break in the clouds; direct sun hit the slope and it could have changed the conditions of the snow during this short time.

My big takeaways are the importance of doing a detailed double safety check with partners, and to assume that things can always go south, regardless of forecasts or how stable slopes may appear. Grant and I hope that others can learn from our mishap and that our story encourages everyone to be as safe as possible.

GRANT GUNDERSON

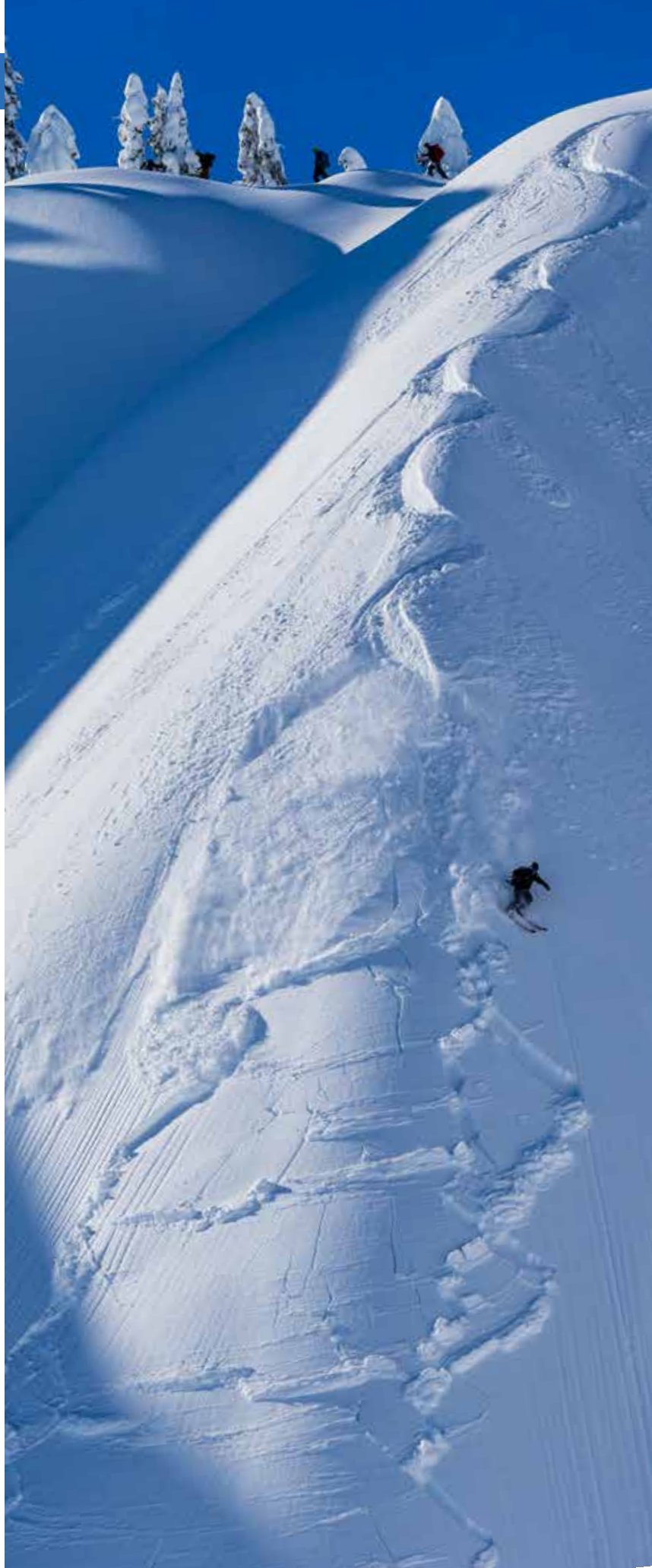
Since this article first appeared, Grant received further avalanche training through the CAA. These are his thoughts.

Looking back on this incident after talking CAA Level 1 Operations, my thoughts are, dig, dig, dig. In the past, I generally have not dug pits if I have been skiing the same area day in and out, as I've always felt if I am confident with the existing snow pack, and know first hand what the weather/snow systems have been doing in that area on a daily basis, I have had a pretty good idea of what the snow was likely to do. The problem with that logic is no matter how mindful you may be of the present conditions, it's too easy to overlook small and often imperceptible

environmental changes that can have a big impact on stability. In the case of this close call, taking a T0 and a T10 temp may have shown that the near surface snow temps were receiving more solar radiation than we had perceived.

I think the bigger takeaway for me from the Ops 1 class is that the course improved my techniques for evaluating snow, and I am significantly quicker at now digging consistent test pits. For instance, on a recent shoot in Japan, we came into an area with some pretty large features in open terrain. While the athletes where looking at what features they where interested in skiing, I was able to quickly dig a test pit and perform two CT tests that showed consistent failures at three separate depths in the snow pack. Based on these findings, the athletes and I decided to quickly do a Rutschblock test, which correlated the results I had in the compression tests. Seeing that, the athletes and I were all comfortable with the decision to walk away from skiing and filming those features.

With media crews, snowpack evaluation is something we need to integrate into our shooting plans anytime we are lining up to film in a new area. It's something we should be able to without slowing down production, even on days when we are working without a dedicated guide. This brings up a point I would like to stress to the guide community. Often when we are a media crew working with a guide, the guides tend to only let us know they are comfortable or not with our decision to film a feature and usually do not give us the actual findings from the test pits. Providing the media crew with the actual data from the test pits, and when necessary taking the time to include the whole crew in doing additional tests, can greatly reduce the potential for conflicts between the media crew and guides. At the end of the day, we all want to have a fun, productive and most importantly safe day in the mountains.



Flakes

ROB BUCHANAN

wyssen switzerland avalanche control

Wyssen Canada Inc.
Revelstoke BC
+ 1 778 252 05 17
canada@wyssen.com
www.wyssen.com