Avalanche Rescue

Presentations on various avalanche rescue methods and technologies are always prevalent at the ISSW, and so it was in Davos. Marcellus Schreilechner, Markus Eck and Michael Schober of Pieps presented findings on differences and shortcomings of various transceiver manufacturers' definitions and descriptions of search-strip widths. They noted that search requirements like turning and rotating are poorly defined, leading to published strip-search widths being defined in different ways. This, in turn, leads to frequently incorrect techniques by users. Basing their tests on recommendations from the ICAR in 2008, useful ranges and strip-search widths of various multi-antenna transceivers were empirically derived and compared to values published in transceiver manuals.

Bruce Edgerly, Franz Hohensinn, and Dieter Stopper discussed taking advantage of multiple searchers in a transceiver rescue. Basing their presentation on the premise that complex multiple-victim transceiver searches are rare, they argue that learning and teaching how to perform a parallel transceiver search is extremely important and is applicable for single and multiple burials. In single burials, the searchers spread out according to a standard search-strip width of at least 20 meters. In multiple burials, this search-strip width can be adjusted according to the size of the deposition area and the number of rescuers. Searchers are not to deviate from their search strip until a specific distance, corresponding to the search-strip width used by the group, is shown on their transceiver. By reducing the search strips by using multiple searchers, this technique can address the rare, but challenging, scenario of close-proximity burials.

Schreilechner, Eck, and Schober presented a poster on rescue equipment effectiveness and specific operational methods for avalanche double-burial incidents. Using two- and three-antenna transceivers and an electronic probe capable of deactivating an active transceiver, each tester completed a scenario with two active transceivers placed approximately 15m apart in a 50m x 50m site. Test results indicated specific searching techniques such as the Three Circle Method did not prove significantly beneficial, noting that few persons knew such techniques and were able to perform them under stress. The use of the electronic probe was shown to be advantageous, particularly the deactivating function. This functionality brought about the largest improvement in overall search time. Perhaps the most interesting conclusion drawn was that "experts can benefit more from efficient, modern equipment than beginners. The practical conclusion the user has to draw is that even with supporting and self-explanatory technical equipment, the search time for an avalanche scenario with a double burial can be improved with corresponding knowledge and training."

I had a great time in Davos, and look forward to future ISSW events in Europe. If you're ever in the Davos Klosters valley, a visit to the Monsteiner Brewery is highly recommended. It just might be as it's billed: "The last beerstop before heaven."

Rick Grubin is the member affiliate representative to the AAA board. He has also been doing an exemplary job as substitute secretary. He would like to thank his wife for agreeing to spend the last week of her birthday trip to Europe at the ISSW.

ISSW 2009 presentations were simultaneously interpreted into German, French, Italian, and English to the nearly 550 international participants, allowing the experts to speak and engage in discussions in their mother tongue. *Photo courtesy ISSW09 SLF/Henzen/Heil/Sutter*

ISSW 2009 in Review

Story by Jürg Schweizer

Almost 550 experts engaged in scientific research, natural-hazard management, and mountain sports attended Europe's first hosting of the International Snow Science Workshop (ISSW) to discuss topical issues and promising solutions concerning snow and avalanches. In view of the event's popularity, the varied conference program and the large contingent of practitioners, the organizers were delighted with the success of the ISSW's European premiere.

The International Snow Science Workshop (ISSW), which took place in Davos from September 27 until October 2, 2009, was attended by nearly 550 experts – many more than anticipated. For the first time in its history, the foremost snow and avalanche congress for practitioners was held in Europe. It was organized by the WSL Institute for Snow and Avalanche Research SLF and Science City Davos. Researchers, engineers, safety experts, mountain guides, education and training officers, and practitioners from 24 nations traveled to Davos, which is acknowledged as the cradle of modern avalanche science. The systematic investigation of snow and avalanches was initiated on the Weissfluhjoch above Davos in 1936.

The ISSW is not a conventional academic congress on snow and avalanches, but serves as a meeting place for researchers and practitioners. This underlying objective is reflected in the workshop's official billing as "A Merging of Theory and Practice." The ISSW in Davos was the fifteenth congress in the series and the most international one to date. It has been held in North America every two years since the 1970s.

An extensive range of presentations and discussions took place during the five-day event. Experts addressed the congress on current problems relating to avalanches and possible solutions. Academic lectures dominated the morning sessions, while the afternoon events, in the form of workshops and excursions in the Davos region, focused primarily on practical issues. About half of the more-than-100 speakers were practitioners – chiefly safety authority representatives, mountain guides, and avalanche forecasters. The afternoon workshops covered artificial avalanche release, avalanche forecasting and rescue, avalanche dynamics (computer simulation of avalanche movement), avalanche education, quantitative stratigraphy, and the role of snow as a natural resource for winter tourism. An extra whole-day workshop, on the subject of building on permanently frozen soil or permafrost, proved especially popular.

In most disciplines, remarkable progress has been made recently in the quantification of key processes, including snow metamorphosis and transportation by the wind. Modern visualization methods (computer tomography), image processing, and remote sensing now provide a far more detailed view of the snowpack than was possible just a few years ago, and new findings are certain to emerge in the near future. The capture of high-definition periodic images allows deformation and fracture processes in the snowpack to be quantified. For the first time, terrestrial laser scanners are capable of recording the complex patterns in which snow is deposited by the wind. Computer models simulating snow transportation, which is a key process in avalanche formation, can thus be validated.

Several presentations investigated the processes that take place in the snowpack and play a major role in the formation of wet-snow avalanches.

In France, where avalanche warning is the responsibility of the national meteorological service, the computer models used by forecasters when issuing avalanche bulletins are very advanced. Such models facilitate not only an assessment of the snowpack's current condition at various altitudes and in different aspects, but also the forecasting of its development in the next day or two. Besides model data, current data gathered in the field are also crucial. The primary interest here lies not in the data delivered by automatic measuring stations, of which there are very many nowadays, but in observations of the snowpack and avalanche activity. By way of special, latest-generation mobile phones with integrated GPS, mountain guides, for example, can now report such observations directly to the avalanche warning services. The SLF conducted a successful trial last winter. A significant improvement in avalanche warning is expected to arise from better communication of the information on which warnings are based. As illustrated by examples from the US, the use of visual elements in particular – such as pictograms, images, and even short films – can capture the attention of new user groups and make them aware of current avalanche problems. Similar projects have also been initiated in some European countries.

The focus on the prevailing avalanche problem (e.g., fresh snow or snow drift accumulations) is an important aspect of avalanche training – not least because of the recognition that proficient decision-makers in avalanche-prone terrain assess the situation primarily by identifying patterns and then adopt a course of action according to their findings. The experts at the congress were unable to agree on how avalanche training should be structured to counter the influence of the "human factor" – feelings, intentions, and attitudes – on decision-making. It became clear, however, that the assessment of the human factor depends largely on the accident analysis and the applied error model. The error model represents a hypothesis on the behavior that caused the avalanche to be released; in other words, on the key factor of human influence. The type of inappropriate behavior that predominates in avalanche accidents is, however, largely unknown. It must be borne in mind that the cause is not always an obvious lack of caution. Even when the prevailing avalanche danger is "considerable," the probability of release is in the range from 1:100 to 1:1000. If behavior is adjusted accordingly, the probability is even lower.

In the densely populated Alpine region, hazard-zone planning and the appropriate dimensioning of buildings and infrastructure facilities in danger zones are especially important issues. The congress took a much closer look at this topic, therefore, than the ISSW workshops held in North America. Presentations focused on the various computer models that simulate the movement of avalanches

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DEEP BREATHING

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the beginning of your relationship in relative security but when halfway down she asks, "Do you love me?" you better know what you're going to say and how you're going to say it. If you're unsure, it's too late. The hundred feet of serious exposure is steep and narrow enough that if something goes wrong, you'll soil your trousers and not even notice. You'll be too busy panicking in the seconds it takes to get flushed 1500' down the line and onto the apron. If you survive without trauma maybe then you'll notice the warm stench seeping through your Gore-tex. I seldom ski this mountain aggressively. It would be fun to fly through the top section and plunge fall line into the cup of the couloir's entrance, but the memories of what it looks like when things go wrong are too clear, and I'm old enough that I don't heal very quickly.

I press deep effortless turns into the rib of comfort and slow as things get more serious. It's already steep enough here that I can accelerate quickly into a ski cut and return to my happy place with a degree of confidence. There's enough room for two or three quick cuts before one must take the plunge. I've done this before, so it's not as freaky as it used to be. No one has triggered any slabs of note in the past few days despite skiing numerous big lines. I have two trusted partners in adjacent lines so things are about as comfortable as they ever get around here. That means I am very much afraid of something going wrong but managing my fear with objectivity and carefully considered action.

The final cut pops out a fresh wind slab, 20-30cms deep and full width. It's about the size of my living room, maybe a little bigger. I see the fracture race out in front of me just as I ski off the slab and onto what remains of the rib, now little more than a strip of loose rock that ends in a precipice above the rest of the chute. I turn to watch the slab pour down the drain, run down the couloir and out onto the apron below. "Hmm, no evidence of unstable slab anywhere except the one spot it lay waiting to smack me down. Just enough wind here last night to lay the hidden trap." I move through the crux and ski out the line to regroup with my partners below. They had just skied adjacent couloirs with similar exposure, elevation, and aspect without incident. Glad I teased my line instead of trying to knock it out of the park.

What's a pobrecito to do?

High consequence lines will always beckon. There will always be another slope to open or a strong group of clients in an apparently stable snowpack or a choice line to pluck when the timing seems right. Some people are good at ignoring potentially high consequences and just tearing into a line they feel good about. Some people don't think much about all the potential results of their chosen course of action and just go for it because that's their style. Maybe they don't stop and breathe enough. I have a hard time with those approaches and often wish I had skied a line harder after I'm safe and sound at the bottom.

I would rather add ten pretty good descents to my list than nine epic runs and one major trauma. My actions are the only input I have before the result, so I try to weigh them carefully. I try to keep my head in the game and my finger on the pulse because I know the mountain doesn't care. It just sits there and waits for me to decide which action I'm going to take. Inevitably a consequence of some sort will follow, but the result doesn't exist in a vacuum. It begins with me. It begins with you.

Doug Krause likes powder, beer, and meat and dislikes surprise avalanches and gout. He lives in Silverton, CO, and is trying to find ways to incorporate fewer facets and more tropical sand into his life. ✲

ISSW REVIEW

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and their effects. Such avalanche dynamic models are much more detailed than they were 10 years ago. Progress in this respect has been achieved, in particular, by measurements taken in a variety of test sites in Norway, France, and Switzerland (Vallée de la Sionne, Valais), chiefly by releasing avalanches artificially. An innovation unveiled at the congress was the prototype of a wireless sensor that is carried along by the avalanche and transmits relative positional data, so that the movement inside the avalanche can be tracked.

It was encouraging that presentations were delivered not only by established researchers, but also by a large number of young scholars, eager to inject fresh impetus into the field of snow and avalanche science. Many practitioners, whose contingent constituted the largest group of attendees, were taking part in such a conference for the first time and expressed their great satisfaction with the event. A large number of delegates would not have attended, had the presentations not been simultaneously interpreted (German, French, Italian, and English). This enabled the experts, in particular those from the major Alpine countries, to deliver presentations and engage in discussions in their mother tongue.

Swiss mountain guide Werner Munter, who has made a ground-breaking contribution to avalanche science over a period of decades, was presented with an award in recognition of his life's work.

A meeting of the ISSW steering committee broadly welcomed the proposal that the ISSW be held in Europe regularly in the future. The successful debut made by the ISSW in Davos is thus likely to have a lasting influence on the congress.

Jürg Schweizer, ISSW 2009 Davos co-chair, WSL Institute for Snow and Avalanche Research SLF. ✲