



An angel on the slopes

I still get quite a lot of different items of kit sent to me by manufacturers, probably a legacy from when I was the equipment officer in my MRT, having written a book about navigation and because of the small specialist outdoors business I run with Scottish Mountain Rescue responder, Scott Amos.

Aptly timed for the beginning of winter, a small electronic tool for avalanche prediction arrived and, in keeping with our philosophy of 'Test for real and never recommend anything you don't use on the hill yourself', I put the item into my freezer, alongside my greenhouse's max/min thermometer and promptly forgot about them both for two weeks: a product of age! The reason I placed it in there is that both battery life and output progressively decline with falling temperatures.

The last Arctic winter we had in Scotland was five years ago, in 2013, when mild air which usually approaches us from across the Atlantic, was instead pushed aside by the exceptionally cold winds — normally confined to swirling around the North Pole — split up in January and created much colder seasonal conditions for the months to come. It was in that year that a party of six climbers were avalanched, four losing their lives and one being seriously injured, in the Church Door Buttress on Bidean Nam Bian, in Glencoe.

Yet, only three years before, when weather conditions were much milder, two climbers had died in February 2010 when they were swept away by an avalanche in Glencoe and this is

because most winters in Scotland are subject to the vagaries of the famous 'British Weather', and thereby the rest of Britain.

We are a relatively small island, at most 271 miles from the far western coastline of Wales, directly east to Ipswich, and in Scotland the maximum is 100 miles less from Applecross to Buchan Ness, so weather systems from the Western Atlantic expanse to the North Pole can sweep quickly across our island, creating ideal conditions for avalanches. In the same day, we have all experienced all four

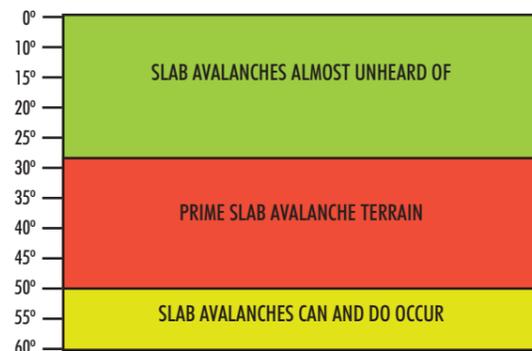
There, I realised that the science of avalanche is ever expanding and that for most mountaineers, myself included, the subject is just too big to completely understand.

This is why I rely on the absolutely brilliant service provided by the Scottish Avalanche Information Service (SAIS) and the tireless work by people like Mark Diggins, their senior forecaster, who ventures out daily, and in all weathers, to measure the snow stability and snow accumulation, and to make an assessment of the current avalanche hazard.

1. Avalanche Hazard, weather and mountain conditions available at www.sais.gov.uk
2. My party's personal skills and, of course, my own
3. The terrain we intend to visit.

Lastly, as a matter of routine in winter I always now carry the 'Holy Trinity': my transceiver (with fresh batteries), my snow shovel and my search probe. Even when there is no snow at the start of my journey, it can always begin to snow, and I'm always conscious that over 90% of avalanches occur during or within 24 hours of heavy

SLOPE ANGEL IS AN EXCELLENT SMALL NEW TOOL IN THE ARMOURY TO HELP PROTECT YOU AND YOUR PARTY AGAINST THE RISK OF AVALANCHE. IT'S EASY TO USE AND QUICK TO GET TO WORK AND SAVES FAFFING ABOUT WHEN MEASURING SLOPE ANGLES, ESPECIALLY WHEN ON A CALL-OUT.



seasons, anything from rapid rises in daily temperatures followed by long periods of cold temperatures creating weaker snow so, when the next dump of snow comes, it has nothing to adhere to. With rain, the heavier it is, the more the increase in avalanche risk.

I was lucky enough to spend some time at the WSL Institute for Snow and Avalanche Research in Davos, some years ago, after working with one of the Swiss mountain rescue teams much further west in the Bernese Alps.

I can't praise this organisation enough for their outstanding contribution to mountain safety. It publishes daily reports of observed and forecast, avalanche, snow, and mountain conditions at the six most popular areas of Scotland during the season. It's sad the rest of Britain's mountainous regions have not been able to follow this example.

Personally, before I decide to venture out into the snow I follow the SAIS guidelines and take into consideration:

rain or snowfall.

Nonetheless, that infamous British Weather can catch us all out when on the hill so, a few years ago, I designed a waterproof Credit Card sized aide memoire to determine slope angle, using contour spacing, which is the single most critical factor to consider when crossing snow covered slopes. My M3 compass also has a clinometer that is used for this purpose and, whilst both of these tools work, they can be clumsy on the hill.

But back to my garage and the freezer.

I set up a test-rig of various slope angles, each exactly measured using a protractor, to test the accuracy of this new piece of kit in measuring slope angle. Retrieving the Slope Angel from the freezer, I discovered that the digital temperature display on the freezer agreed with my greenhouse thermometer reading of -18°C (yet another fact I can bore my friends with) and, most importantly, the Slope Angel's digital temperature display.

It instantly came to life when switched on and its accuracy in measuring slopes from just 5° to 60° — it will measure to 90° — was never more than 2° out. Next stage was out onto the hill with it.

It works best if you place it on an ice axe, walking/ski pole or ski laid facing down the slope and the slope angle displayed. The lanyard supplied was too short and with it being so small it would be easy to lose so I connected a longer piece of paracord, itself attached to my person. Statistically, three quarters of avalanches occur on mountain slopes with a steepness between 30°-45°. Allowing for error, this danger zone is usually defined between 27°-50°. Avalanches only occur on slopes of less than 27° if the snowpack is very unstable, and those steeper than 50° usually shed snow regularly as it accumulates through sluffing or shallow-depth slab avalanches, which prevents larger avalanches from occurring. (see chart).

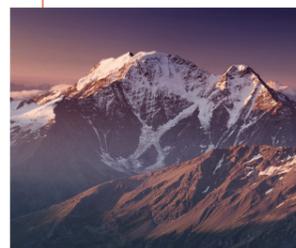
Air temperature is a massive determinant in the stability of the snow pack, with avalanche

forecast organisations gathering temperature information for the previous 24-hour period, recording maximum and minimum temperatures, at different elevations and near avalanche starting zones, and from this build longer-term temperature trends — not usually practical for the average mountaineer/hill-walker or skier. The most straight-forward reliable way to use temperature as an indicator of avalanche risk is temperature change because rapid rises in temperature can destabilise a pack, while slow rises stabilise it, especially if a cooling trend follows.

If air temperatures rapidly rises ≥ 8°C in >12 hrs, the rate of creep increases, which can lead to avalanching: this is most critical when temperatures are ≥2°C, as the rate of creep increases exponentially with increasing temperature. Using the Slope Angel you can measure the air temperature at the beginning of the day and monitor it during your journey for any changes.

The Slope Angel is an excellent small new tool in the armoury to help protect you and your party against the risk of avalanche. It does not replace good training, planning and experience. It's easy to use and quick to get to work and saves faffing about when measuring slope angles, especially when on a call-out.

LYLE BROTHERTON IS FOUNDER OF THE ULTIMATENAVIGATION SCHOOL.CO.UK CHARITY AND AUTHOR OF THE ULTIMATE NAVIGATION MANUAL



SLOPE ANGEL: SAFER IN THE MOUNTAINS

Slope Angel is a durable, lightweight and compact device that helps assess the safety of the terrain when skiers, mountaineers, hikers and rescue teams venture into the mountains. Two of the vital factors in identifying avalanche

terrain risk are slope angle and air temperature, so it's important to properly understand the conditions. Slope Angel has been designed to make that easier and is essentially a digital inclinometer and thermometer that accurately measures slope gradients between 0-90 degrees and air temperatures in both centigrade and fahrenheit. It also comes with detachable, laminated avalanche safety advice cards.

BUY FOR JUST £19 FROM SLOPEANGEL.COM



ACCOMMODATION IN THE RJUKAN VALLEY, NORWAY

:: ICE CLIMBING

:: SKIING

Rjukan

- Fantastic base to explore the valley
- Offers some of the best ice climbing in Europe
- Multi pitch ice routes suitable for all abilities
- Easily accessed climbing routes
- Cross country and downhill skiing also available

Our apartments have been used regularly by UK Mountain Rescue clubs

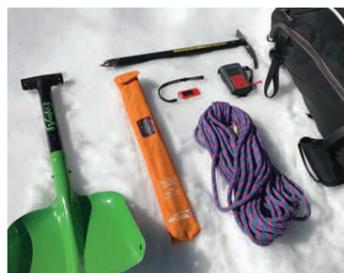
Facilities include:

- Apartments sleeping 4 / 8
- Modern shower room
- Fully equipped kitchen
- Dishwasher
- TV & DVD
- Free WiFi
- Large drying room
- Climbs within walking distance



www.rjukan.co.uk

email: enquiry@rjukan.co.uk tel: +44 1509 631 530



Images © Lyle Brotherton

This is the first time I've ever promoted anything we sell on these pages but I make no excuse whatsoever for this new kit because, to me, it's an essential carry. So... **we will supply these to MRT responders at cost, £13/unit (RRP £19). Simply enter MRT1718 when you order from www.shavenraspberry.com**