

avoid an avalanche



Expert advice on the skills you'll need in the hills – courtesy of the instructors at Glenmore Lodge, Scotland's National Outdoor Training Centre

As mountain goers we deliberately put ourselves at risk on a regular basis. Our motives for heading into the hills are strong, and our responsibility for managing the risks even more so. Having an avalanche free day out is a holistic process: it begins at the planning stage when we gathering information, we add more information as we head out, and we constantly update and review our knowledge until hopefully we get home safe. The following article is designed to give you an insight into the knowledge you need to try and avoid avalanches and the decision-making process you should go through.

Common Forms of avalanche

Snow builds up throughout the season, forming layers of different ages and types. This "snowpack" is the factor most often used to help us understand the likelihood of terrain being avalanche-prone. Sometimes an avalanche occurs full-depth, removing all of the snowpack. More commonly it occurs at a weakness within the snowpack, leaving a smooth slide surface behind.

The most common form of avalanche is the windslab avalanche. It is formed during windy conditions (above 15 mph) when there is loose snow in the air or on the ground. So as well as being created during storms, windslab is also created when winds blow the snow around, forming drifts. It can be recognised by its dull chalky appearance, the way it squeaks when we walk on it, and the way it easily releases in slabs and blocks when we test for it (see images on facing page). Because snow predominantly drifts and collects in the lee of mountain features it is reasonably easy to predict where it will form. If the snow came with strong south-westerly winds, the windslab build-up is likely to be on north-easterly slopes (that is, slopes facing directions north through to east).

Another important form of avalanche is a wet snow avalanche, which will sometimes release full depth. Commonly associated with alpine thaw conditions, they can happen at any time of the UK winter. Although they're often small in the UK, these slush-like slides can still dislodge a climber or, like a collapsing cornice, trigger a bigger avalanche. If they occur full depth, they can be devastating as this snow is particularly heavy.

How weather changes affect the snowpack

As new layers of snow are put down on existing ones, the snowpack can become more complex. If the original snowpack included unstable layers then they may well persist but the very act of adding more weight to the pack can make the layers below more likely to release. Or additional snow layers may insulate the instabilities below, slowing changes, and therefore making any risk persistent. Of course, the addition of new snow layers may also bring additional avalanche concerns, for

instance where there had been a build up of windslab only on north-facing slopes, a new storm from a new direction may add a windslab risk on westerly slopes also.

Thaw has a major affect. Initially it may weaken bonds in the snowpack. This will result in settling and sometimes avalanche. However when there is a subsequent freeze, the water molecules in the snowpack freeze together, helping to increase stability. This cycle of thaw and re-freeze, given time, stabilises the snowpack. In areas of deep snow it sometimes takes a long time to thaw to ground level, and so these areas do not always stabilise as quickly as shallow packs.

How terrain affects avalanche risk

Snow doesn't avalanche on flat ground! It is of course still vulnerable to snow falling from above, but the point is that snow needs to be on a slope to slide. Generally slope angles below around 30 degrees don't slide either; angles between 30 and 45 degrees are the most commonly at risk of avalanche. Unfortunately this is often the angle of crag aprons and steep walking terrain.

Steep, open slopes are common in our hills, as are those beautiful funnels at the top of gulleys. You can see that these areas are prime sites for avalanche if the appropriate snowpack conditions persist. Combine this with steep convexities where we top out onto ridges and plateaux and we create ideal release points for avalanche (the rapid angle change of a convexity makes it an area under tension, and therefore a weakness). If we are caught in a gully when this snow avalanches we are in big trouble as it is funnelled onto us.

The Avalanche Triangle

The Avalanche Triangle helps us understand where to look for information to help with our decision-making. Each of its three points represents an important factor to consider but the last major factor is at the very heart of the triangle: people. How we and others behave in the hill has a massive effect on whether we are avalanched or not. It is a fact that experienced winter hill goers get caught out and avalanched. When the survivors are interviewed, they often know what they did wrong. They were distracted, and made a poor decision against their own better judgement.

Terrain: Simply put, on days when we think the snowpack and weather will be making avalanches likely, we should head for areas where it is not

terrain



snowpack

weather

possible for them to occur: places that are shallow angled, are free of a threat from above or have limited or no snowpack, maybe following rocky ridges. You'll need to look very carefully at the map, checking to ensure you're not going to be under steep slopes and still have safe retreat options.

Snowpack: It gets more complicated here. We need to know how safe the layers of snow covering the ground in our proposed mountain area are. This includes considering things like whether there has been heavy snowfall lately and what the nature of that snow on the ground is. The UK is a windy place and we get a lot of windslab forming. This is a major avalanche concern and can persist for days after snowfall. Learning about the snowpack is important, but keeping up to date with changes is difficult even for professional mountaineers. The daily bulletins issued by the Scottish Avalanche Information Service are an incredible resource for those going into the Scottish hills. Keep an eye out for the yellow noticeboards and check out the website at www.sais.gov.uk. They provide a summary of the current avalanche hazard along with an avalanche hazard outlook which is based on a weather forecast.

Weather: It's important that we know what's happening and how it might affect the avalanche risk. Will it be thawing? For how long? What is the freezing level? How will I spot this on the hill tomorrow? Strong winds will shift any loose snow on the hill, drifting the snow onto the back (or lee) of the hill – this snow will probably be windslab. So you can see that any avalanche outlook for our day on the hill is reliant upon the weather forecast being accurate.

Observations and testing

Having looked at the information available and planned for a sensible day out, we go into the hills with an expectation of what we will experience. We would expect to make observations that confirm these predictions as we go – the type of snow that's building up and whereabouts it's accumulating, the direction the wind is coming from, the height at which the snow is freezing, whether the crags are white and frozen or black and dripping. These observations should comfort us as they match up with our expectations. Occasionally, however, alarm bells ring because the picture doesn't match our expectations. This is a good time for a rethink and maybe a change of plans.



Sometimes we dig in the snow to test its likelihood of avalanche.

This process is too complex to outline in a paragraph, but basically, if we cut around suspect layers and see how easily they slide on those below, we get a crude picture of the avalanche risk. Most snowpack testing is done to confirm our expectations or out of curiosity.

Obviously walking blindly into the foot of a gully and then testing it is a suicide mission. By the time we are under a slope that is big enough to cause concern, we should already believe it is safe.

Occasionally, though, we find ourselves in the awkward position of having to cross a slope to get to safety while being unsure whether it will avalanche. If we decide to go, we will choose our route carefully and travel one at a time to minimise risk. Crossing suspect slopes should be avoided. However spreading out on the slope and keeping an eye on each other from areas of safety (eg on ridges, under crags, below boulders) is often used to reduce risk, in all but the safest of conditions. This is a "safe travel technique".

Should I Stay or Should I Go Now?

As we become more skilled at making good decisions, we are able to enjoy our winter days out while minimising the risk of being mauled by a Great White. However good you are, there are still many days when the decisions are not easy – but our actions should be the same. If we know it's safe we can go on; if we know it's dangerous we should change our route; and if we don't know we should assume it's dangerous! Remember the Avalanche Triangle tells us that we shouldn't have to stay in the valley. Even if avalanche conditions are present, we should still be able to go for a safe day out if we stick to the right terrain. Happy hiking... and don't become sharkbait!

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The Glenmore Lodge website features a freely available avalanche awareness quiz as well as video clips and other advice. The centre offers courses in avalanche avoidance, and a range of winter mountaineering and ski-mountaineering courses. www.glenmorelodge.org.uk