

### Mountaineering skills for mountain rescue

by Bob Sharp Photos: Bob Sharp

There is a clear overlap between mountain rescue and mountaineering. Many principles and skills are common. Some items of equipment used in mountain rescue (ropes, harnesses, prussik loops) are also used by climbers. Similarly, many mountaineering skills are relevant to mountain rescue. Searching a moorland area in bad weather at night time requires team members to know how to navigate. And the rope techniques and principles required to safeguard someone on steep ground are not dissimilar to those required by climbers on a route.

Most rescue teams expect their members to be proficient in the basic mountaineering skills – navigation, self-reliance, rope handling, etc. Indeed, most teams require aspirant members to be competent hillwalkers or mountaineers before they will accept them as members. How you become a mountaineer or skilled in the basics is not the aim here. There are numerous instructional texts and courses available across the UK to help people develop basic skills and acquire appropriate qualifications and national awards.

This article lists key skills (with a little elaboration) and makes no

attempt to 'train' people in their acquisition or describe in full the nature of those skills. The various topics will be more or less important depending on the individual team's operational needs.

#### Navigation

Navigation is a key skill employed by all who venture to the hills, but given that team members often operate in marginal conditions, their understanding and competence need to be ingrained to such a level that they can navigate and, for example, perform an effective search at the same time. This calls for a deep level of skill and familiarity which is second nature.

The terrain in which teams operate in the UK varies widely from the windswept plateaus of Dartmoor or Cairngorm to the Skye Cuillin and Helvellyn ridges. Each area presents different navigational challenges.

The prime skill of navigation is map reading, with the interpretation, visualisation and interpolation of the ground from the map, and vice versa, of prime importance. It is critical that team members are able to look at a map and estimate what the various components mean in terms of the shape and character of the land in that section.

To do this, teams may choose to use 1:25,000 scale maps for particular complex areas, whilst others use the standard 1:50,000 scale OS Landranger map. Use of ground features, through accurate contour reading, can allow the simplification of the route finding, which then frees up the senses for other tasks.



*I think it's a grid reference...*

The fine use of the compass, combined with accurate distance estimation using pacing and/or timing are the other key skills required in poor visibility.

Many strategies can be employed whilst navigating, and all team members should be familiar with fine navigation techniques such as aiming off, handrails, or attack points. Whilst these can often be employed to good effect, the priorities of an operation may, on occasion, make their use impossible. At these times, knowing how to relocate when misled, using a variety of tactics, is also important.

The use of GPS receivers in rescue situations is invaluable and all team members should, as a minimum, be able to use a GPS to give an accurate six or ten figure grid reference when required to do so by Control.

#### These are some of the skills needed to navigate in the hills:

- Interpretation of relief including knowledge of contours



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- Taking and following a compass bearing
- Map scales and measuring distances on the map
- Estimating distance traveled using timing and pacing
- Route choice
- Aspect of slope or direction of linear features
- Relocation strategies
- Setting the map
- Knowledge of conventional symbols
- Micro navigation techniques – aiming off, attack points, collecting features, handrails
- Grid references
- Winter techniques eg. boxing a cornice

#### Essential tools

Movement on the hills in the winter requires an additional set of skills to those required in summer, whilst other important aspects such as personal organisation and sound judgement are built directly from those acquired in the summer conditions. The winter environment is unforgiving to those who are disorganised, unprepared or ill-equipped and clothed. Sound judgment needs to be exercised in choosing a route, deciding when to put on crampons and knowing when limits have been reached.

A large number of teams in the UK encounter full winter conditions – snow, ice, driving blizzard – over the winter period. For these teams it is essential for members to be both competent and confident when moving on steep, snow and ice covered terrain. Competence in moving on Grade I terrain (Scottish grading) should present no difficulties for members of these teams. Even if a team does not expect to operate in such

conditions, it should bear in mind that it might be called to assist a team that does work in these conditions. In this case, a degree of familiarity in the basic skills is essential for every team member.

The winter mountaineer’s essential tools are their ice axe and crampons, which should be carried whenever there are potential winter conditions. This may be as early as November, or as late as May. In regard to ice axes, many makes, models and lengths are available, but whichever are chosen they should become an extension of the hands and feet through constant use and practice. Also, the correct type of boots and matching crampons perform a role every bit as important.

The carrying of a lightweight snow shovel has also a lot to commend it. It can be used, not only for digging avalanche pits and snow shelters, but some models can also be used as emergency ‘dead men’ (snow anchors). Ski poles or trekking poles, whilst making walking easier on the flat can become a liability on steeper slopes. If they are used on steep snow slopes then sound judgement should be used and they should be put away early and where a fall will not result in an uncontrolled slide.

The ice axe is the key tool. It can be used for progression, as a walking aid, for cutting steps, climbing steep snow or ice, or as a belay in snow. When things go wrong, it can prevent a slip or perform an effective self-arrest. All these tasks only come with practice and refreshment each winter.

The wearing of crampons allows a degree of security on hard snow

or ice, which is impossible to obtain even with the best cut steps but, in softer conditions, the kicking or cutting of steps may save some time for smaller distances or when crampons are ‘balling up’. Again sound judgement calls have to be made depending on the nature of the terrain, time available and the consequences of a fall.

Gaining or making shelter from the incessant buffeting of the winter gales is also an important winter skill. Shelters vary enormously in their type and methods of construction and, it has to be said, in their comfort levels. There is a world of difference between setting out fully equipped to spend the night in a palatial snow hole that takes three hours to dig and lying for a night in a snow grave due to an emergency. Again practice and personal experience should allow you to construct the correct shelter efficiently.

#### Avalanche awareness

Whilst winter snows are becoming an increasingly rare phenomenon on the British

#### Cutting out the slab and the Burp Test



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mountains, it can be certain that wherever there is lying snow then there will be associated avalanche activity. The vast majority of injurious or fatal avalanches, especially in Scotland, are those caused by wind slab.

When snow falls and is blown by the wind, it accumulates on the lee slopes, although with wind turbulence this may extend 90 degrees either side of the true wind direction. Numerous factors affect the stability of the snowpack at a particular instant, viz:

- Rate of accumulation: If the rate is >2cm per hour the snowpack can become unstable
- Angle of slope: Slopes most prone are between 30° and 45°
- Shape of slope: Convex slopes have a greater likelihood of avalanching
- Air temperature: Affects consolidation and adhesion
- Wind: Determines the cohesiveness of the snowpack
- Surface hoar: Fine frost crystals when buried in the snowpack can act as sliding years
- Underlying surfaces

Recognising the factors that contribute to avalanche formation is not an exact science but a highly useful approach is to examine three key categories of information. Firstly terrain. Is the slope greater than 30 degrees? Is the slope convex in nature? Is there evidence of previous avalanche paths? Secondly, the snowpack. Is there fresh avalanche debris? Are there 'whumping' noises as snow layers collapse under foot pressure? Are snow blocks released as you walk across the snow? Thirdly the weather. Has there been recent heavy snowfall? Are slopes loaded

with windblown snow? Is there a rapid rise in temperature? These are just some examples of the three major categories – terrain, snowpack and weather.

It should also be noted that the human factor is a key element; the majority of persons caught in an avalanche trigger it themselves!

In practice, once the hazard warnings have been read, the next evaluation phase is to carry out one of the many tests that are available. The most common of these is the Rutschblock test. It takes some time to prepare but can give a good indication of the snow instability. In addition, 'hasty' pits can be dug quickly and throughout the day as the journey through the terrain progresses.

When travelling through avalanche terrain, potential avalanche hazards along the route should be noted and avoided, if at all possible. Crossing suspect slopes should be undertaken one at a time with good look out and crossing as quickly as possible from one island of safety to another. If someone is caught in an avalanche they should shout and try to escape to one side. Once someone is buried, their best chance of survival is by being found by their own companions. Thereafter, the chances of survival diminish rapidly.

The most efficient method of location is by an avalanche transceiver which sends out a signal to the search party. A practised mountaineer can use their transceiver to find a buried victim within a few minutes. This is another skill that must be practised regularly.

If transceivers are not worn, the searchers will need to resort to traditional search techniques using

probes. Members of mountain rescue – particularly those teams which operate in avalanche prone areas – should be familiar with and practiced in coarse and fine probing techniques. They should understand how to manage an effective search as well as how to operate probes to best effect. A knowledge of avalanche dogs and the conditions under which they should be deployed is also vital.

#### Security on steep ground

Many mountain incidents take place on terrain that is normally avoided by hillwalking or climbing groups and it is often termed 'broken ground'. Ground such as this includes scree slopes, steep grass and easy angled but fractured rock, all of which can make for difficult and unsafe progress. Problems can be compounded by the need to shift a loaded stretcher or assist shocked casualties to safety.



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Rescuers must, therefore, be fully conversant with the movement skills associated with such terrain found in their area and be able to move across it safely, in all conditions, night or day.

Reassurance is often needed for the 'walking wounded'. At the simplest end of the spectrum this can simply be a rescuer walking alongside in close proximity or supporting by holding a rucksack strap. In more complex terrain, it may be appropriate to attach a long sling or rope and use this as a confidence rope, giving support whilst moving. Normally in a rescue situation, climbing equipment is carried, with a spare harness being available for the use of the casualty during evacuation. There may be occasions when appropriate equipment has not arrived and only a rope and a few slings are available. In these situations, the use of the rope only for lowering may be expedient, using a Dulfers Seat such as the Thompson knot or improvised harness. The rescuer can then descend using one of the 'classic' methods of abseiling to join the casualty. Within these systems direct belays can be utilised, similar to when safeguarding a stretcher down similar terrain. The judicious use of an Italian Hitch can also be considered which minimises the use of special equipment.

#### Mountain weather

Mountain rescue teams operate in all weather conditions. Of course there are limitations. If a team leader feels it is unsafe for party members to venture onto the mountain because of adverse weather, or if conditions are so

bad that it would be operationally very difficult or wasteful of time or resources, then operations will be delayed until the weather improves. However, it is still important for all rescuers to understand weather patterns and to be able to estimate conditions, particularly if a lengthy stay on the mountain is expected. It is not necessary to provide further detail here as there are numerous resources that can be referenced, but the following list provides a summary of the key topics that should be known and understood by all rescue personnel:

- Principles of air temperature and movement
- Pressure and associations with wind direction and associated weather
- Common air streams which affect the UK
- Knowledge of frontal systems
- Weather prediction – use of synoptic charts
- Effects of mountains on weather
- Localised effects eg, wind acceleration over cols and saddles.

The critical aspect for rescuers is recognising the changes that take place with altitude. Weather characterised by light wind and temperature above freezing may quickly change to a raging blizzard 900 metres higher up.

#### Swiftwater skills

Mountain rescuers approach moving water in two situations. Firstly, as mountaineers, they may be required to deal with flowing water hazards in the course of moving to/from a rescue. Secondly, as swiftwater rescue technicians, they may be required

to use their skills to assist others.

The changing climate has led to an increase in rainfall with the subsequent rising of water levels. Recent years have seen rivers rise almost 50% above average levels.

Mountain rivers tend to be steep and fast flowing. The consequences of a slip may mean a tumble down stream into boulders and over waterfalls. Lower down, additional hazards such as fallen trees and fences can have a differing but equally dangerous effect.

Hypothermia is a potential problem with all watercourses. River water especially in winter tends to be just a few degrees above freezing.

Knowing a little about river hydrology and river bed morphology can allow judgements to be made about strength of flow in relation to its direction and therefore informed decisions about safe crossing.

Essential skills for crossing rivers include:

- Examination of need to cross
- Evaluation of crossing point using flow and morphology
- Preparation of personnel and equipment
- Knowledge of river hazards – fallen trees, cold water, water flow
- Need to rescue people trapped in moving water and how to safeguard rescuers and rescue casualties
- Knowledge and selection of crossing methods – roped and unroped

The skills of swiftwater rescue using technical equipment, drysuits, buoyancy aids and rafts or kayaks to rescue others is a



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specialist discipline. Whilst there are some similarities between the rope skills utilised to those in other rescue situations, the proximity of white water renders the situation very fluid.

When working near or in water all rescuers should wear appropriate personal flotation devices and no one should enter the water unless it is strictly necessary.

#### Improvisation and self reliance

No two rescues are ever the same. Time of the day, weather, location, personnel and equipment available, casualty factors and incident details all conspire to make each incident unique. It is vital, therefore, that all team members are prepared for unique and challenging situations and have the toolbox of technical skills to meet those challenges. It's all well and good practising things in the cosy confines of a warm indoor training room, but the skills learned are only useful if they can be selected, applied and sometimes adapted in practice. So, for example, members should know how to set up snow/ice anchors without the use of bespoke gear such as dead men or ice screws. And they should be versatile enough to manage (with the help of others) the extraction of a casualty from awkward situations (eg. stuck on a steep ledge or in a rock cleft). Doing

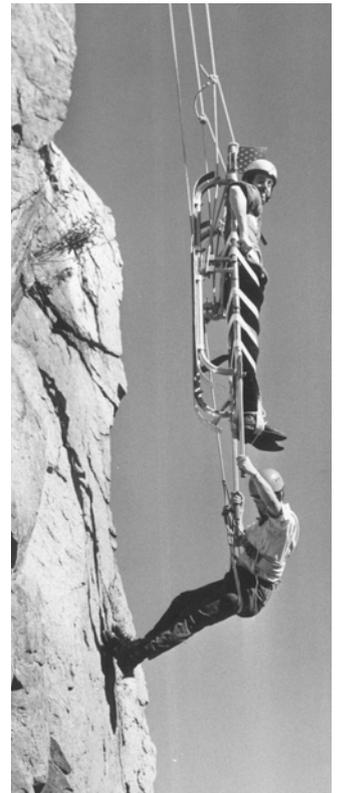
these things correctly and safely is about practising unusual things in training, and having the mindset to solve atypical problems. Some people are naturally very good at this whilst others are not! Hopefully, every team has its fair share of good improvisers.

Finally, everyone should be self-reliant. Not a skill as such but a vital part of being a safe and competent mountaineer. Those involved in mountain rescue are not exempt from this because they have the backup of fellow team members. Everyone needs the capacity and fortitude to look after themselves when the chips are down. You never know when you might find yourself alone in bad weather or faced with a very difficult situation (eg. stuck on the mountainside for twelve hours in driving rain or left at the bottom of a crag with nobody to haul you back up). Self reliance embodies a whole raft of qualities – technical skills, experience, wisdom, confidence, ability to improvise, good planning and preparation, and so on. Hopefully, all team members will have these things in abundance, but teams should do their bit to check members are self reliant so that when tested for real, they don't let the side down.

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