

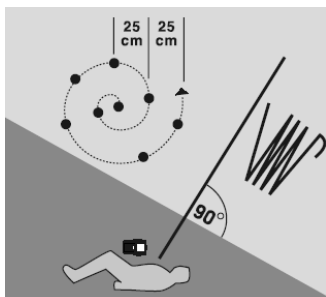
## Avalanche victim rescue: Probing and digging.

If you have read my article of transceivers, then you should be in a better place to find the avalanche victim using by your transceiver. Remember time is critical with avalanche rescue and it is important not only to be efficient with the transceiver but also with the probe and shovel.

The transceiver search and probing will normally be done very quickly (less than 3 minutes from finding the signal), but the digging takes most time by far. Having the best digging technique will speed up this process no end. Most people train to use their transceivers, but it is also equally important to practice using the probe and shovel to uncover the victim as fast as possible.

### Probing

Once you have identified the minimum distance it is time to get the probe out and physically locate the victim. To prepare the probe; hold the top of the probe and flicking it downhill whilst pulling the cable tight, then lock the cable at the top of the probe. It is important to probe at 90° to the surface of the snow as this will be the shortest distance. If you probe vertically you may miss the victim if they are on a slope. It is important to use the probe efficiently, use the lower hand to guide the probe and the upper hand to drive the probe as this is more accurate and sensitive. You can work in a spiral from the minimum distance detected on the transceiver as shown below but I prefer to work in a right-angle grid at 25cms intervals as I find it is easier to measure/draw.



Probing 90° to snow in a spiral



Probing 90° to the snow in a grid

Once you strike the victim leave the probe in place as a marker, and as reassurance for the victim. Most probes have 40cms sections, so you should measure the depth of the burial and if on a slope move that distance down the slope on steep slope or 2 times that distance down a shallow slope to start digging if the slope is not very steep. If the burial is very shallow (less than 30cms), then you may decide to skip this step.

Your transceiver is best positioned in the chest area so that your rescuers can home in closer to your airway. There is a trend to put transceivers in a secure trouser pocket, but this may mean more time for your rescuers to reach your airway.

Also, you will have hopefully got both hands on your face to create an air pocket and to protect your eyes from the probe.

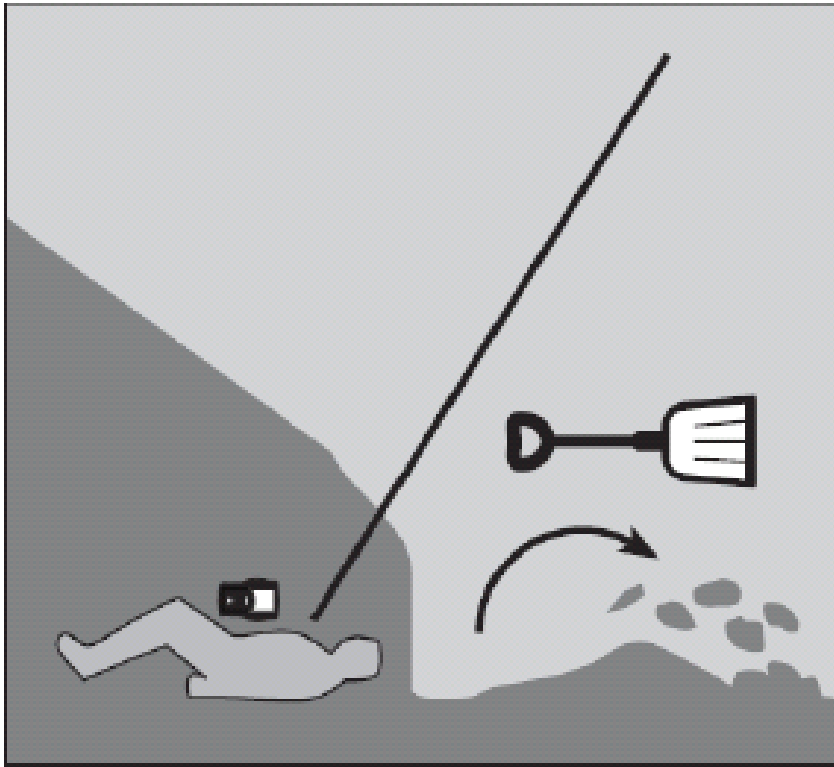
### Digging

Now the hard work really begins...

We have the probe planted in contact with the avalanche victim so moving down the slope 1 to 2 times the burial distance (depending on the steepness of the slope, 1 time for steeper slopes, 2 for less steep slopes). If you are by yourself then you may have a substantial amount of work ahead of you.

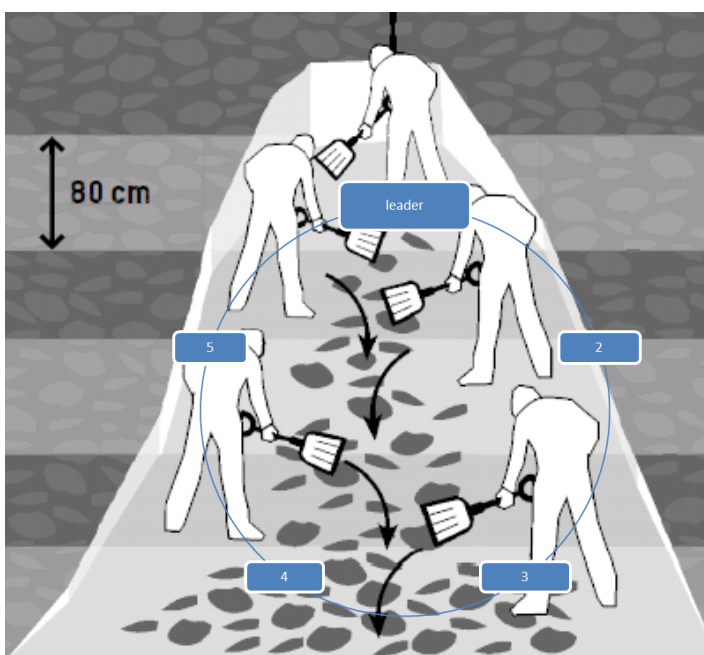
Just to quantify the task at hand...

To clear a victim buried under one metre of snow in a 10 ° slope, it is necessary to have to move about 4 to 5m<sup>3</sup> of snow. The weight of snow after an avalanche is about 500kg/m<sup>3</sup>. It will therefore be necessary to move about 2.5 tonnes of snow. Each shovel stroke moves about 0,004m<sup>3</sup> and it will take about 1250 shovel strokes to uncover the victim. Counting 1 second per shovel, it will take 20 minutes to clear the victim, as long as we hold the rhythm ...!



If you have sufficient numbers of rescuers, then you can organise a very efficient team rescue.

It is important to form a pyramid of diggers 80cms (an extended shovel distance) from each other as shown in the diagram below...



... as possible for 3 to 4 minutes or when  
... own, it is then the responsibility of the  
... ush and replace the lead digger out of

the way to replace him, don't be polite the victim is suffocating, speed is imperative! The team thus rotates clockwise.

Rapid shovel strokes taking about 10cms of snow are more efficient than trying to move big blocks. When the victim is visible it is time to slow down a little to try and work out where their airway is so to uncover this first. The lead digger and second move closer together and go on their knees, the rest of the team keep clearing the snow behind them.

Once the victim's airway and chest are clear basic life support (BLS) may be needed. Then totally uncover the victim (while doing CPR if this is needed). Use the hole created as a shelter if conditions are inclement.

If the victim is unconscious it is important for the hospital to know how long the victim has been buried so that they can determine if the victim may be unconscious through hyperthermia (long burial) or trauma (short burial) as this may affect their treatment plan. In either case continue with CPR unless they have injuries incompatible to life.

If the victim is conscious then it is still important that they go to hospital as soon as possible so that they can be monitored for fluid building up in their lungs (secondary drowning) as they most probably have inhaled snow, and this is an irritant to the lungs.

Remember also to prepare the site for the mountain rescue which may involve a helicopter.

You can see that the use of the transceiver is only one part of the avalanche rescue and it is important to train in the all aspects of the rescue, including probing and shovelling.



## Buying Shovels and Probes

Manuel Genswein, the Swiss guru of ski mountaineering equipment, recently made very thorough tests of snow shovels, in terms of strength and efficiency of use for the UIAA. His report is very in depth but his general recommendations were:

### Bigger is not better!

When fast movement of snow is needed the speed of shovelling overrides the amount per scoop. Manuel Genswein found that a shovel size of 577cms<sup>2</sup> (yes, he is very exact), this equates to a medium sized shovel (cutting edge of 21.5 x 27cms deep).

Large shovels with a flat blade are really great for digging snow pits to analyse the snow as they make a nice flat wall, but they are not good for the fast movement of snow as they can get stuck in the snow and each shovel load can be too heavy to sustain a rapid rate.

He also found that the claw method of digging was not any more efficient than the normal digging method so having this function on your shovel is not a priority.

Shovels do need to be robust and Manuel Genswein tested all the current shovels on the market to destruction using 5 test methods. He established a UIAA standard which shovels should conform to and when buying a shovel, you should look for this standard which is UIAA 156. Shovels made of metal (generally aluminium) are strongly recommended.

It is good to have an extendable handle but be careful when digging as this extra leverage can cause the shovel to buckle in hard snow.

I use a sturdy probe of at least 240cms in length, and normally I carry one which is 320cms. Don't be tempted by the lightweight options as these will slow the rescue down.

As always, we hope that we will not need to use these skills, but best made plans can go wrong so it is best to be prepared. I would certainly expect any body that I was skiing with to have this basic lifesaving skills.

I would like to wish you good safe skiing.

### References

Mammut

Louis Piquet

Swiss Mountain Training

For more help with transceiver training and ski touring risk management please consider the [International School of Mountaineering \(ISM\)](#) ski touring skills course.

Terry Ralphs. Saturday, 17 November 2018

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