Notes on Alpine-style SRT

For SRT *rigging* (which is not covered here) check out the new rigging guide

The sodding scanner has been mended! Most of the pictures are now here although I may add a few more or tart up existing ones as time permits

These notes are the result of three of us here in Canberra teaching other members of NUCC alpine style SRT techniques. More specifically the SRT manoeuvres as described here are the result of me, Mark and John arguing about the best way to do things while our hapless victims were strung up in trees struggling with our SRT obstacle courses - so credit should be given here to all those people (Mark, John and our NUCC guinea pigs). These notes assume a certain amount of fore-knowledge, that you know how to abseil and how to prusik using a frog rig. Please don't try and learn SRT from scratch using these notes, you will just hurt yourself. Get someone who knows to show you how to do it (and if you can't find someone, I'll do my best to give you a contact if you send me email).

Some good books to read more about this style of SRT are: Vertical by Al Warild
Single Rope Techniques Neil Montgomery
Caving Practice Equipment ed David Judson (SRT chapter by Dave Elliot)
There are also other books by Mike Meredith and Dave Elliot whose titles I can't recall, and for those who can read French, I am told that Marbach's book ("Techniques Speleo Alpine"?) is very comprehensive.

Thanks to Nigel Whittington (N.P.Whittington@spps.hull.ac.uk) for helpful input and comments.

Contents

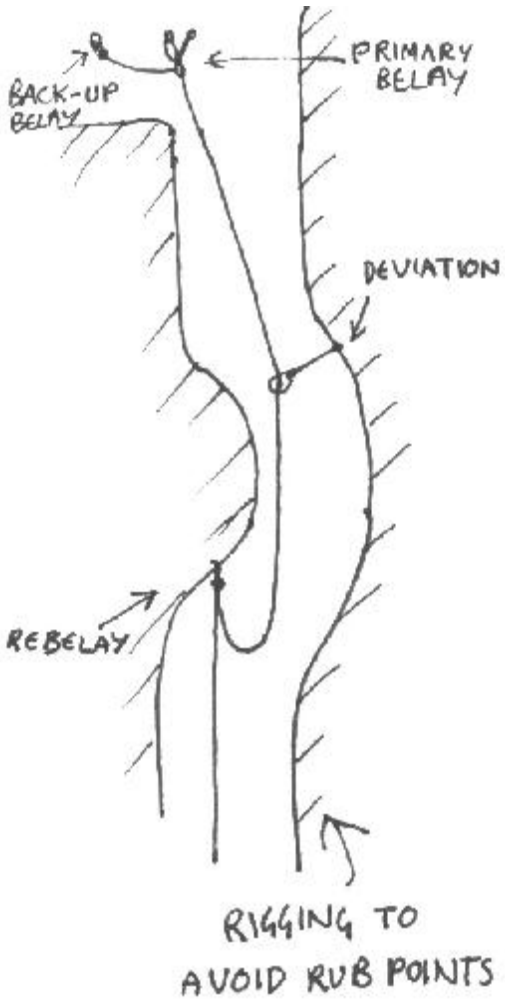
Introduction

These are some very short notes to summarise the basic manoeuvres of alpine-style SRT. They are no substitute for practicing the techniques and are intended just as a reminder. If you want more detailed info read a good SRT book such as "Vertical" by Al Warild.

The best way to learn SRT is to get lots of practice and get a feel for it rather than trying to learn the moves "by numbers". If you encounter any difficulties underground, familiarity with the basics will get you over them.

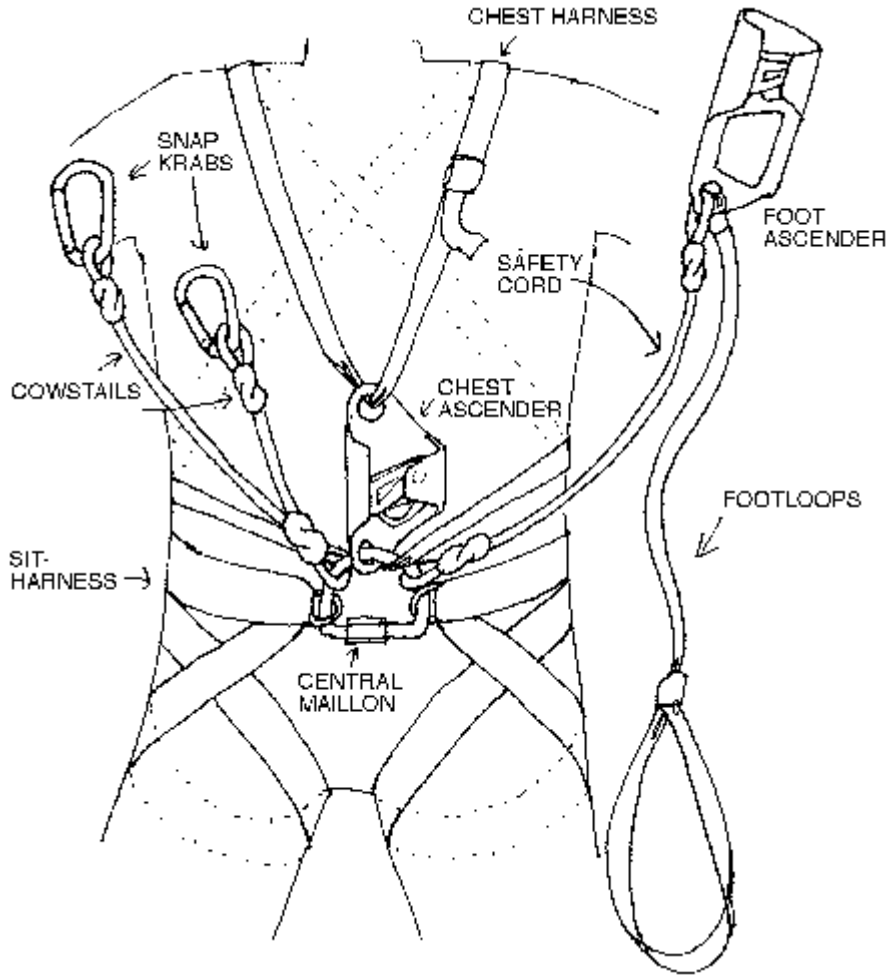
Why Bother?

Unlike indestructable rope technique, alpine-style SRT makes use of rebelays and deviations so that the rope hangs freely down the pitch avoiding rub points and other hazards such as waterfalls. This has the advantage that much thinner rope can be used which is much lighter and more compact to carry (or alternatively you can carry much more rope - useful if you are exploring a deep cave). Another plus is that abseiling or prusiking on a free hang is easier than abseiling or prusiking against an uneven wall. The (slight) downside is that you have to learn how to negotiate rebelays & deviations - the techniques and equipment used for these manoeuvres are summarised in these notes.



SRT Equipment for ascending/descending:

Apart from lots of practice, the thing that will make the most difference to the ease which which you can do SRT manoeuvres is having the right equipment and having it correctly set up and adjusted. Properly set up gear will not only vastly improve the efficiency of prusiking and changeovers, but will also minimise the risk of cock-ups (i.e. getting your gear in a tangle and getting stuck on the rope). The diagrams show the set up of gear for a frog-rig, the most commonly used SRT set-up in alpine caving. IRTers sometimes prefer ropewalking or other types of SRT rig which can sometimes have slight speed advantages on long pitches, but which make it difficult to negotiate rebelays etc.



SRT ascending/descending kit (descender omitted for clarity)

The Harness:

this should be a purpose designed caving sit harness. A sit harness is fairly snug fitting and designed so that the central attachment point (i.e. the central maillon to which the chest ascender etc is attached) is fairly low on the body. This is important because the length of a prusik step is determined by the distance between the chest and foot ascender when the foot ascender is raised on the rope. If the chest ascender sits too high on the body this distance is reduced and the caver can only take short prusik steps which is inefficient. Several designs of harness suitable for caving are shown in the diagrams. A climbing harness is also shown for comparison. These can be used for SRT, but are far from ideal because the central loop is too high on the body. Also there is no central maillon and an intermediate krab or maillon has to be used to attach the chest ascender to the harness resulting in it sitting even higher on the body.

The chest ascender:

As outlined above, for efficient prusiking the chest ascender must sit fairly low on the body (about on the stomach, just below the sternum). For this reason its is best to use an ascender without a handle, and better still, a purpose-built chest ascender such as the petzl croll which is designed to lie flat on the chest when clipped through the central maillon.

The chest harness:

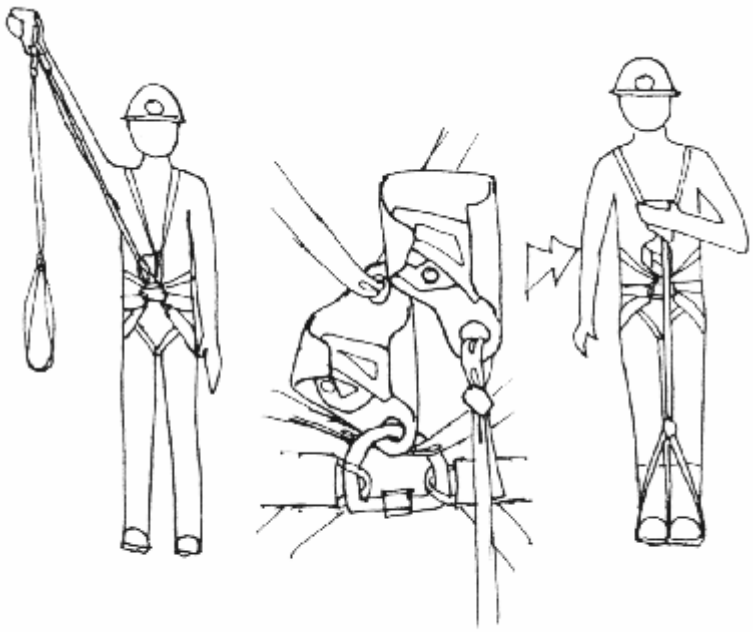
The purpose of the chest harness is to keep the chest ascender in position on the body so it moves cleanly up the rope when the caver stands in the footloops. It also holds the caver in more upright position on the rope which makes prusiking easier. If the harness is too loose, or the chest ascender too high, the caver will tend to lie back of the rope when sitting on the chest ascender, which is both uncomfortable and inefficient for prusiking. The chest harness should be done up sufficiently tightly that it is uncomfortable

to stand in when you're not on the rope. Most people use a length of tape with a buckle as a chest harness (see picture). Purpose built chest harnesses are available but don't seem to work any better than the plain tape variety, and don't fit at all if you're female (i.e. if you have a bust). The chest harness isn't intended to be load-bearing and some people use a piece of bungee cord instead of a tape. This doesn't give the caver as much support on the rope but can be better for pulling the croll smoothly up the rope. Some cavers choose to use both a tape and a bungee cord (or similar) and have the best of both worlds.

Foot ascender, footloops and safety cord:

The foot ascender can be a handled or standard (non-handled) ascender according to personal preference. It is attached to the caver via a safety cord of dynamic rope (8-9mm is suitable). The cord can either be clipped in directly to the central maillon by the knot in the end, or via an intermediate krab or maillon. There is no hard and fast rule about which is best, it comes down to personal preference. Clipping it in via a krab or maillon means that it can be unclipped from the central maillon while on the rope, however extra ironmongery on the central maillon can also cause problems if you get into a tangle. However, there are definite advantages to attaching the other end of the cord (and also the footloops) to the ascender via a maillon or krab, particularly if you're doing a rope rescue (see rope-rescue section on the pulley-style footloops rig).

The foot loops can be made of either tape or rope. Tape tends to be more hardwearing and if a rope is used, the bit that you stand on is best protected by a length of tubing. There is a risk with tape footloops that the tape can get jammed behind the chest ascender cam (this was the cause of an accident in the UK a few years ago), however, many cavers do use tape footloops and this type of incident seems to be rare.



CORRECT ADJUSTMENT OF SAFETY CORD AND FOOTLOOP
FOR PRUSIKING

Footloops can either be two separate loops, one for each foot, or a single loop for both feet (as in picture). It is important to get the lengths of the footloops and the safety cord just right. When standing in the footloops (off the rope) lift the foot ascender up till the footloops are taut. If the length is correct the camming part of the foot ascender should be just above the camming part of the chest ascender(see picture). Adjust the safety cord so you can reach the foot ascender when hanging from it on the rope by your safety cord.

Cowstails:

These are a pair of safety cords used for protection during manoeuvres. The long cowstail is used for general security when passing rebelays, deviations and knots. The short cowstail is used specifically for

passing rebelays while descending, during which your weight is hanging from the short cowstail alone. Cowstails should be made of 10-11mm dynamic rope with snap krabs clipped through the knot loop at the end of each cowstail (some cavers use 9mm rope in which case fig 9 knots should be used for tying the cowstails). A screwgate krab can be used as an alternative to a snap krab on the long cowstail for extra security while rigging. The krabs can be secured to the knot loops with snoopy loops (loops of tyre inner tube rubber) which hold them in place.

The picture shows how the cowstails are tied (there are alternative methods of tying cowstails but this method is the most common one). To tie the cowstails take a piece of dynamic rope about 2.5-3m long, and tie a double figure 8 (or figure 9) knot in one end, tie another double figure 8 (or figure 9) knot as close to the original knot as you can. Then tie a third double figure 8 (or figure 9) knot leaving about about 40 cm of rope between it and the second knot. Swami knots can also be used for the ends of the cowtails - these help hold the krabs in place. Some cavers use overhand knots for the ends of the cowstails as they are less bulky than fig 8's etc, but these do reduce the strength of the rope more than other knots (bear in mind the thickness of the rope you are using).

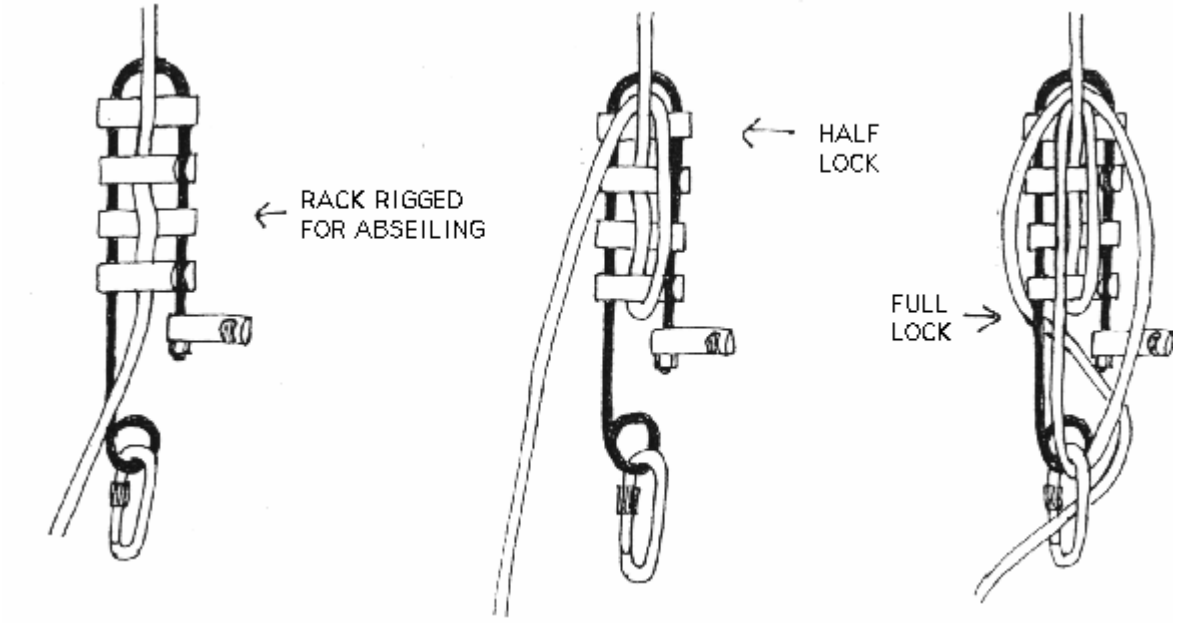
Make sure all the knots are correctly stacked and then tension the cowstails by hanging your weight from them. The lengths should now be about right. Remove any excess tail rope using a hot knife to seal the ends (the tails needn't be more than 10cm long) and tape the tails of rope to the cowstails. The short cowstail should be about 25-45cm from knot loop to knot loop, and the long one about 50-70cm (it should be at least short enough that you can reach the krab when it's taut). If you clip the cowstails to your central maillon via a krab or maillon you'll want them a bit shorter than if you clip the knot loop into the central maillon directly (see comments about attaching the safety cord above).

Descenders:

There are many kinds of descenders that can be used for caving but most alpine cavers use bobbins, autolock descenders ("stops"), or racks. The pictures show the way a rack and bobbin are rigged, for abseiling and for locking off (i.e. to lock the descender so it cant move on the rope). The stop works in basically the same way as the bobbin, except it also has a brake lever.

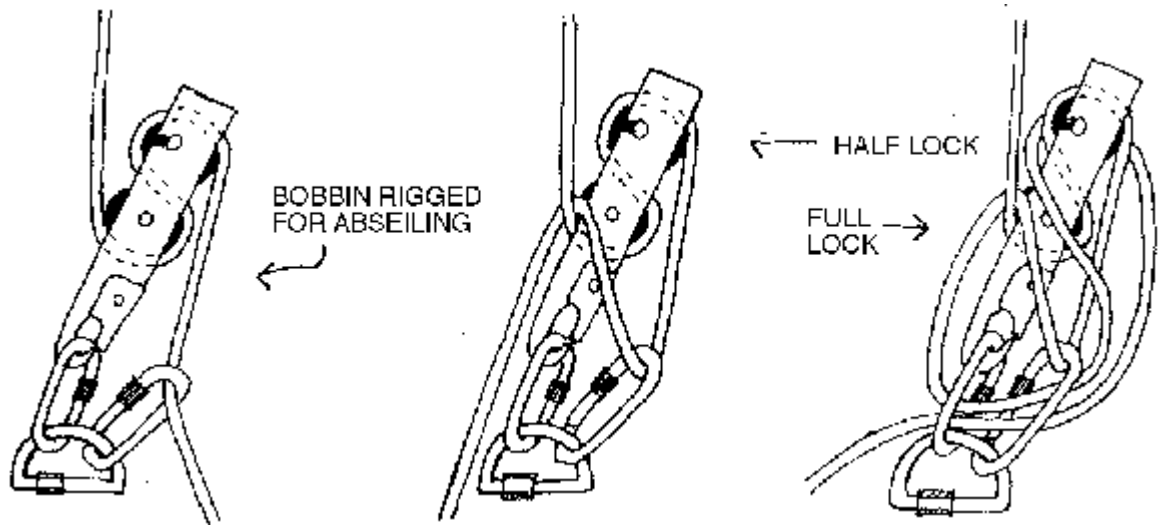
Racks:

These provide friction by weaving the rope around a series of aluminium (or sometimes steel) bars. Commonly the first (uppermost) and third bars on a rack are fixed, and the second, fourth and fifth bars unclip on one side allowing the rope to be looped behind them. It is possible to "suicide rig" a rack by looping the rope around the wrong side of the bars - this will undo itself as soon as any weight is put on it so always check you've rigged it right!



Bobbins:

The rope is wrapped around two fixed wheels to provide friction and then clipped through a braking krab (see picture). One side of the bobbin can be unclipped at the bottom allowing it to be swung open for attaching or detaching the rope. If the rope is very "slow" (i.e. fat and stiff therefore slowing the descent) a bobbin can be "C" rigged with the rope passing around both wheels in a "C" rather than "S" configuration. If the rope is very fast, abseiling with the bobbin on half lock can be used to slow down (see picture).



Rigging and locking off a bobbin

Autolock descender ("stop"):

These are a more sophisticated version of a bobbin with a brake lever. When the lever is squeezed you will "go" and when the lever is released you will stop. If you're going too fast remember to let go, it sounds obvious but "it isn't always the most natural reaction" as it says in the Petzl catalogue (people sometimes squeeze the handle thinking it will brake their descent). Some versions of this type of descender are designed to stop when the handle is either squeezed or released and only "go" in the middle position, but these tend to be much bulkier.

Other descenders:

Descenders that are often popular with climbers such as Figure 8s, or stitch plates are not ideally suited to caving as you have to unclip them completely to get them off the rope (making dropping them more likely on a rebelay). They also tend to twist the rope which is really annoying when you're spinning round on the prusik back out. Whaletails also deserve a mention, if only because of their mysterious popularity with Australian cavers. These are OK for caving, but they are very heavy and bulky (machined out of a solid block of aluminium) and also they are very long which can make otherwise straightforward SRT manoeuvres surprisingly difficult since they take up so much room on the rope.

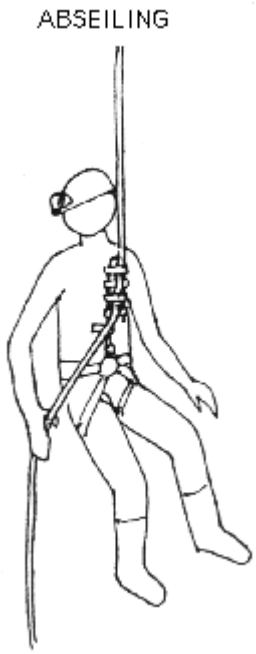
SRT basics

Notes on abseiling

Controlling speed while abseiling:

Once you have attached your descender to the rope you are ready to abseil. The principle is the same for all descnders - it is the tension of the rope runningthrough the descender that determines your speed. The tension is controlled using the rope *below* the descender. When abseiling hold the lower rope firmly with one hand down away from the descender. If you hold the rope taut you shouldn't move at all, and to move

just let the rope slip slowly through your hand. With a bit of practice you should have no trouble controlling your speed. As well as being able to control speed you also need to know how to lock off a descender so that you can "park" on the rope without needing to hold the rope below you. Methods of locking off a bobbin and a rack are shown in the diagrams



Bottom belaying:

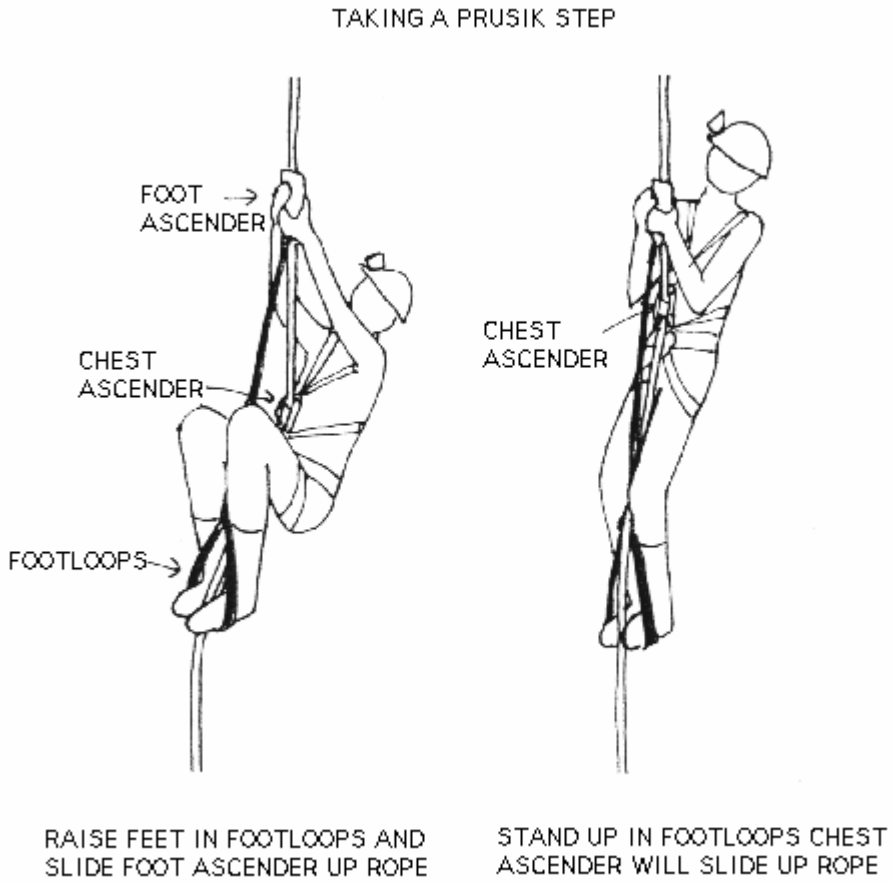
This can be used to provide extra security for novice abseilers. The belayer standso holding the bottom of the rope. If the abseiler gets out of control and starts going too fast the belayer can slow them down (and stop them if need be) by pulling on the rope. This tensions the rope passing through the descender which increases the friction and slows the descent.

Prusiking

Prusiking is the method of ascending the rope in SRT. Traditionally this was done using prusik knots which was slow and awkward, but mechanical ascenders have made prusiking much easier. The ascenders have a sprung loaded cam which slides up the rope but not down it. The caver wears a chest ascender attached to the sit-harness and held in place with a chest harness (see picture). A second ascender is attached to the caver via a safety cord. A pair of footloops are attached to this ascender (the foot ascender). The ascenders are put onto the rope by opening the cam, slipping the rope in and letting the cam close on the rope. The cam is usually prevented from opening fully by a safety catch which has to be disengaged for getting the ascender on and off the rope - for any other manoeuvres the safety catch chould be left in place.

The chest ascender is put on the rope below the foot ascender. The caver sits down on the chest ascender which will be supporting their weight on the rope. The feet are put in the footloops. While sitting on the chest ascender the foot ascender in raised up the rope (you will need to lift your feet at the same time to take the weight off the foot ascender). Then the caver stands up as far as possible in the footloops and the chest ascender slides up the rope. The caver sits back down onto the chest ascender. This sequence is repeated over and over to progress up the rope. The footloops need to be adjusted so that when standing up in them the chest ascender almost meets the foot ascender.

Sometimes the rope won't slide freely through the chest ascender, particularly when you are at the bottom of the rope. With practice you can grip the rope between your feet while standing up in the footloops which will pull it through the chest ascender. When standing up in the footloops, push your feet downwards under your bum rather than out forwards as it makes prusiking easier and more efficient.



Approaching pitch-heads

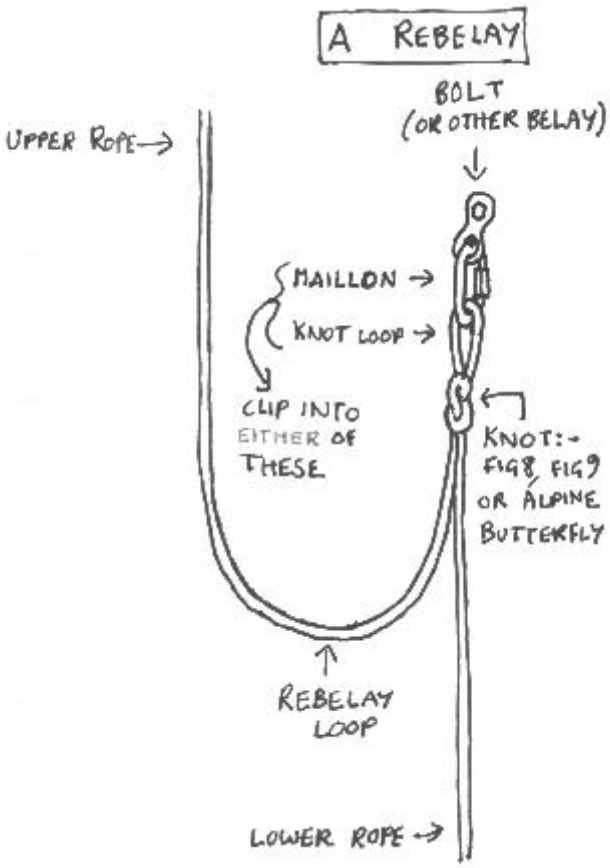
Pitches rigged for alpine-style SRT will have back-up belays usually a little way back from the pitch-head, with a rope runing from the back-up to the primary belay at the pitch-head. When approaching a pitch-head always clip your long cows-tail into the rope between the back-up and primary belays for safety. Leave it clipped in until you are sitting on your descender on the rope ready to abseil. If the back-up belay is right next to the primary a separate traverse line to the pitch-head should still be rigged for safety .

Passing Rebelays

A rebelay is where the rope is re-attached (belayed) to the rock part way down a pitch (see picture). If the rope from the top of the pitch meets a rub point/ waterfall/loose rock etc. the rope is rebelayed to the rock over to one side so that the lower part of the rope (which hangs down from the rebelay) avoids it.

Abseiling:

- Abseil until you are level with the rebelay knot - DON'T abseil past it!
- Clip short cowstail into rebelay (into the knot or the maillon)
- Abseil until your weight is taken by short cowstail
- Take descender off upper rope and put it on lower rope
- Lock descender off (full lock)
- Unclip short cowstail by standing in rebelay loop or on handy ledge to take your weight off it.
- Transfer your weight onto the descender
- Unlock descender and away you go...



NOTE: The long cowstail can also be used for extra safety during this manoeuvre: Clip it in initially at the same time as the short cowstail and leave it clipped in for the whole manoeuvre, only unclip it just before abseiling when the descender is half unlocked. This will give you protection should you fail to rig your descender properly.

Prusiking:

- Prusik up to just below rebelay knot.
- Clip long cowstail into rebelay
- Take weight off chest ascender by standing in footloops
- Transfer chest ascender from lower to upper rope
- Transfer foot ascender from lower to upper rope (watch that the safety cord isn't wrapped round the lower rope)
- Unclip long cowstail from rebelay (you may need to prusik up a little to do this until it is slack)

Passing a deviation:

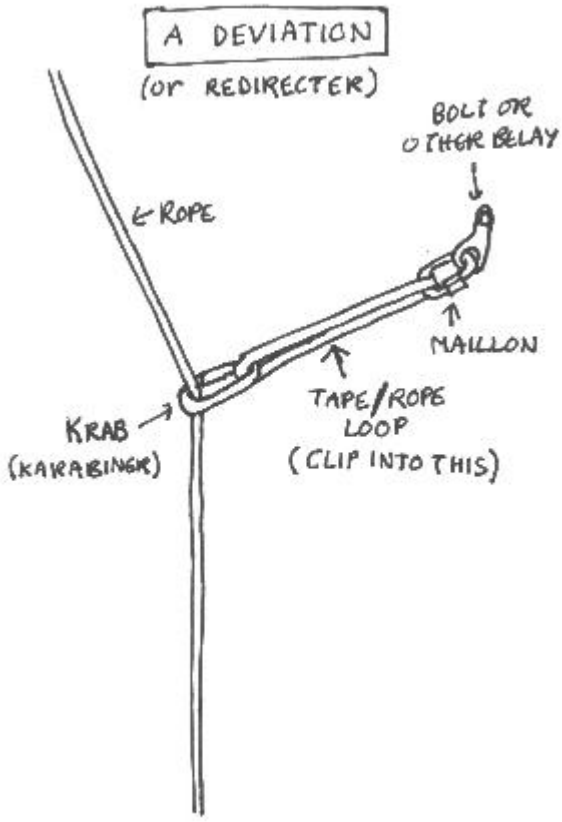
A deviation (or redirector) is another means of avoiding rub points and other hazards by altering the hang of the rope down the pitch. The rope runs freely through a krab which is attached to a belay via a tape or rope-loop. This deviation pulls the rope away slightly from its natural vertical hang to move the rope below the deviation away from a rub-point. A deviation never bears the full weight of a caver (only a fraction of it) and consequently deviations can sometimes be used where there isn't a sufficiently strong belay for a rebelay. Since deviations sometimes use poor belays you should never load them with your full weight. In the description below, the cowstail is clipped into the deviation merely to stop you swinging away from it - at no point should you be hanging from the deviation itself, your weight should always be taken by the rope.

Abseiling:

- Abseil down to the deviation (you may want to lock off your descender)
- Clip into the deviation with long cowstail
- Unclip deviation karabiner from the rope below you and clip it in on the rope above you
- Unclip cowstail and continue abseiling

Prusiking:

- Prusik up to the deviation
- Clip into the deviation with long cowstail
- Unclip deviation karabiner from rope above you and clip it into the rope below you
- Unclip cowstail (you will find that you swing away from the deviation) and continue prusiking



Changing from ascending to abseiling:

This on its own is not a common manoeuvre underground, but it is the basis of other manoeuvres such as knot passes and it is essential in rope rescue. Being able to change over easily from ascending to abseiling and vice versa is also very useful if you ever have a cock-up (get stuck on the rope) as it will usually enable you to extracate yourself.

- Make sure your foot ascender isn't a long way above your chest ascender
- Put your descender on the rope below your ascenders and lock it off
- stand in footloops to unweight chest ascender and unclip chest ascender from rope
- Sit back down until weight is taken by descender
- Unclip foot ascender from the rope
- Unlock descender and abseil

NOTE: You will find this manoeuvre difficult (or impossible) if you use a long descender such as a whaletail which takes up a lot of space on the rope. It is difficult to rig it far enough up the rope so that your foot ascender safety-cord is slack when you sit back on the descender, particularly if your safety-cord is on the short side. One way around this is to stand in your footloops and clip your short cowstail into your foot ascender. Remove the chest ascender from the rope and sit onto the cowstail. Removing the chest ascender makes more room on the rope for rigging the descender. When the descender is rigged (as high up the rope as possible, just below the foot ascender) stand in the footloops to unclip the short cowstail and sit back down onto the descender. The safety cord should now be slack allowing the foot ascender to be taken off the rope. This "sneaky" method of doing a changeover can't be wholly recommended as you are hanging from a single ascender at one point, which strictly speaking isn't safe. A variant of this technique can also be used for speeding up knot passes (provided you have a short descender!).

Some notes on down-prusiking

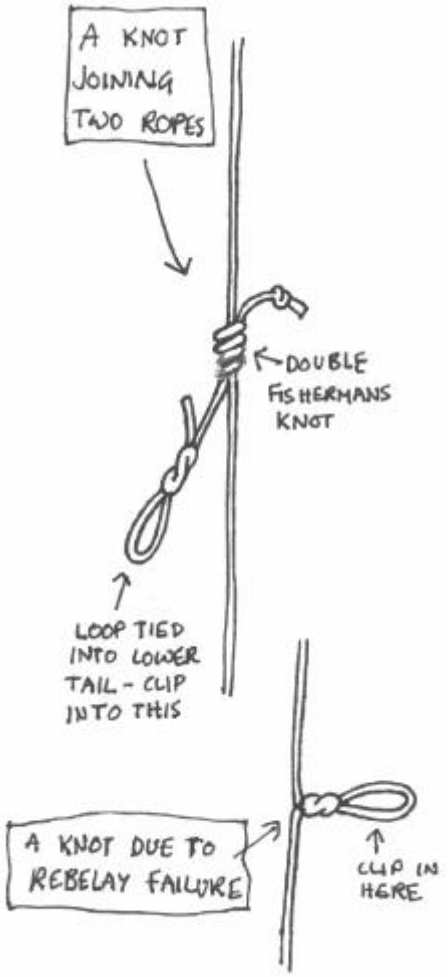
Down-prusiking is used for passing knots when descending, and also used if you need to descend a loaded rope for any reason (i.e. unconscious person on rope below you that needs rescuing). To down-prusik, unweight your chest ascender by standing in your footloops, depress the chest ascender cam from the top to release the rope and slide the ascender down the rope. Release the cam so the chest acender grips the rope and put your weight on it while you move the foot ascender down the rope. Repeat as often as necessary!

Passing a knot:

You may encounter a knot mid-rope for a number of reasons. Usually it is where two ropes are tied together as a single rope isn't long enough to reach the bottom. You may also encounter a knot where a rebelay has failed or where a damaged section of rope has been tied out.

Abseiling:

- Abseil down to knot
- Clip long cowstail into the loop tied in the tail emerging from the knot (see pic)
- Put foot ascender on the rope a few inches above descender
- Stand in footloops and clip chest ascender into rope between foot ascender and descender
- Take descender off rope
- Down-prusik to knot
- Transfer ascenders (chest ascender first then foot ascender) from above to below the knot
- Put descender on the rope below your ascenders and lock it off
- Unclip long cowstail
- Stand in footloops to unweight chest ascender and unclip chest ascender from the rope
- Sit back down and transfer weight to descender
- Remove foot ascender from rope
- Unlock descender and continue abseiling

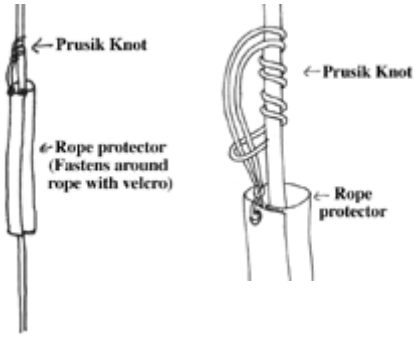


NOTE: There is a "quick and sneaky" way of passing a knot (while abseiling) that can be used by people with short descenders (and not-too-short safety cords). Abseil onto the knot and put the foot ascender on the rope just above the descender. Clip the long cowstail into the knot-loop for protection. Stand in the footloops, clip the short cowstail into the foot ascender and sit back down on the short cowtail. Take descender off the rope, put it on the rope below the knot and lock it off. Stand in the footloops to unclip the short cowstail, and sit back down (hopefully) onto the descender. Unclip the footloops and long cowstail and abseil. If your descender is too long, or your safety loop is too short you won't be able to do this - it's the kind of thing you should try out in a tree before having a go underground!

Prusiking:

- Prusik up to just below the knot (not hard up to the knot)
- Clip long cowstail into the loop tied in the tail emerging from the knot.
- Transfer foot ascender from below to above the knot
- Transfer chest ascender from below to above the knot
- Unclip cowstail and continue prusiking

Passing a rope protector



Ideally you shouldn't need rope protectors to rig a pitch, but some rub point are very hard to avoid, and a rope protector can be much simpler than trying to rig the rope around them. To pass a rope protector when abseiling:

- Abseil down until you can reach the rope protector knot and lock off your descender - DON'T abseil onto the knot!
- Unfasten the rope protector and untie it from the rope (don't drop it!)
- Abseil to below where the rope protector was tied on and lock off.
- Tie the rope protector back onto the rope above your descender using a prusik knot.
- Fasten up the rope protector as you descend past it, checking that it is correctly positioned.

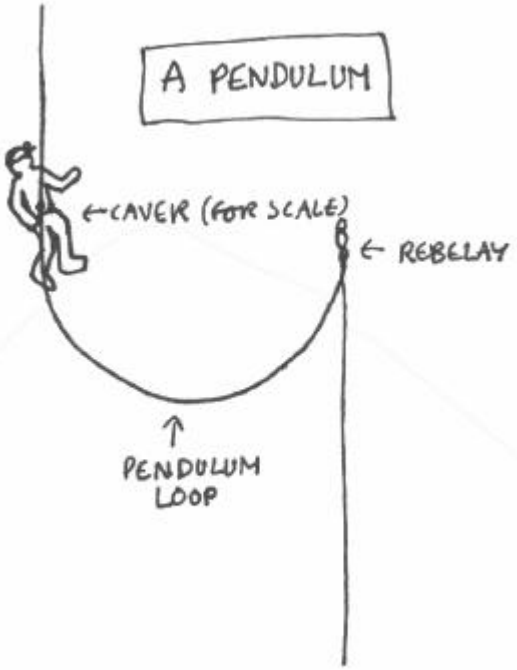
When prusiking the procedure is almost the same:

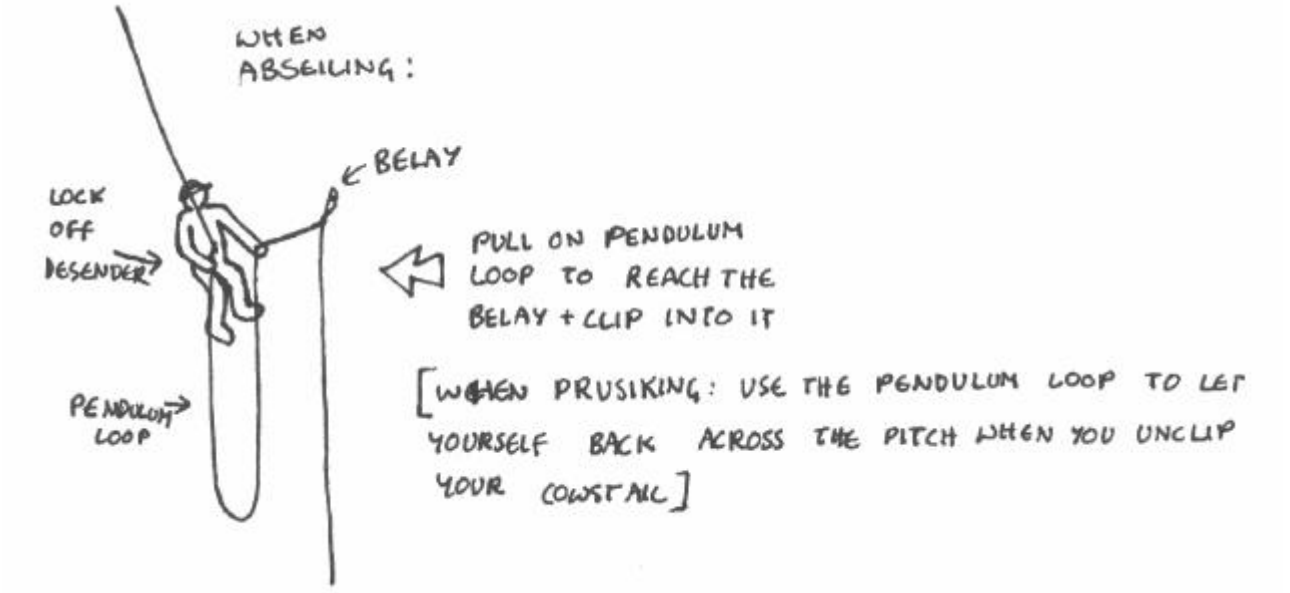
- Unfasten the rope protector when you reach it and prusik up to just below the rope protector knot.
- Untie the rope protector
- Prusik up a little
- Retie the rope protector on below you and fasten it around the rope.
- Check the rope protector is positioned properly before carrying on up the pitch.

A note on pendules (or pendulums):

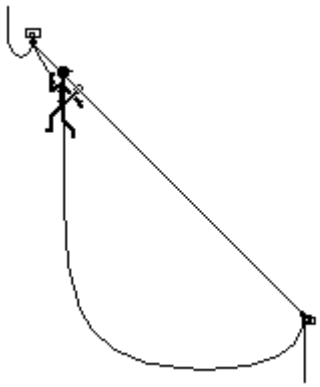
A pendulum or pendule is basically a variant of a rebelay where the upper and lower ropes are much further apart horizontally (see pic). If abseiling on the upper rope you wont be able to reach over to the rebelay knot to clip in. When level with the knot lock off your descender and pull yourself towards the rebelay using the pendulum loop. Clip in your short cowstail and continue as if you were passing a normal rebelay.

If prusiking, start as if passing a normal rebelay (use the pendulum loop to pull in the slack on the upper rope). When your ascenders are on the upper rope you will find your cowstail is taut. Pull yourself towards the rebelay to slacken and unclip your cowstail and then use the pendulum loop to let yourself out across the pitch (otherwise you will go flying across the pitch which is rather unpleasant).





A note on tyroleans:



This is similar to a pendule in that is is a means of negotiating a rope where there is a significant horizontal distance as well as vertical distance between two belays. A Tyrolean *(NB I'm not actually sure if his is the correct name for it)* can be rigged much like a pendule (see above) with the addition of a **taut** rope rigged between the upper and lower belay. To descend, the caver rigs their descender onto the slack (pendule) rope and clips their short cowstail onto the taut rope. The slack rope takes most of the weight of the caver as they descend and the taut rope pulls them over toward the lower belay, so the descent is roughly diagonal.

A tyrolean can be rigged as an alternative to a pendule where the large horizontal distance makes it difficult for the caver to pull themselves across the pitch towards the lower belay (see the pendule above). In these cases it is easier to *ascend* the tyrolean as a conventional pendule without using the taut rope. In other cases a Tyrolean is rigged as a

means of pulling the caver away from a hazard such as a waterfall, in which case the caver would clip into the taut rope when ascending as well as when descending. Prusiking up whilst clipped into a taut rope is strenuous but is preferable to being soaked or prusiking up the wall of hanging death etc.

Rescuing an unconscious caver from a rope

If a caver is knocked out by a falling rock while on a rope, or becomes unconscious for some other reason, you need to be able to get them off the rope as fast as possible. A person lying unconscious in their SRT harnesses may start to suffocate due to construction of the chest by the chest harness, or possibly due to choking on their tongue. If the casualty is not breathing at all you have 4 minutes to reach them (and you'd have to be bloody fast to figure out what was wrong and get there in time to do anything about it). If the casualty is breathing you have a little longer. The procedure described below assumes you are at the bottom of the pitch, below the casualty. If you are at the top you would have to down-prusik to the casualty, clip their short cowstail into you, and then continue as from step 4. I have also assumed that the casualty was prusiking. If they'd been abseiling they would a) have been using a stop in which case once you reach them, clip into them and use their descender to get down the pitch. b) be stuck in a rebelay loop, in which case the procedure is much the same as if they'd been prusiking, or c) have ended up at the bottom of the pitch.

- Prusik up to below the casualty and clip their short cowstail into your central maillon.
- Remove the casualtys foot ascender
- Move your foot ascender and then chest ascender past the casualtys chest ascender onto the rope above the casualty (as if you were passing a knot).
- Continue prusiking until you have taken the weight of the casualty on their short cowstail (which is clipped into you). This is strenuous.
- Remove the casualtys chest ascender from the rope.
- Put your descender on the rope below your chest ascender, and lock it off (full lock off).
- Stand up in your footloops (you'll be taking the weight of the casualty) and remove your chest ascender. This is the difficult part.
- Sit back down onto your descender (your footloops safety cord should be slack when you've sat down).
- Unclip your foot ascender, unlock your descender and abseil to the bottom of the pitch with the casualty.

If you cant lift the casualty:

Lifting someone by standing in your footloops isn't easy. If you cant lift them you can re-rig your footloops to give a 2:1 pulley advantage which should enable you to lift almost anyone. To re-rig your footloops, unclip the safety cord and footloops from the foot ascender and tie the footloops to the safety cord. Run the safety cord through a krab (or if you have one, a pulley) which is clipped to the foot ascender (see picture). Now when you stand in the footloops you'll find you are expending less effort in standing up (although you'll only move half as far). You may find the footloops are too long in this arrangement and you'll need to tie out a small section to shorten them. With this re-rig, you effectively have no safety cord between you and your footloops. You could clip in your long cowstail to your foot ascender as a safety cord (otherwise you'll spend a short period during the manoeuvre attached to the rope only by one ascender which is unsafe).

If your footloops safety cord is taut when you sit onto your descender:

Conventionally you would stand in your footloops, re-attach your chest ascender, move the foot ascender down a bit and try again (i.e. stand in footloops, remove chest ascender and sit back onto descender). At a pinch (and time is of the essence here) you could just stand in your footloops to slacken the safety cord, unclip the safety cord from the foot ascender and sit down onto the descender, It is possible that you would be unable to recover the foot ascender if you did this, but don't forget you have a spare attached to the casualty.

Rebelays:

If possible derig any rebelays/deviations between you and the casualty on your way up. This wont be possible if the pitch has been well travelled, or if you approach the casualty from the top of the pitch. If you do have to pass rebelays on the way back down, treat the casualty as a heavy tackle-bag and proceed as usual. You may need to use your footloops to unweight your short cowstail prior to unclipping it, and re-rigging your footloops as described above would help.

Use your brain (& practice lots):

You may not be able to do this manoeuvre exactly as described here, but if you are familiar with the basic techniques and equipment you should be able to work around any difficulties in safety with a bit of cunning.

Alternative Prusiking techniques

It is assumed in most of the sections above that you are using a "Frog rig" for prusiking. This is just one of numerous prusiking rigs, but it is one of the most popular as it is simple and versatile, less prone to "cock-ups" and easy to pass rebelays etc with. Of the alternative prusiking set-ups, "ropewalking" systems are the most popular, especially with US cavers. Ropewalking systems are generally more complex than the frog rig, but they do have a speed advantage provided there are no rebelays or deviations (which is why ropewalking and "indestructable rope technique" are popular with the same people!). Described below are two methods for turning a frog-rig into a rope-walking (or semi-ropewalking) rig.

Hybrid Frog-ropewalker

All this requires in addition to the frog-rig in an extra ascender which is attached to the foot firmly with a webbing strap. The other foot still uses the footloops as is the conventional frog-rig. If you use a single footloop rather than a pair, you will probably need to shorten it a little to make it the correct length for use with one foot only.

Clip in the chest ascender and footloop foot ascender as usual. Also clip in the ascender attached to the other foot. Instead of ascending by standing up with both feet at the same time progress is made by a walking motion, first lifting the footloops then standing up in the footloops and raising the other foot sliding its ascender up the rope ready for the next step.

This is a very simple modification to the frog-rig which can give some of the speed advantages of rope-walking, however it is not really a true rope-walking rig.

The 'Caving Supplies' Combination rig

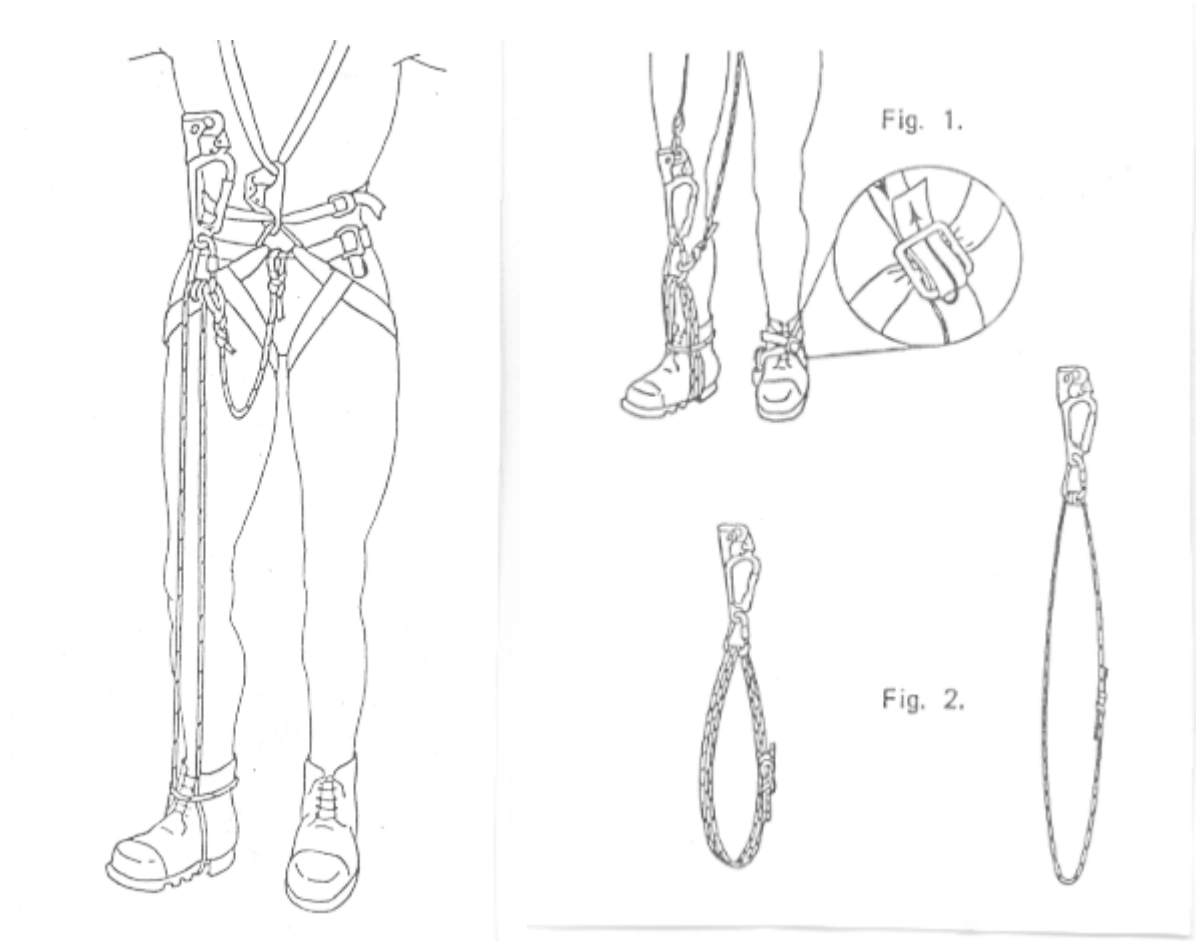
Thanks to Nigel Whittington for this description which I've quoted straight from his email.

This is a simple modification of the 'Frog' rig that enables energy~efficient ropewalking technique to be used on long pitches and Frog technique to be used on alpine style deviations and rebelays using the same personal rig.

It uses the standard 'Frog' rig with the addition of an extra jammer, buckled footloop, elastic cord and two carbine hooks. A slight modification to the footloop is also made.

Make or buy a webbing strap (load bearing!) that will wrap around your ankle and foot in a fig 8 pattern. Use this to fix a non-handled Petzl (tm.) jammer to your LEFT foot.

Modify the footloop on your top jammer so it can be shortened to about 15-20 cm. This can be done several ways, e.g. an extra knot or just clipping the lower loop into the crab or mallion on the jammer. The jammer is attached BELOW the chest jammer and the footloop should be ajusted so that with the right foot raised the janner is just below the chest jammer, with the right foot raised the foot mounted jammer should not foul the floating jammer.



a) set-up for frog rig with slightly altered footloop
b) alteration to footloop and addition of left foot ascender for ropewalking

Attach an elastic cord to the top of the jammer with a carbine hook, run the cord over your shoulder and attach to the back of your harness via a second carbine hook.

A crab on the chest harness can be used to clip onto the rope to prevent the possibility of inversion and hanging from ones ankles in the event of the chest jammer accidentally opening.

USE

Clip in all three jammers as described, and take short, alternating steps. At the foot of a pitch you may need to weight the rope to ensure the rope runs through the foot jammer.

To transfer to Frog:

Disconnect the floating jammer.
Lengthen footloop.
Remove elastic cord (optional)
Connect floating jammer above chest jammer.
Disconnect foot jammer.
Feet in footloop.

Et Voila, Frog!

To transfer to ropewalking:

Connect foot jammer.
Shorten footloop on top jammer.
Disconnect top jammer.
Connect top jammer on rope between foot jammer and chest jammer.
Pass elastic cord from back of harness, over shoulder and clip to top of what is now the floating jammer (was top jammer).
Right foot in shortened loop.

Et Voila, Ropewalking.

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