Cave Instructor Certificate Resources: Pull Through Caving Techniques

Supporting document for the CIC Scheme: Pull Throughs

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Disclaimer

Neither the authors nor British Caving Association assume any responsibility for the improper application of the techniques or principles outlined in this document. Use of these techniques are at the user's risk. The techniques illustrated in this document provide supporting information for the Cave Instructor Certificate syllabus and should be read with the remit of that award in mind. This document is not a substitute for attending certified training courses.

Cave Instructor Certificate: Pull Through Techniques

Introduction

Pull through trips when well managed provide an exciting and swift traverse of a cave or mine system, without the encumbrance of many bags, and without the effort of uphill rope travel! It isn't known as 'old man's' caving for nothing… However, some of the larger cave system traverses provide arduous journeys with many obstacles to overcome. These would be far less enjoyable and achievable if every pitch had to be rigged. Even as pull throughs they should not be underestimated.

It is difficult to find much guidance on pull through techniques, and even less so for those leading groups. This resource is to provide some information for CIC candidates but may be useful in supplementing the knowledge of cavers in general. While there are not many places where it may be useful in the UK, it is particularly useful for clubs undertaking long through trips in large foreign systems.

Written on behalf of the CIC panel by Phil Baker & Chip Rafferty, with photos by Phil Baker and illustrations by Gethin Thomas.

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Contents

Ropes

Standard Type A caving ropes should ideally be used. Bear in mind there may well be rub points as pull through pitches commonly follow SRT routes that may normally be rebelayed. It may be worth considering thicker ropes to protect against the extra abrasion this causes.

The rope needs to be easily the length of the longest pitch doubled (unless a pull through cord is in use – best applied in lightweight/expedition situations), plus enough for the knot at the top.

Pull through trips are committing, especially with led groups. It is imperative to carry a spare rope the same length as the main rope in case it gets trapped on a pull down, or damaged during the trip.

Rope bags

Rope bags that drain are best in wet caves, and the rope carried are twice the normal length for the biggest pitch on the trip. So slimmer easily carried bags with handles are preferable. Obviously, the spare rope should be bagged separately from the main rope.

Packing of ropes

If retrievable traverses are likely to be used, the bottom of the main rope needs to be accessible, so should be tied off at the top of the bag. Equally the top of the rope needs to be easily seen, so this too should be tied off, with a different knot to distinguish between the two ends. The middle of the rope should have an overhand loop tied for identification purposes. In the picture below the bottom end of the rope is tied off with a bowline… (note the barrel knot at the end of the rope), and the top with a figure of 8.

Packing a tackle bag (note both ends accessible)

Abseiling devices and other group equipment

It would be normal for group members to use standard SRT descending devices (Stop or similar) but given that they are not ascending, SRT kit is not always necessary. Some trips do include up pitches, in which case pre-placed ladders or ropes will be needed and groups equipped accordingly. Leaders should always have SRT kit.

Groups in climbing harnesses with cowstails and figure of 8 descenders are common for instructed groups. Bear in mind though, these climbing descenders work better on double ropes and are hard to control on single ropes – another reason to consider thicker ropes. They also have no assisted or automated breaking mechanism. The spare rope should generally be deployed as a safety rope if a figure of 8 device being used.

Anchors

Normally the abseil anchors at the pitch head would be two bolts or a combination of a bolt and a natural, tied off to equalize them to one point which is threadable. One bombproof natural may also be used. On SRT routes there may be two P (resin) bolts or plate hangers with maillons to thread (plate hangers should not be threaded). Consider the angles these are placed at – they may not be angled for pull throughs and be prepared to equalise then with supplementary equipment which will be left behind.

Rings and chains set up especially for pull throughs are ideal (see photo 1), although a large ring can load the back bar of the connector on the rope or allow the knot to flip through. This can be alleviated by clipping the connector through the knot as shown below

Non connected bolts (either resin bolts or plate hangers with connectors (photo 2) may be threaded. Depending on the orientation of the bolts this may well twist the rope badly. It is preferable to equally load both anchors using chain or rope/tape.

Pre-tied ropes should be checked for age and wear, particularly when there is no metal work on the rope (photo 4) as this will create a heat point and burn the sheath as the rope is pulled through. These ropes should be replaced, and

1: Ring and chain

2: Rope and maillon

a metal connector left behind.

3: Plate hangers and maillons

4: Poor rigging tied direct to plate anchors & no maillon. Best replaced before use.

Securing the rope

Various methods of tying off the abseil rope can be used as below:

1: Overhand knot and krab

2: Overhand knot and krab through the knot (when using an oversized ring)

3: Alpine Butterfly and krab

3: Barrel or Capuchin knot butted up against a small maillon

5: Bowline on the bight to tie off rope until last person descends

(the bowline unties easily after successive loads)

In all cases the abseil side should be easily accessible as the clients approach, not behind the anchor attachment.

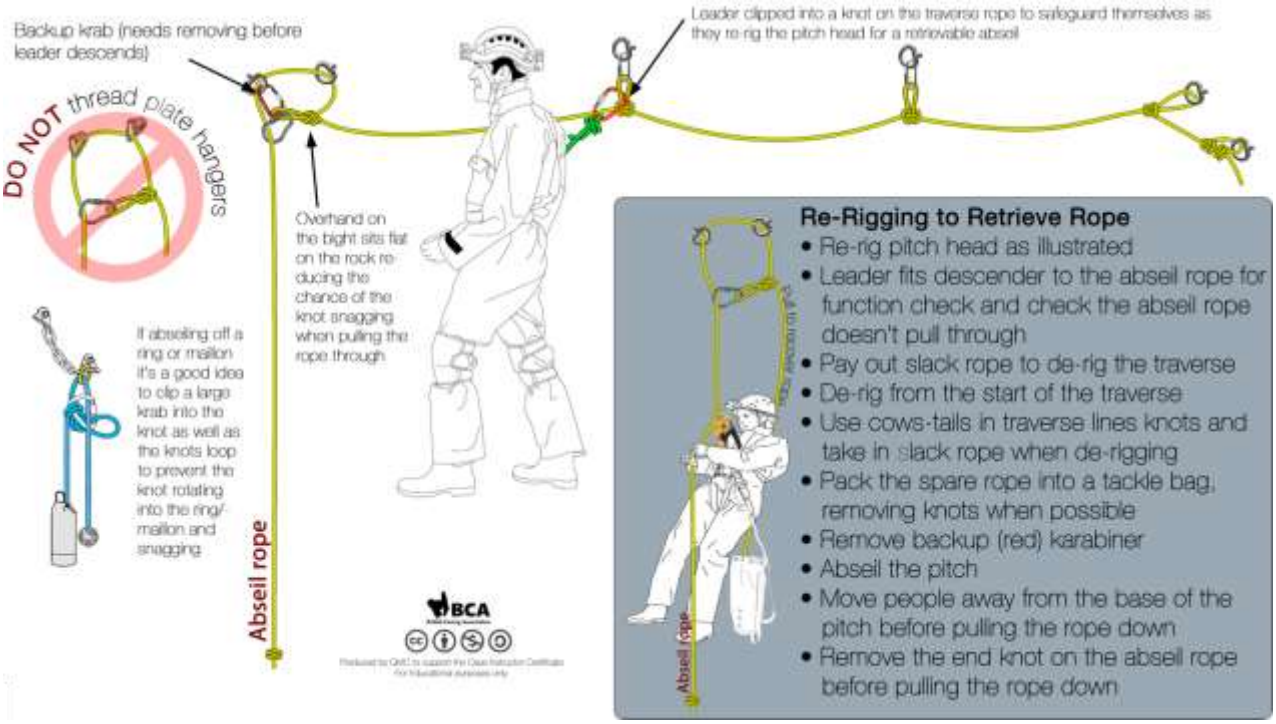
Protecting a traverse to a pitch head

Use of sling or short rigging rope

- **Pro's – quick on short approaches, spare rope completely free for rescues**
- **Con's – not appropriate for longer traverses to pitch head**
- **Hard to rig and retrieve by derigging after last group member descends**

Re-Rigging a traverse and pitch for leader to pull through

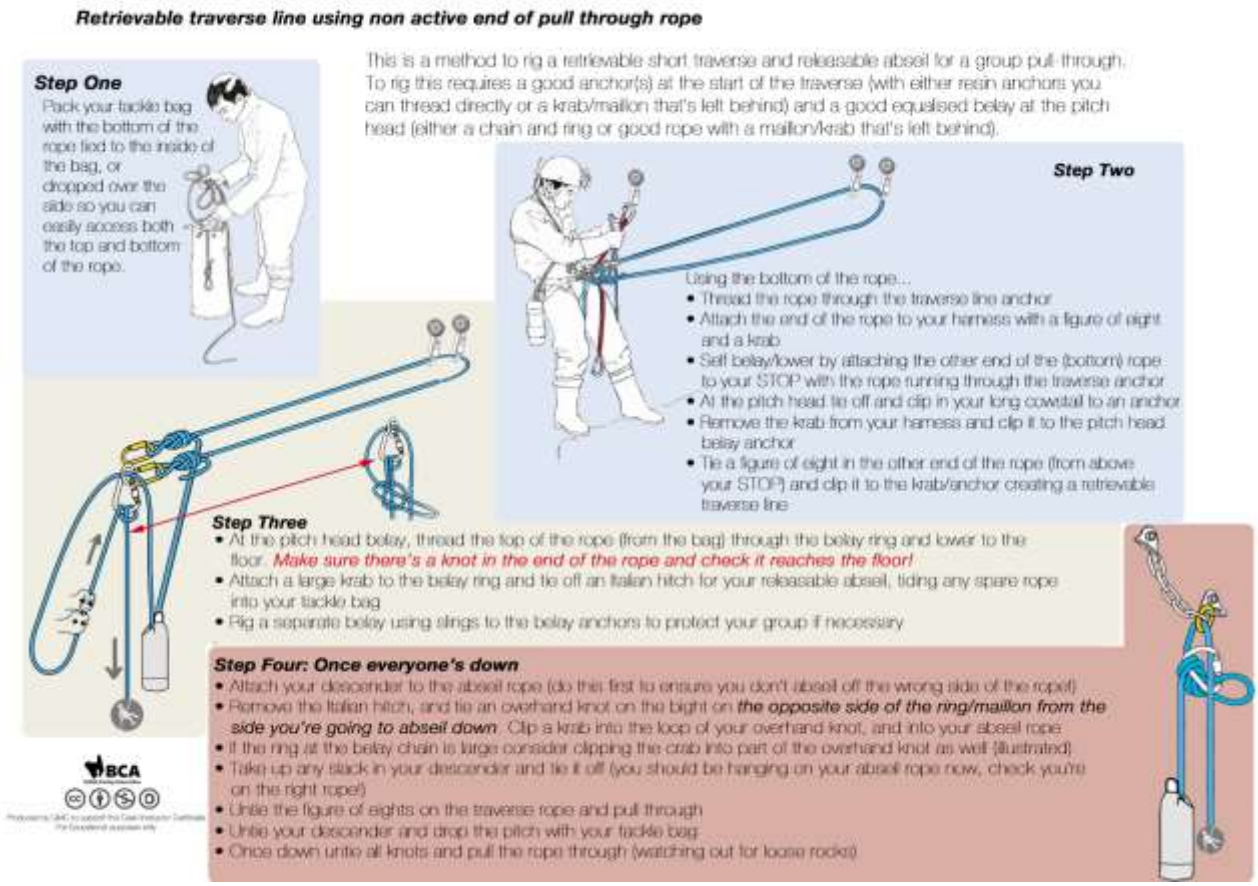
Note: in the rigging diagram below illustrates how the leader can re-rig a pitch so that the rope is retrievable. The pitch should be rigged in the normal way for group members.



Pro's – safe, standard technique, familiar to client (one rope, normal rigging), works on more complex traverses

Con's –potentially slower (due to the derigging required) than a retrievable line, so delay group at base of pitch

Retrievable line using non active end of pull through rope



Sequence rigging a retrievable traverse with intermediate anchors

1: Initial bombproof anchor

2: Both ropes through connector as leader moves along traverse

3: Repeat at each intermediate anchor

4: Bottom of rope transferred to master point once leader has clipped in with cowstails, and then take slack from descender

to tie off the traverse line

5: Thread live end through master point and secure the rope

6: Trusted last caver removes intermediate connectors

7: After last caver descends untie traverse line and put in bag

8: Release end of rope

9: Pull through traverse line and put in bag

10: Leader descends

Pro's – quick (if practiced), works on longer traverses if straight line

Con's – potential for tangles, last client needs to retrieve karabiners from intermediate bolts so has to be trusted/some risk, needs practice to be slick

Retrieval of rope cleanly

It is not only frustrating but also adds to the commitment if the rope jams after the last caver descends! To help with a clean pull, make sure the rope pulls before the last caver goes down (brief to the penultimate caver). Ensure that there are no knots in the end, and that you are pulling the right rope! Look for twists in the rope before pulling and stand in a position which gives the cleanest pull on the rope.

Group Management

Effective communication

As with all pitches, good communication is essential with all cavers clear on the actions they need to take at the base of the pitch prior to their descent.

The usual 'rope free' is obviously preferred but a noisy wet or long pitch may require alternative communication systems such as use of a whistle, light signals or defined tugs on the rope.

Position of leader

The leader is usually best placed at the top of the pitch to check the group members have attached to the correct side of the rope, sort the rope after the last group member has descended etc. In this position they are also able to effectively intervene if a caver has an issue on descent, using the top end of the spare rope.

However, if the base of the pitch is dangerous or the pull through is a split pitch, they may need to consider being at the bottom (or part way down the pitch at the next pull through on a split pitch). This is a risky strategy and is only likely to be applicable with groups of cavers that are experienced and with a good assistant. Robust risk assessment prior to the trip is advisable.

Best use of assistant

As with any trip, an assistant is useful and should be deployed in the most effective way – for traverses that need derigging they may be at the back, but for simple traverses maybe the bottom of the pitch to direct group members may be more appropriate. Either way clear briefings are essential.

Wet pitch management

Unlike well rigged SRT pitches, pull throughs may well enter the fall line of water. Hence effective and efficient rope management is essential, to prevent the group waiting too long when cold. The first person down could for example carry a group shelter if the base of the pitch is wet/draughting.

Before descent the group should be directed to do their suits up and put hoods up under their helmets to prevent water ingress. Bags should be clipped to harnesses directly to stop them tangling in the rope or on projections, which could slow or even stop a smooth and swift descent.

The first person down (preferably an assistant) could take the other end of the main rope down in a tackle bag. Once the abseiler is installed on the rope this loose end can then be tensioned out of the water (by a human belay if nothing else exists) to create a guideline. Subsequent cavers can clip their cowstail into this to direct them to a drier descent. Care must be taken to ensure that once the abseiler gets off the rope it isn't pulled down by the belay team.

This system will not work with a retrievable traverse line as the other end of the main rope is involved in the rigging, in which case the spare rope could be used.

Preventing and solving likely problems
Knowing the group

By their nature pull throughs are committing and it is essential to know the group have the ability and stamina to complete the traverse the cave before embarking on the journey. If in doubt, hard rig it and go back later for the ropes!

C.L.A.P. ***(Communication; Line of sight; Avoidance of problem; Position of best effect)***

As above this principle applies equally if not more so in pull through caving.

Retrieval of clean rope

The last caver (who may not be the leader i.e. split pitches or complex descent) selects and adjusts abseil rope. They should clip the retrieval rope with a cowstail before descending (to prevent twisting ropes) and descend a clean line. Always check that the rope pulls before last person descends.

Cold wet cavers

Good wet pitch management and briefs, with appropriate equipment available at the base of the pitch to re-warm. Use a guideline as appropriate. Use appropriate traverse rigging in relation to severity or consequence of slip whilst rigging/derigging. Speed and efficiency will mitigate against cold cavers, but not at the expense of safety.

Carry a spare emergency rope!