

Eco-Anchors in Scotland

Scotland does not have the number of deep caves with vertical pitches found in areas such as Yorkshire, Derbyshire or Mendip. It does have a few scattered over the country and while the drops may be less you can be just as dead falling 10 metres as 100. We have already seen the same proliferation of anchors in Scotland as happened in other countries, with badly placed and/or worn out spits appearing then being superseded with newer anchors. The GSG has therefore joined the BCA's Eco-anchor scheme and has members trained to install Eco-anchors. The following pages are plagiarised from the BCA, CNCC and other Regional Caving Council websites to give a comprehensive description of the Eco-anchor schema and how to inspect and use the anchors safely and effectively.

BCA Anchor Scheme

Thanks to CNCC Technical Group for all information supplied

The anchor scheme came about in early 1990, as a need was identified by the CNCC, to replace spit anchors that were either failing or whose life looked to be short, and would require replacement.

The issue with replacement of the spit anchors, was the proliferation of spits when older ones had passed their useful life. This issue affected the placement in both good rock and also quality of rope hang from the new positions. To this end the CNCC with the backing of the National Caving Association (Now BCA), started a program of research into suitable anchors, resins, and establishing best practices for the installation of the anchors.

The Anchor scheme, undertakes to train installers of anchors, to log all installations, and to provide insurance for all registered installers, and the anchors they have placed.

The Anchor

Most Eco-anchors in UK caves were produced by DMM, in 8mm diameter 316 stainless steel, (which is also used for marine applications). It is formed into a double 'P' shape, which requires a drilled hole of 18mm x 100mm deep. New Eco-anchors from 2009 are made in China from the same grade of stainless steel and have passed the same test as the DMM product.

Wear & Tear on the Anchor

Being made from 316 stainless steel there should be very little wear even on anchors placed on popular pull through routes. Anchors placed in Swinsto Hole Yorkshire, a popular pull-through route, show very little signs of wear on their inner curvatures. Should an anchor fail the annual test, then it should be deemed unsafe and a regional official should be informed. The regional anchor officer/co-ordinator shall ensure that the anchor is checked, and if necessary, another anchor will be installed into the hole. Although the Eco-anchor has considerable strength, basic rigging practices should still be observed i.e. back ups & 'Y' hangs etc.

Safe Use Of Anchors

All anchors should be checked before use.

Twist the anchor using the fingers, while observing any movement. Slight flexing or rotational movement (+/-1mm) of the anchor is acceptable.

The following points should be checked before using or loading the anchors:

- Looseness or fracture of the rock in which the anchor is placed.
- Grooves or abrasion inside the curvature of the anchor. i.e. the inside contact area of the anchor.
- Obvious damage to the anchor or placement from rock fall.
- Excessive rotation of the resin within the drilled hole.
- Rotation of the anchor within the resin.
- Fracturing of the rock within 20cm of the anchor placement.
- Egress of the anchor from the resin or the resin from the drilled hole.

Bob Mehew. Chair BCA E&T Committee

Should any of the above defects be noticed in a Scottish anchor you should report it as soon as practical to the Regional Co-ordinator. Any defect reported will be checked and the anchor replaced if necessary.

The following information is required when reporting suspected defective anchors:

- Name of cave.
- Route on which defective anchor is located.
- Traverse or pitch number/name.
- Anchor number, counting from the start of that group of anchors.

Report defective anchors by sending an email with the above information to anchor.defect@gsgroup.demon.co.uk or send a letter to Regional Co-ordinator, 45 Maitland Road, Kirkliston, West Lothian, EH29 9AP

Note: Due to the cost of installing Eco-anchors and the scarcity of good useable limestone at pitch heads, the anchors have been installed so that all cave users, whether SRT, ladder and lifeline, or pull through, can use them. Attempts have been made to avoid over-rigging and to encourage the use of available natural belays where possible. In areas where there appear to be an excessive number of Eco-anchors, they have been installed in addition for ladder and lifeline techniques or to facilitate rescues. When Eco-anchors are used for ladder and lifeline it is essential that pulleys are used, the rope must not be pulled when loaded through the anchor as this will cause premature wear on the contact area.

The Eco-anchor has been approved by the British Caving Association as a fixed anchor to ensure the safe descent and ascent of caves and potholes. All enquiries regarding fixed anchors in Scottish caves should be addressed to the Regional Co-ordinator.

You may find pieces of old rope and slings left in caves and mines by previous parties.

DO NOT be tempted to use them even if they look safe. Take and use your own, then remove them after the trip.

Eco-Anchors - Rigging

Page last updated 19 March 2006

Although Eco-anchor placements have considerable strength, basic rigging practices i.e. backups, shared loading 'Y' hangs, deviations etc. should still be used. Eco-anchors are not an excuse for bad rigging techniques. All the precautions used to gain a safe descent and ascent of pitches and negotiate exposed areas still apply when using these anchors.

SRT

When using SRT, the rope can be tied directly to the first anchor by using a figure of eight knot. Maillons or karabiners are then used for the attachment of the rope to further Eco-anchors to the head of the pitch, where two anchors, normally on opposite walls, provide a 'Y' hang. It is good practice to try and keep the rope taut, this ensures that each anchor placement is backed up to the previous anchor.

All anchor placements at pitch heads have been placed to give a free hang as far as a re-belay or deviation. It is still important to check that a rub point has not been caused by too short, or too long a loop in the 'Y' hang. Occasionally 2 maillons or karabiners may be required to avoid a rub point close to the anchor placement.

DO NOT tie the rope to the first anchor and then pass it through all the other anchors to the head of the pitch, the rope must be secured to each individual anchor placement.

Due to the shape of the Eco-anchor, more than one rope can be rigged from each anchor point. This practice may lead to some tangling of the ropes, but this is far safer than using other (non Eco) anchor points, where security and strength of placement cannot be guaranteed.

Ladder and Lifeline

Use at least three anchor points for pitches rigged using ladder and lifeline. The belay device is best attached to two shared anchors. Cows tails used in conjunction with traverse lines will provide safety when negotiating exposed areas. Always use a pulley or karabiner for double lifelines, under no circumstances should the rope be pulled through an Eco-anchor when loaded. This action will damage the rope and cause premature wear on the inner curvature of the Eco-anchor.

Pull through trips

A number of caves are descended as 'pull through' trips. When descending a cave and pulling through, the rope should be always be threaded through two anchors. There are a number of safe ways to approach the head of the pitch.

If the Eco-anchors are more than a cows tail width apart, tie a butterfly or figure of eight knot in the rigging rope so that you can reach the next anchor.

A separate short length of rope can be taken to rig each traverse, (long enough for the longest traverse). This is derigged by the last person to cross the traverse and finally unfastening the last anchor point from a safe position or while their descender is locked off on the main descent rope. Take care to ensure that the short end of rope is knotted to prevent anyone descending the wrong rope. When a single rope descender is being used, a Butterfly or Figure of Eight knot with a karabiner (maillon is better) can be used to strangle the anchor, care is required to ensure that inexperienced cavers descend the correct rope. The pitch can be rigged with a single rope until the last person, or the spare end pulled up to avoid confusion.

When clipping directly to an anchor, it is possible that under certain circumstances during movement, the anchor can open the gate of snap gate karabiners.

DANGER - the Self-Disconnecting Safety Line

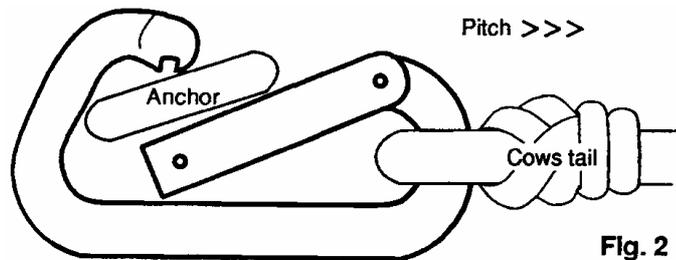
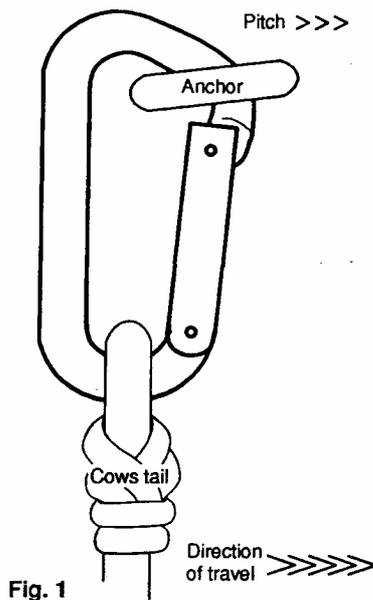
After a thorough investigation, the CNCC Technical Group issued the following warning in 1998. It concerns the use of the following permanent anchors, **Eco-anchors**, Lyon safety bolt, Fixe 'glue in', Petzl Collinox & Bat'inox.

In certain locations it has been necessary to locate the anchor placement low or at ground level. This is due to the geological constraints of the entrance, cave passage or pitch head. e.g. Rowten Pot entrance pitch, Cow Pot entrance pitch, Juniper Gulf entrance pitch at the north end, Pillar Holes.

When an anchor is clipped into at ground level, and progression to the entrance drop is made by keeping low. It is possible for the attachment karabiner to become detached from the anchor. Anchors that have been placed below waist height on traverses may produce a similar result. See figs. 1 & 2.

When using anchors placed in rock at ground level or anchors that have not been placed correctly on traverses e.g. too low and the wrong alignment certain extra precautions need to be observed.

1. Always clip up and through the anchor so that the karabiner gate is on the outside
2. While manoeuvring, watch the attachment karabiner.
3. Always have captive karabiners on cows tails/safety loops
4. If possible, ensure that you have two safety devices connected. (due to the embedment depth of the Eco-anchor it may not be possible to insert two karabiners and a rope. An alternative may be to tie the rope directly into the anchor and clip into the rope loop).
5. Consider using screwgate or twist gate krabs on safety loops/cows tails.
6. When belaying/top roping etc. where there is a necessity to move around, it may be desirable to tie into the anchor.
7. If rigged, clip into the rope and not the anchor.



Links

Council of Northern Clubs Technical Group - http://www.cncc.org.uk/cncc_technical_group.html

British Caving Association - <http://www.british-caving.org.uk/?page=108>

Council of Southern Caving Clubs - <http://csccl.org.uk/wiki/doku.php?id=equipment:start>

Cambrian Caving Council - http://www.cambriancavingcouncil.org.uk/p_hangers.html

Rana Hole, Assynt - NC 26895 16768

Use scaffolding for initial Y-hang (July 2009)

Entrance Shaft

RH01 to RH11 are eco-anchors also known as P-hangers

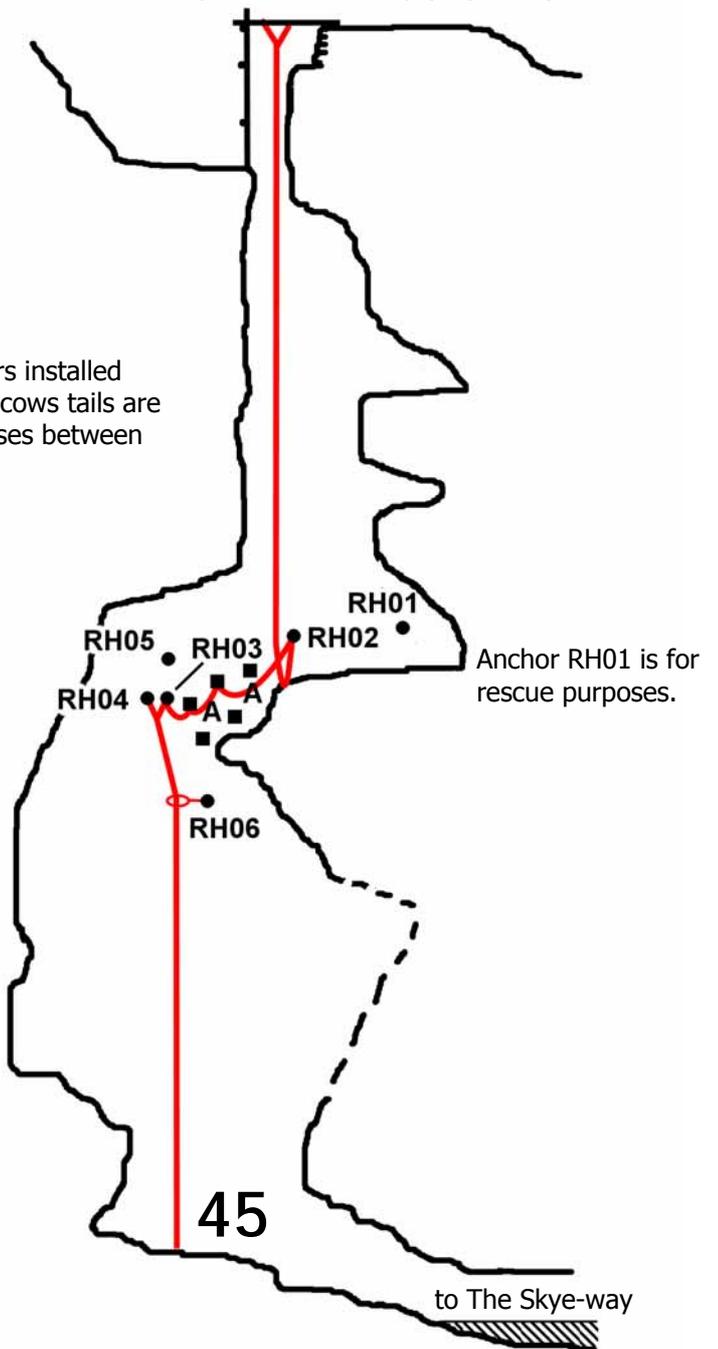
Equipment required

Rope	45 m
Short slings	3
Screw gate karabiners/MR	7
Snap gate karabiners	1

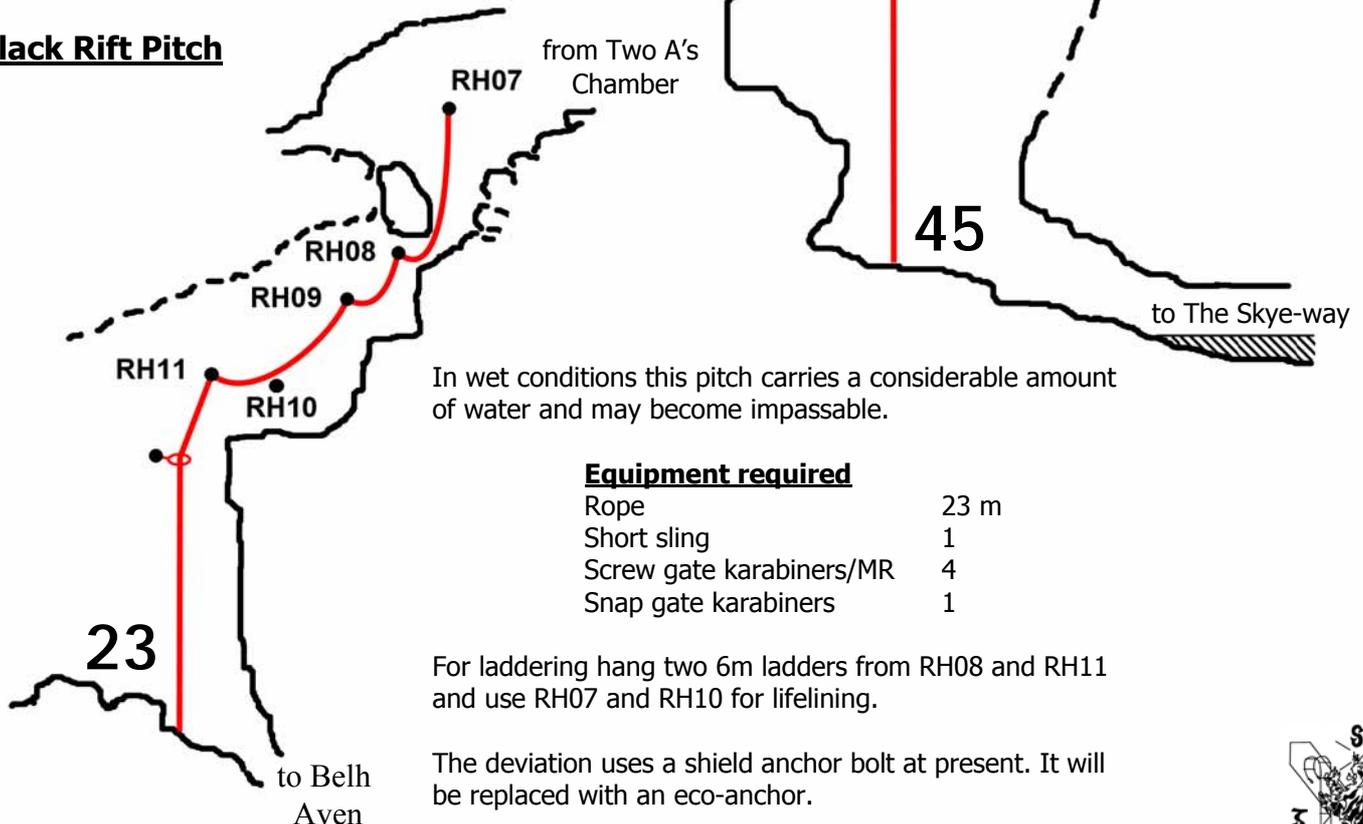
At present (July 2009) the entrance shaft has fixed rigid ladders installed and you can descend with no additional tackle. A harness and cows tails are recommended for protection on the descent and on the traverses between ladders.

To protect the traverse the rope can be rebelayed to the 12mm stainless steel U-bolts 'A'

Anchor RH05 on the opposite wall of the shaft is for rescue purposes.



Black Rift Pitch



Equipment required

Rope	23 m
Short sling	1
Screw gate karabiners/MR	4
Snap gate karabiners	1

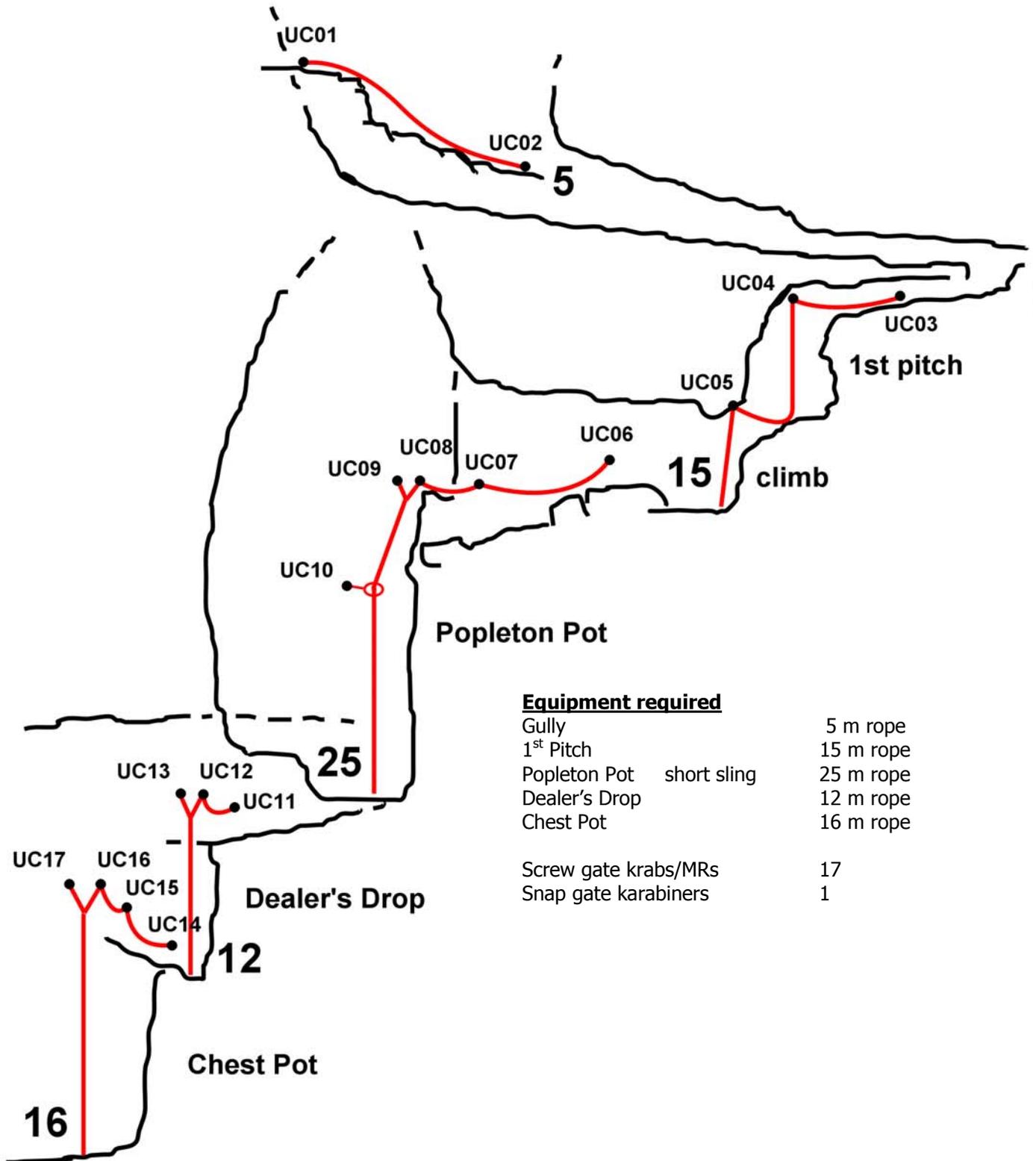
For laddering hang two 6m ladders from RH08 and RH11 and use RH07 and RH10 for lifelining.

The deviation uses a shield anchor bolt at present. It will be replaced with an eco-anchor.



Uamh nan Claig-ionn, Appin - NM 98203 51388

(Cave of the Skulls)



Equipment required

Gully		5 m rope
1 st Pitch		15 m rope
Popleton Pot	short sling	25 m rope
Dealer's Drop		12 m rope
Chest Pot		16 m rope
Screw gate krabs/MRs		17
Snap gate karabiners		1

