

BCA Equipment and Techniques Committee

Meeting held at The Wessex Cave Club HQ, Priddy, on 28 October 2012 commencing at 10:30 am

Present: Andy Lewington (CCC), Faye Litherland (CSCC), Roger King (DCUC), Jenny Potts (DCA, observer), Nick Williams (Convenor)

1. **Apologies for absence:** Bob Mehew, Stephan Natynczuk
2. **Minutes of the meeting held on 17 March 2012.** These were agreed without alteration.
3. **Matters arising from the minutes of the previous meeting.**
 - 3.1. NW asked for it to be placed on the record that while it had been stated elsewhere that at the meeting he had admitted lying to the representatives of DCA and CNCC, he did not agree with this interpretation of his actual statements at the meeting.
 - 3.2. Action list:
 - 4.2.1: List of trained installers from LS and RM to GJ + NW - ongoing. ~~ongoing~~ *closed.*
 - 4.2.2: FL to produce notes on dialogue with BP - ~~ongoing~~. *Superseded by event - closed.*
 - 4.2.3: LS to supply DofCs for resins to NW - closed incomplete.
 - 4.2.4: NW, RK and AL to develop document on installing anchors in substrates other than limestone - some activity, ongoing
 - 4.2.5: BD to run spinning bolt tests - closed incomplete.
 - 7.1: BD and FL to produce list of 'don'ts' for fixed aids: closed incomplete.
 - 8.0.1: AL to identify and obtain permission for test site in N. Wales - site located. *Robin to follow up + report back.*
 - 8.0.2: LS to purchase 150mm anchors and drill - closed incomplete.
 - 8.0.3: RK to enquire about rock strengths - ongoing
 - 11.0.1: LS to obtain expected delivery dates from BP - closed.
 - 12.0.1: RM to supply RK with designs of the two proposed coupling devices - NW, RM and RK to take forward by correspondence *call NW to work on it*
 - 12.0.2: LS to identify carabiner testing bar dimensions - closed incomplete
 - 12.0.3: BD to progress developing the anchor puller into a device for maillon testing - understood to be ongoing

15.1.1: FL to issue her draft User Spec for comments - ongoing, FL needs information on requirements/ standard/ spec for resin.

17.2: AL to arrange for disposal of drill with proceeds to SWCRO - no one seems to want it ~~to~~ agreed will pass to NW for spares for various digging teams. ^{So}

4. Proposed replacement bolting policy document.

- 4.1. NW presented a revised and simplified policy document. He noted that this was not intended to be a replacement to the CNCC/CDA IPTD, but was intended to provide a framework within which regional councils can adopt their own training documents. Following agreement of the document by E+T committee, the document would be presented to the BCA AGM for ratification as official BCA policy, replacing all previous such documents.
- 4.2. The proposed document was examined line by line and modified in accordance with the discussion and wishes of those present. A final draft (attached to these minutes) was proposed by FL, seconded by RK and agreed unanimously.

5. Rope testing.

- 5.1. Bob Mehew had submitted a written report to the meeting (appended to these minutes) including a request for financial and other support.
- 5.2. Some concern was expressed by the meeting that we were unclear as to the overall objectives of the test programme and where it might lead. While there was no objection in principle to further support, it was felt we needed a clearer idea of what we will gain from the tests so we can justify the expenditure to BCA members.
- 5.3. The Committee agreed to support the request for funding and endorse requests for support from rope manufacturers.
- 5.4. ~~AL agreed to contact RM~~ to discuss a summary of objectives.

6. Commentary by E+T members in public fora

- 6.1. Concern was expressed that statements had been made on UKCaving.com which might have been interpreted as having been made officially by BCA when in fact they were the opinions of only one individual.
- 6.2. NW said that he was aware of the specific situation where this issue arose but that he did not consider it to be worthy of major concern. Nevertheless, Committee agreed that as a general principle, members should make clear that any opinions they express in public are personal unless they are endorsed by the Committee.

7. Anchor Administration Report

- 7.1. Glenn Jones had submitted a report (attached).

7.2. it was noted this referred to the anchor material as A2 when in fact we had ordered A4. **NW agreed to raise this with GJ and LS.**

8. Training of anchor placers

8.1. This matter had been discussed in the formulation of the new policy (above). For clarity, it was agreed that RC's can make their own arrangements for training in accordance with their own documentation. Any trainer with appropriate qualifications from another regional council or an appropriately qualified (e.g. IRATA) professional would be considered a suitable trainer.

8.2. Training can be centrally funded by BCA. **FL to speak to Nigel Ball** to discuss whether this should be done via Training Committee budget.

9. Next meeting

9.1. Date agreed as 2 March 2013, venue to be announced.

10. Any other business

10.1. Hellie Brook and Dave Checkley - repeated loading / unloading tests - Ongoing

10.2. RK mentioned the new Petzl Croll which is aluminium with a stainless insert and presents concerns of differential electrolytic corrosion. It was agreed **that RK to purchase two samples for tests** and report to March meeting.

Meeting closed at 13:00.

Notes by NJW, issued 8 April 2013

FL to further discuss w.m.

→ for anchor / resin / rock bond - ongoing

signed as a tie record.



*N. Williams.
14/4/13.*

British Caving Association

Equipment and Techniques Committee

Association scheme for the placement of resin bonded anchors.

1. Scope

This scheme shall cover the use of resin bonded anchors for any purpose, including for ladder and line, SRT and other fixed aids.

2. Selection of anchor systems

From time to time, the Equipment & Techniques Committee shall make recommendations on the choice of anchor system to be placed for various purposes in UK caves and mines.

Regional Councils shall be free to use alternative anchors, but they must take responsibility for gathering the evidence required to demonstrate the safety of any system which they choose.

The results of any tests shall be reported to the Equipment and Techniques Committee.

3. Funding

BCA will re-imburse Regional Councils' expenses necessarily incurred in the placing of anchors in their region.

Applications for re-imbursement of expenses must be made via the Equipment and Techniques Committee.

In general, E&T will only fund the direct costs of placing anchors, i.e. the purchase of anchors, resin, drills and similar equipment. Travel and other expenses shall be borne by the Regional Council concerned but may be the subject of funding from other BCA budgets.

From time to time, E+T may commit funds in support of testing programmes and other activities undertaken by Regional Councils and others on its behalf.

4. Location and use of anchors

Regional Councils shall establish a procedure to consider and approve the choice of locations for the placing of anchors within their regions.

5. Training of installers

Regional Councils shall ensure that all persons placing anchors on their behalf are appropriately trained and experienced to ensure that:

- anchors are placed in accordance with the manufacturer's instructions;
- the choice of location of the anchor is appropriate for the caving techniques it is expected to support;
- the persons placing the anchor are able to ensure their own safety while placing the anchor;
- records of the placement are made in accordance with this scheme.

Regional Councils shall maintain a list of persons authorized to place anchors on their behalf within their region. Those persons shall be Individual Members of BCA. The list shall be reviewed annually with a view to deleting from the list persons who have insufficient recent training or experience in anchor placement or are no longer Members of BCA.

Regional Councils shall take responsibility for the training of persons who will be authorized to place anchors on their behalf. Training shall be undertaken in an organized manner against a written syllabus.

The E&T Committee shall regularly review the information at its disposal and inform regional Councils of any identified need for retraining or changes in procedure.

6. Record keeping and reporting

Regional Councils shall establish a procedure for recording the details of anchor placements, including at least:

- The location of the anchor
- Who placed it
- When it was placed
- The type of anchor
- Batch and/or serial numbers of the anchor and resin

Records shall be kept by the Regional Council and a copy shall be given to the E+T Committee.

7. Inspection of anchors and reporting of defects

Cavers using anchors shall be responsible for checking each anchor prior to use on each and every occasion.

Anchors placed under this scheme shall not be subjected to regular periodic inspection.

Regional Councils must have in place a reporting mechanism which permits cavers to report unsatisfactory anchors. The mechanism must be publicized so that it is widely known about and easy to use.

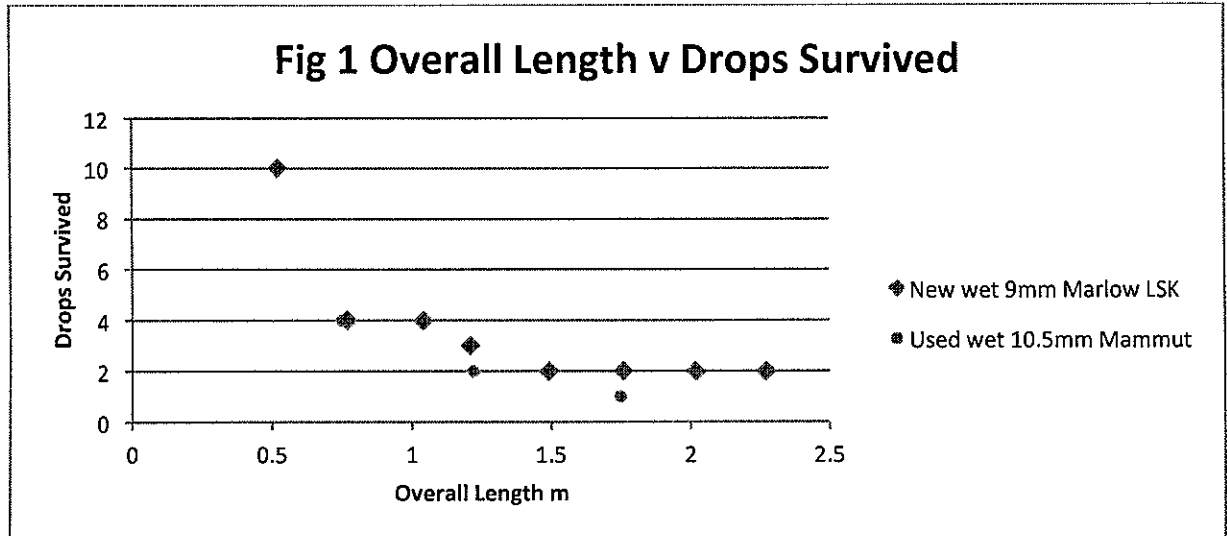
Regional Councils shall investigate reports of unsatisfactory anchors within a reasonable time period and shall take action to decommission and/or replace any anchors which are found to be unsafe.

Regional Councils shall provide a report on each such investigation to the Equipment and Techniques Committee.

Document agreed by the E+T Meeting on 28 October 2012.

Some Recent Observations on Rope Testing

In the past few months I have gained access to the Craven Pothole Club's Rope Test Rig (RTR) which is capable of testing rope samples with an overall length of up to 2.25m. The standard (EN 1891:1998) specifies an overall length (OL) of 2.0m whereas the BCA RTR can accommodate up to 0.8m OL. (The Bradford Pothole Club's (BPC) RTR can accommodate up to 1.5m OL.) The results from a set of tests using new 9mm and used 10.5mm SRT rope are presented below.



It can be seen that there is likely to be a substantial difference in drops survived between the 0.8m OL and the standard's requirement of 2m which is in line with some theoretical considerations I have made. Further repeat tests are required to confirm this indication. But the implications are that either the BCA RTR should be modified to take 2m OL samples or we show a correlation between 0.8m and 2.0m sample results. Apart from the cost of building a new rig (or modifying the existing one), the other consequence is that I will not be able to use a 2m rig at my home. So I will need a new location to test rope which in turn implies additional running costs. My instinct is to see if a correlation can be found by repeating the above tests across a range of rope sizes. (There is a downside in producing a correlation in that 0.8m will clearly take many more drops to break!)

As the Committee may be aware, I in conjunction with Roy Rogers, Steve Richards and Alan Latchford have been pursuing some scientific work on the BPC RTR. We have developed two load cells capable of measuring force at time intervals of much less than 1 milli second. We have also developed a means of measuring rope extension on similar time scales but as yet not to a precision of better than 2mm. This capability allows us to observe energy (being force times distance) on similar time scales and thus look in more detail at what is happening in the dynamic testing of rope. We have also managed to modify the BPC RTR to undertake static testing, albeit at slow extension rates (the standard does specify an extension rate for static testing).

The original aim of this work was to find some parameter which would allow a non destructive assessment of the drops survived of a rope. But it was also obvious that more practical objectives could be pursued with the instrumented rig.

Our first piece of work using this capability looked at 9mm used SRT rope and took samples with the same knot at each end and subjected them to a static force of around 6.7kN, see table below.

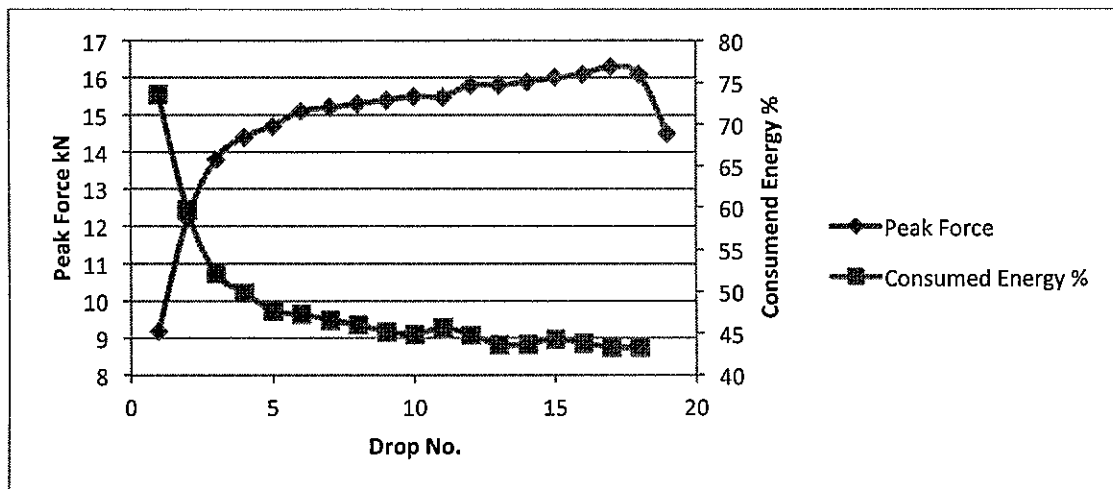
| | Peak force kN | ext J | contract J | % consumed | Ext cm | Lyon static strength reduction (Ref 1) | |
|---------------------|------------------|----------|---------------|---------------|-----------|---|----|
| Fig 8 | 6.7 | 774 | 136 | 82 | 36 | 66 | 77 |
| Fig 9 | 6.7 | 824 | 153 | 81 | 39 | 68 | 84 |
| Alpine Butterfly | 6.7 | 557 | 110 | 80 | 28 | 61 | 72 |
| Overhand | 7 | 596 | 158 | 73 | 29.2 | 58 | 68 |
| Barrel | 6.7 | 1191 | 147 | 88 | 49.8 | 67 | 77 |
| Barrel | 6.7 | 1010 | 152 | 88 | 43.4 | 67 | 77 |

(We did a second barrel knot sample to give us confidence in the first result.) We then took these samples and drop tested them with the following results. (The sample broke on either the first or second drop.)

| | Peak Force kN | |
|---------------------|----------------------|----------------------|
| | 1 st drop | 2 nd drop |
| Fig 8 | 12.2 | 12.9 |
| Fig 9 | 12.3 | |
| Alpine Butterfly | 10.1 | 13.1 |
| Overhand | 12.1 | |
| Barrel | 10.6 | 13.4 |
| Barrel | 9.2 | 16.1 |

This work was undertaken to primarily look at difference between knots to expand on the knowledge given by Lyon's work using simple static testing, though we have yet to explore the difference between static and dynamic testing.

It also provides some further information to support advice I gave in an article (Ref 2) to untie cow's tails knots after each trip. (I have subsequently modified that advice from untying to relaxing the knots; that is to partially untie and then re-dress each knot.) The original advice was based on observations taken from data published in the French Cow's Tail report (Ref 3) which showed increasing peak force with subsequent drop. This is supported by our work on the BPC RTR such as using 10mm new SRT rope:



The parameter consumed energy is the amount of energy absorbed by the rope as a fraction of the total amount of energy put into the rope due to the fall of the test mass. It should be noted that the observed peak force of the first drop in the reported work on the Craven RTR at even 0.5m OL was over 6kN.

Challenges by some cavers as to the value of this advice (Ref 4) make it desirable to investigate several parameters to both consolidate the advice and also substantiate the knowledge on strength of knots. These include looking at the difference between hand loaded and higher pre loaded knots, variation of peak forces with fall length as well as Fall Factor and the impact of shrinkage on unconditioned ropes.

To date this work has not been funded by either BCA or BCRA. Given one rope sample consumes around 2.5m of rope costing over £3 a sample and we are looking at consuming hundreds of metres of rope, our running costs will escalate. I therefore seek agreement from E&T to use the BCA name in seeking sponsorship from companies in undertaking this work. I also seek £600 funding in the first instance for this work.

Bob Mehew
BCA Rope Test Officer

References

- 1 see http://www.hse.gov.uk/research/crr_pdf/2001/crr01364.pdf
- 2 see <http://british-caving.org.uk/equipment/Cows%20Tails%20article%20v2.pdf>
- 3 see http://british-caving.org.uk/rope/lanyard_tests_v6.pdf
- 4 see <http://ukcaving.com/board/index.php?topic=14214.0>

Glenn Jones <glenn@andromeda-park.demon.co.uk>
To: "Nick Williams" <nick.williams@hucklow.net>
Cc: "Les Sykes" <les@speleoadventure.wanadoo.co.uk>
Fw: Anchor scheme admin. report

24 October 2012 16:00

1 Attachment, 33 KB

Hi Nick,

I'm having to send this from the house as I'm having problems with the BCA PC in the shed. The (PS/2) mouse was not working this morning so I have just bought a new one, but it (the new one) would only work from a USB port, but at least it now works and I can navigate on the PC. But I now find the keyboard is not working either, so I'm beginning to think that there's a problem with the PS/2 ports on the PC. I will see if I can get a USB keyboard tomorrow and hope that that fixes it.

Here's my report;

- How many anchors have now been delivered from Bolt Products?

I have had two deliveries;

The first delivery consisted of:

1 x 300mm 8mm A2 anchor

10 x 200mm 8mm A2 anchors

30 x 150mm 8mm A2 anchors

300 x 100mm 8mm A2 anchors in batches of 10 and stamped 1 to 300 (although the invoice states 290)

The 100mm 8mm A2 anchors are stamped as per - that is, no alpha character;



I have not yet checked the second delivery, but suspect that it is for a further 300 x 100mm 8mm A2

- Where/who have these been issued to (if any)?

| | | | |
|-------------------|---|------------------------|--|
| Graham Coates | 18/05/201210 (1 to 10) plus 1 un-numbered | 2 x Resin, 3 x nozzles | Marilyn PECO Decom |
| Les Sykes | 25/05/201212 (11 to 22) | 2 x Resin, 3 nozzles | BPotW |
| Glenn Jones | 07/07/20128 (23 to 30) | None | Long term wet weather test in garden |
| Roger King (DCUC) | 11/09/201215 (31 to 45) | 2 x Resin, 2 nozzles | DCUC projects - in stock with Dave Warne |
| Les Sykes/GJ | 15/09/201210 (51 to 60) | 2 x Resin, 3 nozzles | Death's Head Hole traverse project |
| Les Sykes/GJ | 13/10/20125 (46 - 50) | 1 Resin, 1 nozzle | BP long term test, Yordas |

Additionally, Jim had sent a quantity of un-numbered anchors for test purposes, which have been used for testing in Ingleton quarry, Rowten Pot decommissioning and a small quantity have gone to DCA.

- What arrangements have been made to pay for them?

I have not been involved with any negotiations with Bolt Products (other than to receive delivery) so I don't know. I have copied this reply to Les as, as I understand it, he has been liaising between Jim and yourself.

If there's anything else you need, just ask.

Cheers,

Glenn

-----Original Message-----
From: BCA Membership

Sent: Wednesday, October 24, 2012 2:58 PM
To: Glenn
Subject: Fw: Anchor scheme admin. report

----- Original Message -----

From: "Nick Williams" <nick.williams@hucklow.net>
To: "Glenn Jones" <membership@british-caving.org.uk>
Sent: Monday, October 22, 2012 11:50 PM
Subject: Anchor scheme admin. report

Glenn,

E+T Committee will be holding a meeting this coming weekend as planned.
Please can I have an update on the anchor admin?

In particular:

- How many anchors have now been delivered from Bolt Products?
- Where/who have these been issued to (if any)?
- What arrangements have been made to pay for them?

There is no need for a formal report - I will convey the necessary information from the gist of an e-mail if required.

Regards

Nick.



[Icid_00F61D...1.jpg \(33 KB\)](#)

Cambrian Caving Council's comments on the E & T Anchor Scheme Document

We always have been and remain concerned that it is not always appropriate to install resin bonded anchors.

We are also concerned that the document produced by the Equipment & Techniques Committee is imprecise

We are prepared to adopt the document after suitable amendment and on the understanding that it applies solely to the installation of resin bonded anchors.

The scheme is headlined as

Association scheme for the placement of resin bonded anchors

We would prefer to see the expression "resin bonded anchors" used throughout the document and under the specific heading "scope" we would prefer to add some clarification.

Funding

We have discussed the funding arrangements with the E + T Convener and understand that the intention is that re-imburement of all expenses associated with anchor placement will be made via E+T, either by E+T paying directly for the services required (e.g. purchase of anchors, bolts etc) or by RC's reclaiming costs from the E+T budget.

Section 3 of the document will need to be amended to reflect this.

Training

We read the document as implying that the appointment of trainers, the training of installers and the creation of a training syllabus is the responsibility of each individual region.

We are sure that the intention is that E + T will appoint trainers and set the syllabus and would prefer that the document specifically reflects this.

Anchor Installers

The document requires persons authorised to place anchors to be Individual members of BCA.

According to the membership page on the BCA website individual membership is divided into two classes: Club individual member (CIM) and Direct individual member (DIM). The majority of cavers have only group membership through their clubs.

If this requirement was drafted as intended we see it as too restrictive

An example of a document which incorporates the changes we would like to see is:

Association scheme for the placement of resin bonded anchors.

1. Scope

This scheme shall cover the use of resin bonded anchors for any purpose, including for ladder and line, SRT and other fixed aids. It does not cover, prohibit or endorse the use of any other type of anchors for the same purposes.

2. Selection of anchor systems

From time to time, the Equipment & Techniques Committee shall make recommendations on the choice of resin bonded anchor system to be placed for various purposes in UK caves and mines.

Regional Councils shall be free to use alternative resin bonded anchors, but they must take responsibility for gathering the evidence required to demonstrate the safety of any system which they choose.

The results of any tests shall be reported to the Equipment and Techniques Committee.

3. Funding

BCA will re-imburse Regional Councils' expenses necessarily incurred in the placing of resin bonded anchors in their region.

Applications for re-imbursement of expenses must be made via the Equipment and Techniques Committee.

In general, E&T will ~~only~~ fund the direct costs of placing anchors, i.e. the purchase of anchors, resin, drills and similar equipment, travel, training and other directly related expenses ~~shall be borne by the Regional Council concerned but may be the subject of funding from other BCA budgets.~~

From time to time, E+T may commit funds in support of testing programmes and other activities undertaken by Regional Councils and others on its behalf.

4. Location and use of anchors

Regional Councils shall establish a procedure to consider and approve the choice of locations for the placing of resin bonded anchors within their regions.

5. Training of installers

Regional Councils shall ensure that all persons placing resin bonded anchors on their behalf are appropriately trained and experienced to ensure that:

- resin bonded anchors are placed in accordance with the manufacturer's instructions;
- the choice of location of the resin bonded anchor is appropriate for the caving techniques it is expected to support;
- the persons placing the resin bonded anchor are able to ensure their own safety while placing the anchor;

- records of the placement are made in accordance with this scheme.

Regional Councils shall maintain a list of persons authorized to place resin bonded anchors on their behalf within their region. Those persons shall be Individual Members of BCA.

The list shall be reviewed annually with a view to deleting from the list persons who have insufficient recent training or experience in anchor placement or are no longer Members of BCA. Regional Councils shall take responsibility for the training of persons who will be authorized to place anchors on their behalf. The delivery of training will be undertaken by individuals ~~selected and~~ authorised by the E&T Committee.

Training shall be undertaken in an organized manner against a written syllabus set by the E&T Committee.

The E&T Committee shall regularly review the information at its disposal and inform regional Councils of any identified need for retraining or changes in procedure.

6. Record keeping and reporting

Regional Councils shall establish a procedure for recording the details of resin bonded anchor placements, including at least:

- The location of the resin bonded anchor
- Who placed it
- When it was placed
- The type of resin bonded anchor
- Batch and/or serial numbers of the anchor and resin

Records shall be kept by the Regional Council and a copy shall be given to the E+T Committee.

7. Inspection of anchors and reporting of defects

Cavers using anchors shall be responsible for checking each anchor prior to use on each and every occasion.

Anchors placed under this scheme shall not be subjected to regular periodic inspection.

Regional Councils must have in place a reporting mechanism which permits cavers to report unsatisfactory anchors. The mechanism must be publicized so that it is widely known about and easy to use.

Regional Councils shall investigate reports of unsatisfactory resin bonded anchors within a reasonable time period and shall take action to decommission and/or replace any resin bonded anchors which are found to be unsafe.

Regional Councils shall provide a report on each such investigation to the Equipment and Techniques Committee.

Robert Mehew <robert.mehew@talktalk.net>

11 April 2013 21:11

To: "Nick Williams" <nick.williams@hucklow.net>, "Faye Litherland" <faye.litherland@blueskyeng.co.uk>, "roger king" <roger296king@btinternet.com>, "Jenny Potts" <potts599@btinternet.com>, "Robin Weare" <robinweare@btinternet.com>, "Stephan Natynczuk" <mybigadventure@me.com>, "Boyd Potts" <boyd_p@btinternet.com>, "Steve Holding" <steve_holding@blueyonder.co.uk>, "Speleological Union of Ireland" <suichairperson@gmail.com>

Cc: "Damian Weare" <damiandweare@gmail.com>, "Andy Eavis" <andy@andyeavis.com>

RE: E+T Committee - Rope Test Officers Report

Not much to report except stuff in progress.

I have two of the Long Term Rope Test Part 2 ropes returned and have completed the testing of the base set of samples. Now onto testing the returned rope.

I have purchased 200m of dynamic rope and am about 25% of the way through breaking it.

I published on BCA web site a note on Y Hang knots based on some work we had done and am writing a follow up article for Descent on the topic. One set of knots remain to be tested (two Alpine Butterflies making a Y Hang), hopefully next week.

Much of the Hand Line ropes have been in place (bar one which has yet to be placed – I am told due to weather problems) for about one year but I have not had any reports of concerns so far.

The tensile tester has been purchased and located at the Bradford's garage. Hopefully it will be fitted in position next week and checked over (I gather it needs some hydraulic oil).

And for information, we are about to make a major upgrade to the Bradford Rope Test dynamic drop test rig instrumentation.

Bob



BCA Membership Administration <membership@british-caving.org.uk>

9 April 2013 11:11

To: "Nick Williams" <nick.williams@hucklow.net>

Reply-To: "BCA Membership Administration" <membership@british-caving.org.uk>

Re: E+T Meeting Sunday - anchor admin

Hi Nick,

I have not received any more anchors since my last report to E&T, but despite searching on the old PC, I can not locate that report, neither can I find the minutes of the last E&T meeting. So, the last batch of anchors received (6th November) was for anchors number 701 to 1240.

I have distributed anchors number 1 to 100 for various projects, the most recent being 71 to 100 to CSCC (22/01/13). I will not be distributing any more anchors until I have word from you on the A2/A4 issue.

If you need any further info, let me know.

Cheers,

Glenn

----- Original Message ----- From: "Nick Williams" <nick.williams@hucklow.net>
To: "Glenn Jones" <membership@british-caving.org.uk>
Sent: Monday, April 08, 2013 11:13 PM
Subject: E+T Meeting Sunday - anchor admin

Glenn,

Please may I have a brief summary of the number of anchors in stock and shipped for installation in order to report to the E+T meeting due to be held this coming Sunday.

Thanks

Nick.

