

ACR Anchor Method

The Alpine Cock Ring



Background

This project was motivated by all the recent anchor discussions (and hysteria), which can be traced to John Long's re-examination of old anchor methods. Like a lot of climbers, I've been questioning my usual methods, but am not happy with any of the proposed alternatives—including the equalette and the various medieval bondage dungeon diagrams that have been sprouting up all over the internet.

I've had an eye on the usual SRENE principles (or substitute your boy scout acronym of choice). But I've put special emphasis on speed, simplicity, ease of evaluation, and freedom from quirks that could make it too easy to make a fatal mistake.

Basics

This method uses a cordelette (on the short side; fifteen feet works well) tied in a specific way to a rap ring. There are no pre-tied limiting knots, so the cord can still be used as a standard cordelette, as any kind of traditional sling, as a prussic, a rescue doodad, or whatever.

It lets you create a strong, dynamically equalizing anchor without tying any knots. Its overall performance is then greatly improved by tying a single adjusting knot (which can be done after you're tied in) and redundancy is achieved by clipping the rope directly to your strongest piece.

With a bit of practice it's faster to rig than either a cordelette or equalette. It equalizes three pieces significantly better than either, and is easier than either to rig with an upward directional. It creates a compact, obvious power point that is easy to see, easy to clip for two or three climbers (even when weighted), and that loads carabiners correctly.

Using the ACR safely and efficiently requires **reading** and **understanding** the following instructions. So we can only recommend the ACR to 1) **advanced climbers** or 2) **intermediate climbers with a 4th grade or higher education**. Be warned.



Coiled like a cordelette. It is lighter and more compact than a full-length cordelette.



Close-up of loop around the ring. The loop is critical to the anchor's performance.

This forged aluminum, anodized ring is made by Omega Pacific; it weighs about an ounce, is rated to 20 kilonewtons and cost \$3.10. The truly paranoid could use a Fixe stainless steel ring rated to 30 kn.

How to Tie



1. Clip cord to outer two pieces. It helps if the knot and ring are on opposite sides of a carabiner.



2. Pull the ring down to the center, and clip both the ring and the free strand with a locking biner



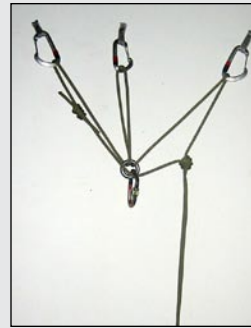
3. Pull the loop from the ring and clip it to the center piece.

Voilà. The anchor is now self-equalizing, and could theoretically hold 30 kn

(if your pieces are all bomber. The ring is rated at 20kn, and holds 2/3 of the load. Six strands of 7mm cord can hold much more than this. In practice the weak link will either be the locking carabiner or the protection itself)

4. To Finish: adjust with a knot.

There are three different knots that I find useful, depending on circumstances:



a. Shortening Knot.

If the pieces are close together, a simple overhand on a loop can yard in slack, bringing the power point closer to the pieces. If a piece blows, the rig will extend 1/2 of the length of that arm. Keeping the arms under a foot long limits extension to 6 inches.



b. Extension Limiting Knot.

Just like in a sliding X. Useful if one arm has to be much longer than the others.



c. Combination Knot.

By tying an overhand knot in both strands at once, you can accomplish **a.** and **b.** in one step.

Notes:

1. you can only tie an extension limiting knot (**b.** or **c.**) in one of the three strands. Tying in two or more strands will stop the anchor from self equalizing.
2. If the pieces are far apart horizontally, and shortening creates angles that are wide enough to cause unacceptably high forces, then one or the arms can be extended with a sling.

How to Tie In



Tie in to the locking biner on the power point with your knot of choice (typically a clove hitch).

Then tie a backup knot with a figure-8 on your strongest piece of pro, leaving enough slack in the backup strand to keep it from interfering with the anchor.

NOTES: The backup knot backs up every non-redundant part of the system except the harness and the rope itself: the cord, the tie-in knot, and the locking biner.

The power point includes the ring and the outer strand of cord. Anyone else clipping in needs to be aware of this, although it would take a deliberate effort to clip the ring without clipping the cord.

There's room at the powerpoint for three carabiners.

After the second takes the leader off belay, the second can break down the whole anchor except for the piece that the backup knot is clipped to.

Variations for Different Situations



A simple way to connect a piece for upward pull.



A way to connect four pieces. The two clove-hitched pieces share the load imperfectly (as in an equalette).

If there's no limiting knot, it can achieve dynamic 33-33-16-16 load distribution.



Trees and rock horns: no special rigging. Just push ring out of the way and tie like a cordelette.



Connecting two pieces (a slightly tricked-out sliding-x. Works the same way as an x, but the ring creates an obvious powerpoint and greatly decreases friction).

1. Shorten cord to the length you want by tying an overhand or figure-8 on a bight. You can tie the knot close to the center to limit extension.
2. Clip the protection
3. Pull the ring to the center and clip both the ring and free strand.
4. Tie a limiting knot in the other strand. This step can be eliminated if speed is more important than extension limiting and redundancy (fat bolts, etc.).



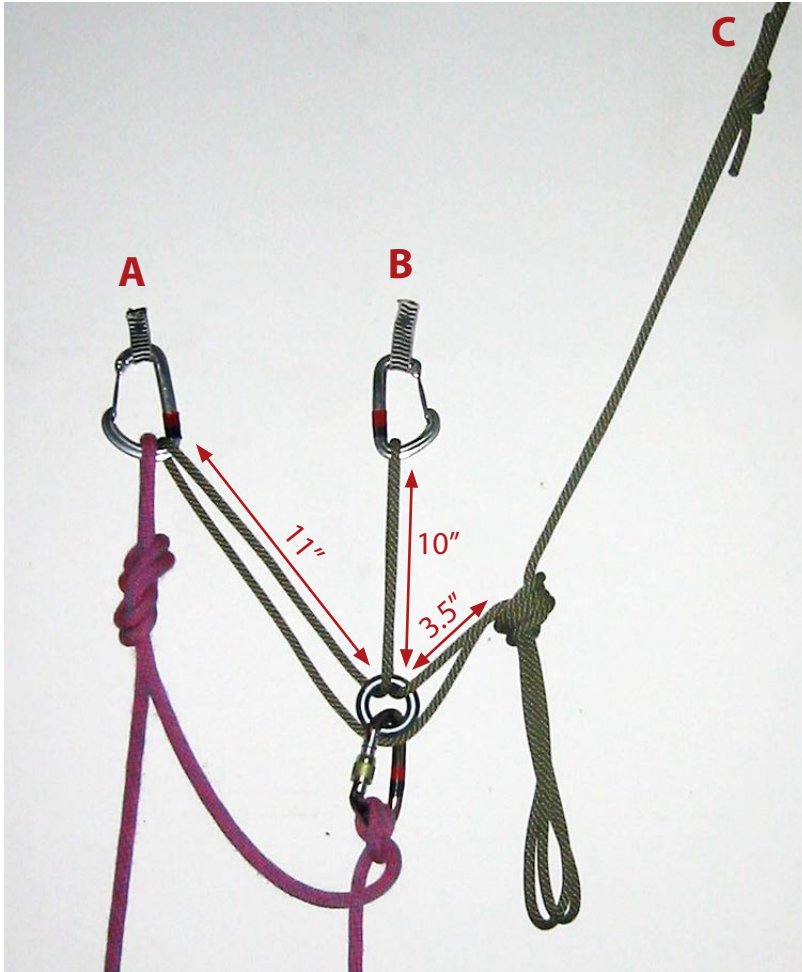
Pieces in a vertical crack: method is the same as with any other three pieces, but limiting extension is trickier.

If the bottom piece and the middle piece are more than a foot apart, it will help to extend the middle piece on a sling.

This will let you bring the bottom piece, the carabiner from the middle piece, and the limiter knot from the top piece within a few inches from the power point.

NOTE: The example in this picture would be improved by extending the runner on the middle piece.

Discussion



Extension

If a piece of protection fails, the power point will extend one half the length of the arm connected to that piece.

In this example, if the piece at **A** blows, the anchor will extend **5.5 inches**. If the piece at **B** blows, it will extend **5 inches**. If the piece at **C** blows, it will extend **1.75 inches**.

If both **B** and **C** blow, the tension will go onto the rope and the backup knot (presumably tied to the strongest piece of pro). In this example, extension would be a bit over 6 inches.

If two pieces, including the strongest piece at **A** blow, then the potential for extension is greatly increased. And all backup systems are lost at this point. If your strongest piece of pro is at all suspect, then you should consider a setup with more than just three untrustworthy pieces of pro. Or don't fall.

Redundancy

The more likely it is for a component of a system to fail, the more important it is for that component to be protected by redundancy. Hand-placed pieces of protection rip out of rock all the time, so we insist on three or more in an anchor. Harnesses and lead ropes almost never fail, so we're usually happy with one of each.

I've seen more reports of rope failure (many cases over the years due to cutting, chemical damage, misuse) and harness failure (a couple of cases due to misuse) than I have of belay anchor cord failure (one, due to a terrible anchor setup). It makes sense to think of backing up the anchor cord, and other components with a minute likelihood of failure (the locking biner, the tie-in knot) as a matter of general principle and not urgency.

Rather than sacrificing speed, simplicity, and versatility in the name of ultimate redundancy, I have forsaken elaborate rigging and pre-tied knots in favor of a single point backup (the rope) for all the non-redundant components.

It is conceivable that your strongest piece of protection could blow, and your cord could be chopped by a sharp flake, all in one horrific display of bad karma. But you are probably more likely to die a hundred other ways while climbing, including getting knocked off a ledge by a satellite plummeting to earth.

If you find yourself with no choice besides an exposed belay with sharp rocks raining from the sky, and nothing but crappy protection at the anchor and above it, then you should consider a different anchor rigging. And you might consider some other questions (Did I bring double ropes? Did I renew the life insurance? Who talked me into climbing here, and what will I do when I get my hands on him?)

Discussion (continued)

Equalization

Equalization is a good idea. Perfect equalization can never be achieved, so obsessing over it is probably not the best use of anyone's time. The ACR appears to distribute force to three pieces significantly better than a cordelette or equalette. It would take drop tests with load cells to confirm this. The smooth ring and lack of strands running over each other reduce friction and discourage any binding.

Products like the Trango Alpine Equalizer may achieve lower friction and more efficient load distribution, but they do so at the expense of versatility. And because of the AE's design, any extension limiting knots completely stop the rigging from dynamically equalizing.

Speed and Simplicity

The ACR is fast because you can rig it and tie in before adjusting anything. And any adjustments (to limit extension or change the position of the power point) can be done with a single, easy knot that doesn't have to be meticulously dressed.

Usually I can set up any 3-piece version of this anchor in half a minute (after the protection is set). I can tie a sloppy cordelette about as fast, but if I carefully adjust for direction of pull and dress the knot nicely, it takes longer. Adjusting the length and clove hitches on an equallette takes me more time as well.

Sloppy tying will affect the potential for extension, but not the equalization. There are few critical mistakes that are easy to make (like forgetting to twist the cord in a sliding X, etc.) I have not discovered any incorrect ways to rig this anchor that might look correct, even at a glance.

The ring is permanently tied to the cord with its critical loop intact. Unlike a carabiner, the ring has no weak axis, no rough spots, and no way to open.

Limitations

It is not as redundant as the cordelette or equallette; it relies on the climbing rope backup knot to back up the cord. It will also extend more than the cordelette (obviously) or the equallette, although smart rigging can reduce extension to less than six inches. Sometimes the best rigging will involve extending the anchor to the protection with slings (to get enough reach or minimize angles, without allowing too much extension).

It is not a one-size-fits-all solution. Its use should be based on weighing its benefits (strength, equalization, speed, simplicity) against these limitations in any setting. You can tie it as a cordelette, equallette, or sliding X on the spot. The ring doesn't get in the way.

Testing

We have field tested the ACR on multipitch trad climbs at the Gunks, Cannon Cliff, and Red Rocks, and on alpine routes at Cirque of the Towers and the Tetons. Another climber has successfully tested it in Yosemite (while solo aid climbing) and in Japan. Others are planning field tests on alpine rock and ice routes in the Canadian Rockies.

Lab tests have so far been confined to the adjusting knots. Jim Ewing at Sterling Ropes conducted a number of pull tests on the combined shortening/limiting knot. He tied the knots loosely and untidily, as they would likely be tied in the field. His samples included 7mm nylon (which we recommend) and 6mm Technora. All samples held over 12kn. Based on experience, Jim is confident that the knotted arm of the anchor could hold a factor 2 test fall by itself.

We are working on getting drop tests performed on the whole anchor rigging, to see how efficiently it distributes loads compared with other methods.

If you are field testing the ACR, please send any comments or suggestions to paul@paulraphaelson.com.