

How to bolt a rock climbing route

You've got experience climbing various routes and it's now the time to open your first route. If you fancy placing your own gear; that is nuts, friends etc, then you should be aware that bolts are not always the superb protection if not placed properly.

Having said that, recently I read an article on a blog where a guy from Australia died after having a fall on a sandstone route. You can read the initial post at

<http://upskillclimbing.blogspot.com/2009/02/how-to-bolt-rock-climbs-and-how-not-to.html>

You can see how bad those bolts were from the video below.

Installation of fixed anchors implies a strong responsibility which you should only take if you have suitable experience. The information given here is not to be taken as the be all and end all of bolting facts. This is advice only and the author is not responsible for inaccuracies, mistakes or accidents caused by using this information. Never assume that the person selling the product (or other climbers including me) are giving the right advice. Read the product manuals and contact the manufacturer if there are any doubts.

Before placing bolts in a cliff you must practice at home. Find a piece of bluestone or use your garage's cement foundation as a test block. Practice drilling, notching, placing and removing an example of all these types of bolts before deciding on a system. Remember - do not trust the guys in the bolt shops to tell you the right information. They have no idea about dynamic loads related to climbing and will recommend equipment that is not suitable. This guide will steer you towards brands that people have been using successfully for years in Australia - it is then up to you to read the technical manuals for the product and follow the instructions exactly. Contact Neil Monteith if you need any more info.

ROUTE BOLTING ETHICS

Before you drill, do a lot of climbing in the area, and think hard about whether your potential line will enhance or detract. Don't bolt something now that you might be embarrassed about later. Decide whether the route follows an aesthetic line. A route should flow together into an obvious set of moves

If you have been climbing outside for less than four years, or if you have climbed in fewer than ten different areas, you should think about getting some broader experience, or at least good mentorship, before drilling and bolting new routes.

In Australia, routes that contain natural protection are left as such. Bolted cracks are extremely rare and are generally shunned upon. If you can place gear then leave the climb in its natural state. You may not be able to climb the line placing gear but other future climbers can.

Do not bolt unless you want crowds to someday arrive. Remember, bolts bring guidebooks which bring crowds who will stomp the place to death and turn it into such a hellhole that you will never want to go back. If the area is a tranquil backwater then try and leave some of its original charm intact by limiting the effects of bolting.

ROUTE PREPARATION

* Keep in mind that climbing gear is designed for climbing, not for window washing or rap-bolting

and rap-scrubbing. Fatalities have been caused by a rhythmic brushing motion abrading ropes. Wear a helmet - rocks fly right and left on virgin routes.

- * Abseil down route and remove loose rock with hammer and crowbar. Bring a rack of natural gear and test placements. If the route is overhung use natural placements, including skyhooks, to 'aid' down the route. If local ethics allow reinforce loose important holds with glue.

- * If possible, top-rope the route to find good clipping stances and holds.

- * Mark approximate location of bolts with an arc of chalk making sure the clip is possible for short people. The first ten metres is the most dangerous area. If the first bolt is 3m up, and the second is 4.5m up, most people will hit the deck if they fall clipping the second bolt. Solution? put the first bolt a bit higher and people will either climb up to it a bit more cautiously (people rarely fall off death routes) or stick clip it.

- * Decide whether the route requires a lower off. If the end has a loose or vegetated top-out, a bad walk down or the climb is very steep than a lower-off is recommended. If the crag already has routes with lower-offs then it is a good idea to continue the trend. Make sure the lower-of is replaceable when parts begin to wear out. This can happen within a few years in high use areas.

- * Choose bolt type depending on route angle, difficulty and rock type (see bolt type guide).

DRILLING

- * Work downwards using a Gri-Gri and two daisy chains for holding your body in when using sky-hooks and natural gear. A person holding the end of rope on the ground can be very useful to swing the bolter into the rock on overhangs. Learning to aid is handy when bolting step routes.

- * Tap rock with hammer to find solid rock for bolt placement. Place the bolt at least 300mm from any fault line (i.e. crack in rock or edge).

- * Before drilling hole lie quickdraw and fixed hanger against rock to test if proposed bolt placement will force carabiner over sharp edge or open carabiner gate.

- * Mark on the drill bit with a bit of tape the depth required for the bolt.

- * Start drilling slowly paying attention to create a straight hole both vertically and horizontally. Take care not to fracture the edges around the hole.

- * Once hole is running straight increase drill speed to maximum.

- * For ringbolts you must drill a notch to recess the ring. Drill a 20mm deep hole below and parallel with the first hole. Now drill vertically up and down to remove the rock between the two holes. Test the bolt in the notch to make sure it fits properly.

- * Blow out the dust with a long tube, bike pump or specific blower . Use a plastic hole brush (test tube brush) to scrub out the excess dust. Keep blowing and brushing until the hole is spotless.

- * Clean up any dust that has spread over the cliff during drilling. These big white stains can be visible for miles and will not wash away under roofs.

BOLTING

Expansion bolts

* Some expansion bolts require hammering in. If you end up smashing the bolt hard with full blows of the hammer then something is wrong. Extract the bolt and re-drill the hole before it becomes mangled.

* Use a torque wrench to work out the correct amount of tightening. If you can't bring the torque wrench to the crag then practice at home on similar rock to find out what sort of pressure to use. If you tighten too hard you can break the head off the bolt - or more dangerously tighten to a point just before failure. 12mm Ramset Dynabolts require twice as much torque as the 10mm variety so make sure you read the exact brand specifications.

* If the hole is too short and the bolt does not sit flush then remove it and re-drill. An easy way to remove sleeve bolts is using needle-nose pliers which can grip the sleeve and extract it after the bolt is removed. To remove the loose cone at the base of the hole screw the bolt in without the sleeve and pull it out.

* Test the bolt by clipping it into a chain of quickdraws and jumping up and down on it. Flick the weight side to side to see if the hanger will slip. On routes with a potential left to right fall the bolt will eventually unscrew itself. It will be plainly obvious when this begins to start occurring.

Glue-in capsules

* Check to make sure the bolt you are going to place sits flush with the back of the hole before gluing. If the bolt will have no fixed hanger then make sure a removable bolt hanger can be placed easily over the head.

* Place capsule in hole. If the route is overhung than use a little blue-tac on the end of the capsule to keep it in place. Hilti HVU Capsules will hold them selves in without assistance.

* Place bolt into hex head socket on end of drill. Make sure drill is in 'hammer' mode and drill the bolt through the capsule - breaking it up and mixing it around the shaft.

* Wipe away any excess glue with a cotton rag.

* Leave the bolt for the prescribed curing period.

* Test the bolt before use by loading shear and tension with a quickdraw chain or daises whilst on toprope. Test to see if a hanger will fit over the bolt head.

Glue-in caulking gun

* No matter how you do it this will be a messy business. Wear old clothes, use old ropes and bring a 'spodge' bag to deposit excess glue and nozzles.

* Clear gear from underneath the climb so falling glue does not stick together your climbing rack!

* Wear rubber gloves to protect your hands from the glue. A face mask is recommended for extended periods of gluing.

* Clean all the holes before starting to glue. The nozzles dry quickly and you will only have a few minutes between uses before it will be too hard to use.

* Squeeze two trigger fulls of glue into a ziplock bag before starting. The bag can be checked later to see if the glue cured properly. Check visually that two separate colours of glue (components) are going into the nozzle.

* Work out before hand how many trigger pulls of glue is required for each bolt. Apply this amount to hole starting at deepest point and slowly pulling out to fill hole with minimal air pockets.

* Wipe excess glue off the end of the nozzle and smear the entire shaft of the bolt with this glue. This will help the glue in the hole bond with the bolt shaft.

* Insert the bolt slowly with a spinning motion. A few turns should remove any air pockets that have built up. Push hard against the back of the hole. Enough glue should flow out from around the bolt that you will need to clean it up with a cotton rag. Make sure the notch on the ringbolt hole is completely filled. Wipe away all ugly excess glue and smooth down the glue around the hole for a nice finish.

* When placing a ringbolt under roof you will need to hold the ring in position whilst drying. Wedge a little piece of stick into the entrance of the hole between the bolt and rock. This should keep the bolt from creeping from the hole. A slightly bent U-bolt is much better as its two legs wedged apart will keep it in while the glue dries.

* Leave the bolt for the prescribed curing period.

* Test the bolt before use by loading shear and tension with a quickdraw chain or daisies whilst on toprope. Test to see if a hanger will fit over the bolt head.