

The Bolting Platform

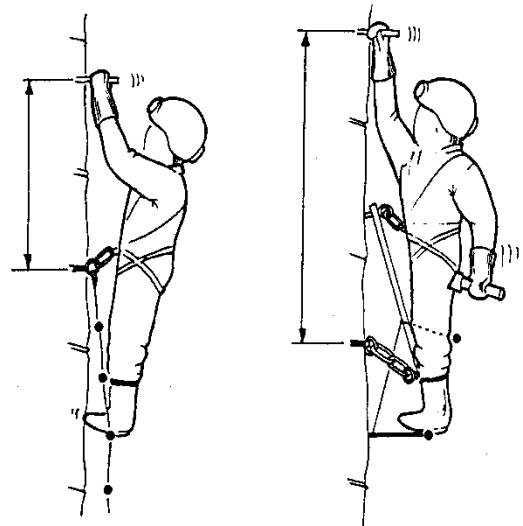
A tool to simplify bolted ascents in caves

The platform as described here is not our original invention; we first saw it in 1993 in <source>. However, it has been modified from the original design to improve both the climbing speed and safety. The platform as described here was designed and built by Rune Damm, with choreography by Thor Martin Klepaker and Marek Vokáč.

The purpose of the platform is to enable the climber to reach a higher position relative to the “current” bolt than would be otherwise possible. Normally, the climber would attach an etrier to the bolt and stand in it, while simultaneously attaching to the bolt with a short cows tail or other sling. With this arrangement the harness can never be higher than the bolt, at least not for any long time due to the strength required to hold an awkward position. Sideways stability – the ability to lean over to place the next bolt away from the vertical – is also not very good.

By attaching the platform to the bolt, and then attaching the climber to the platform, it's possible to routinely have the bolt at the height of the climbers knees or slightly lower. At the same time, provided the rock is not too smooth, it's possible to lean quite far over to the sides while drilling the next bolt. This is valuable when having to pass obstructions, loose rock or other things that cause a diversion from the smooth vertical climb.

It is also slightly less exhausting to climb overhangs with the platform, though this will stress it and reveal any weak materials.



Platform construction

The platform consists of a horizontal base, shaped like a squared-off letter C. The right-hand ends of the bottom rods will face the rock. The round rods are about 27cm long, while the center square bar is about 40cm wide.

In the middle of the C is a long riser, made of two pieces, each 60cm. They overlap and the total length is about 105cm, with possible variations (multiple holes in the smaller, top piece for the center join).

At the top of the riser is an attachment point on the side facing the climber (left in the picture), and a steel plug with sharp edges where it will face the rock (to the right).

In the middle of the riser is a join where the two parts overlap; the join also holds an attachment point for wires/ropes from the bottom base. This is also where a short rope loop attaches the last piece, a round rod that the climber will have behind his knees.

The climber will stand on the base, feet on the round rods, heels on the center bar, facing to the right, and with the harness attached to the top point.

In this picture the behind-the-knees rod has been removed for clarity, while the etrier (rope ladder) is shown. The top of the rope ladder is fastened in a loop over the bolt that holds the riser to the frame, inside the riser. In this way the pull comes at a good place and there are fewer ropes to snag or sort out.



Detail of the riser-to-base join (bottom). The riser is 30x30mm, 2mm thick square aluminium; the top part of the riser is 25x25x2 to fit snugly inside. The bottom frame is also 30x30x2mm.

Thick, heavy washers should be used to ensure that the load from the bolt is placed on the sides of the square tube and not on the face – otherwise the face will bend inwards and the platform will not be stable.

The other (upper) bolt visible here is the attachment bolt for the platform to the rock – the entire weight of the climber will be on this one. On the other side (facing the rock) there is an eye and in the eye a short length of chain or shackles, where the Fifi hook from the rock/bolt/karabiner will attach. This arrangement is used to adapt the length of the attachment to the circumstances of each station.



Riser center join, showing a few of the “spare” holes in the upper part, that can be used to change the overall height of the platform.

The short rope loop holding the behind-the-knees rod rests on the stiffener attachment point.



The attachment point for the base stiffeners, on the riser centre join. A Petzl “Coudee” hanger has been used; these are no longer made, but any kind of solid eye is OK.

The stiffeners should be as inelastic as possible, Dyneema cord or steel wire is best.

Large washers and self-locking nuts are the rule throughout.



The rock-facing end of one of the base rods. While the platform parts are aluminium, the cones at the end of the rods are steel, with concave/convex tip with sharp square edges. The point is to have something that will have high friction against the rock, and will stand abuse and abrasion well.

When the climber stands on the platform, the rod ends are pressed into the rock. If the climber leans to the side, the leverage will attempt to drag the rod ends along the rock – as long as they can resist this, the platform will not capsize.



The anchoring system. The fingers simulate the rock face and hold the bolt. On the bolt is a hanger that must have room for a) a Fifi hook (not shown!) used by the climber while securing the platform, and b) a karabiner (shown) on which hangs another Fifi; this hook in turn is attached to the platform's attachment chain at a suitable point.

The chain should be as short as possible to raise the climber; but not so short that it becomes time-consuming to set it.

The chain is permanently attached to the platform; the bolt and hanger to the rock, and the karabiner with the hook follows the platform but is not permanently attached to anything.



Top left – 30x10mm expansion bolt with 8mm inside thread and expansion cone inside the bolt. The hole must be drilled to the exact depth; then the bolt is set using the auger (top right). Finally, a hanger is attached (middle left), using the spanner (bottom).

Auger and spanner are connected to yo-yo's of the sort used for ski lift cards, to minimize the time spent taking them from & to pockets (or climbing down to retrieve them from the helmet of someone waiting below – always a risky place to be).

The 30x10mm bolt, if used in good rock, provides enough purchase for the platform. It is **not** a permanent anchor! But drilling its hole requires very much less power than a bigger bolt, quickening the climb and extending drill battery life.



Pockets in the caving suit, near the (padded) shoulder, for the bolting tools. This arrangement saves a lot of time and bother.



Fifi-hook and cows-tail attached to the climber. The end of the loop is attached to the climber's harness, leaving the Fifi hook loose; the climber will hang from this hook while setting the platform on the same bolt. By hanging from the hook, the karabiner with the other Fifi hook (through which the climber's safety rope also passes) will be unloaded and can be freely attached to the platform in the most advantageous position. The climber will then transition to the etrier to climb onto the platform, taking the hook off the hanger when established on the etrier. This is a somewhat tricky maneuver that needs practice, and adaptation of the fifi loop length until it works.



Base rod steel tips; recessed diameter on the left is where they slide into the rod, while the hole is for the stiffening cable.



Dimensions and materials

Base crossbar	400x30x30mm, 2mm thick square aluminium tube
Riser, bottom part	600x30x30mm, 2mm thick square aluminium tube
Riser, top part	600x25x25mm, 2mm thick square aluminium tube
Base rod (2 pcs)	270x20mm, 2mm thick round aluminium tube
Base-to-riser bolt	10x80mm hex bolt, nylock nut, thick washers at least 30mm diameter
Platform to rock attachment bolt	8x50mm hex bolt, eye nut, thick washers at least 3mm diameter
Base tensioners attachment / top-bottom riser join	8x50mm hex bolt, eye nut, thick washers at least 3mm diameter
Riser top bolt	8x60mm hex bolt, self-drilling bolt or other sharp object, thick washers at least 3mm diameter, hanger for clipping in karabiner to harness
Base crossbar to rod fastening	6x40mm hex bolt, nylock nut
Base rod fronts	Conical steel with sharp point; back end turned to diameter suitable for insertion into rod ends. A hole through the rod and front cone is used to thread the stiffening cable that goes up to the riser centre join.
Knee rod	340x20mm 2mm thick round aluminium tube

For transportation, the two risers fit inside each other, and the base rods inside the inner riser. The bolt holes at the ends of the risers are coordinated so that bolts can be inserted when they are together for transport and the base rods are inside them – in this way nothing falls out. The knee rod fits inside the base crossbar, and again the bolt holes can be used to keep it inside. Only a small bag of the remaining bolts, washers and hangers remain, together with the tools.

Choreography

Using the bolting platform involves a carefully choreographed sequence of steps, as outlined in my report of the climb of the 200-foot aven in Castleguard Cave, 2005 (see [link](#)).

At the beginning of the climb, a double bolt is set as an anchor for the safety rope, which is fastened to both hangers – this is quite close to the ground. The safety rope will pass progressively through all the new bolts (one hanger & one karabiner is left in each bolt as the climb progresses). If the climb is long, then a collection phase may occur where the lower hangers and karabiners are collected – but always keep at least three below the climber, to make sure of stopping any falls should a bolt pull.

The climber is connected to the safety rope using a GriGri. The GriGri is never opened during the climb, and is used both as a fall arrester (if the bolt pulls), as a substitute for the Croll ascender, and as a descender. Its versatility is a perfect match for the platform. Note however that this is outside the manual that Petzl provides, so training and judgement is needed.

Apart from the GriGri the climber uses a standard Ascension with footloop, and a generous supply of karabiners, bolts and hangers. A good drill is also needed – batteries **never** last as long in a cave as in the sunny experiments outside.

Assuming that the platform is hanging on the “current” bolt, the sequence is as follows:

1. The climber is in position on the platform, secured to it by the harness. Using the drill, make the hole for the new bolt, clean it, and set the bolt. Secure a hanger to the new bolt.
2. Place a karabiner in the hanger of the new bolt
3. Pull rope slack through the GriGri, until there is enough to thread the belaying rope loop through the new bolts' karabiner, above the climber.
4. Unclip from the platform and step off, hanging by the GriGri on the belay rope and the new bolt. Slide down a little using the GriGri as a descender if necessary.
5. Unclip the platform from its bolt, leaving the karabiner in the hanger in place – the belaying rope runs through it. The sequence of bolts and karabiners below the climber are the safety against falling all the way down if the next bolt pulls.
6. Secure the platform directly to the harness.
7. Use the ascender device and its foot-loop, plus the GriGri, to ascend the belaying rope to the new bolt
8. Place the Fifi hook of the harness sling in the hanger, next to the karabiner, and let the GriGri back down the rope until all the weight is on the sling. The karabiner is now unloaded.
9. Place the karabiner with the other Fifi hook in the bolts' karabiner, and place the Fifi hook in the platforms' eye bolt if possible, or in the closest possible chain link, to get the platform as high up as possible. Make sure the belay rope is inside the platform base, and the fifi hook-to-harness sling is in a position where it can later be unhooked.
10. Climb up onto the platform, unhooking the harness sling as it becomes. Keep track of the drill and other “loose stuff” to avoid getting entangled!
11. Clip into the top of the platform and clean up

