This site presents the images from the ebook *High: Advanced Multipitch Climbing*, by David Coley and Andy Kirkpatrick. In order to keep the cost of the book to a minimum most of these were not included in the book. Although they work best when used in conjunction with the book, most are self-explanatory.

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The chapter starts by considering what else apart from the leader needs protecting, how to place pieces in opposition and what Jesus pieces are for. We try to emphasize that cleaning a pitch well and fast is as important as leading it fast – this means not cleaning into one big mess on the harness.

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Contents

Riglos, Spain. Classic multi-pitching: bolted or trad. Depending on the climb, protecting a route here can be as simple as clipping the bolts, or complex and time consuming with loose rock and novel placements to deal with.

Protection has a variety of purposes beyond just protecting the leader. Left, rope eating crack; right, one solution. Other purposes include showing the way to go and
protecting the second on a traverse.

Using a piece just to keep the rope away from some scary loose blocks.

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1. Protecting the leader

Seven things to think about: 1. What direction will the piece get pulled in in a fall if it is the top piece? 2. What directions will it be pulled in if it isn't the top piece – will it stay in? 3. How old/safe is any fixed protection? 4. What's the rock like? 5. Can I find/engineer the best solution? 6. Drag. 7. Do I have the strength to place it?

Strange things can happen during falls. Protection needs to work in whatever direction it will

Wires can be used for small threads. (Here the carabiner is in danger of suffering cross-loading, so one carabiner on each end would have been better, or at least rotating the carabiner around so its wider end was

be pulled in.

in contact with the wire. However, often there isn't time/strength for the perfect placement.

If the eye of a peg is proud of the rock, girth hitch the peg to reduce the leverage.

Left: stacked wires—not as good as a wire of the correct size, but better than nothing. Right: weighting a critical piece to stop it lifting out.

Wires can be joined if you can't reach a placement. (You might want to clip an extender to the upper wire before you place it to make clipping the rope easier too.)

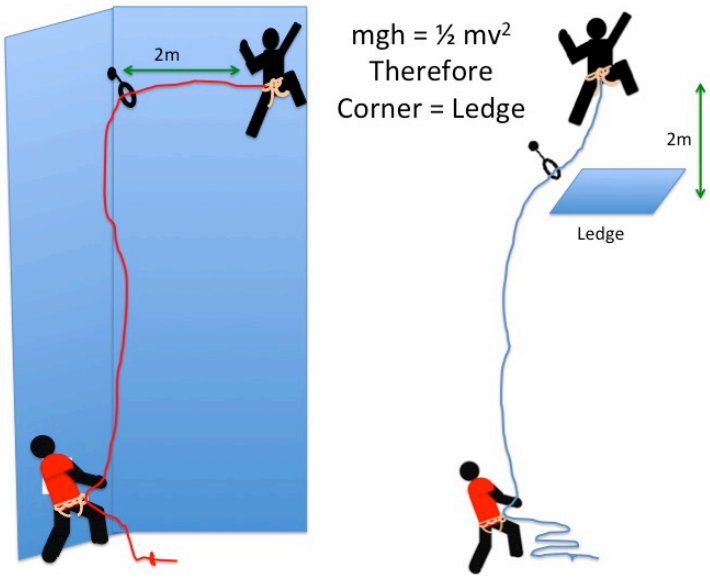
Fixed equipment is not necessarily safe. (Left: Riglos, Spain; right: Costa Blanca sea cliff, Spain.)

For more pictures of unsafe protection, see:
http://www.supertopo.com/climbing/thread.php?topic_id=1691689&tn =0&mr=0&utm_source=SuperTopo
+purchasers+and+forum+up+to+3.22.11&utm_campaign=b63be099a7---
SuperTopo_Climbing_News_May_26_20114_5_2011&utm_medium=email

When putting slings around flakes or trees, then unless the tree is massive, keep them low so as to reduce the leverage.

A long sling being used to reduce the drag and therefore the effective fall factor caused by the rope passing over a roof. Another reason to extend under a roof is to stop the gate of the carabiner being opened by the lip of the roof.

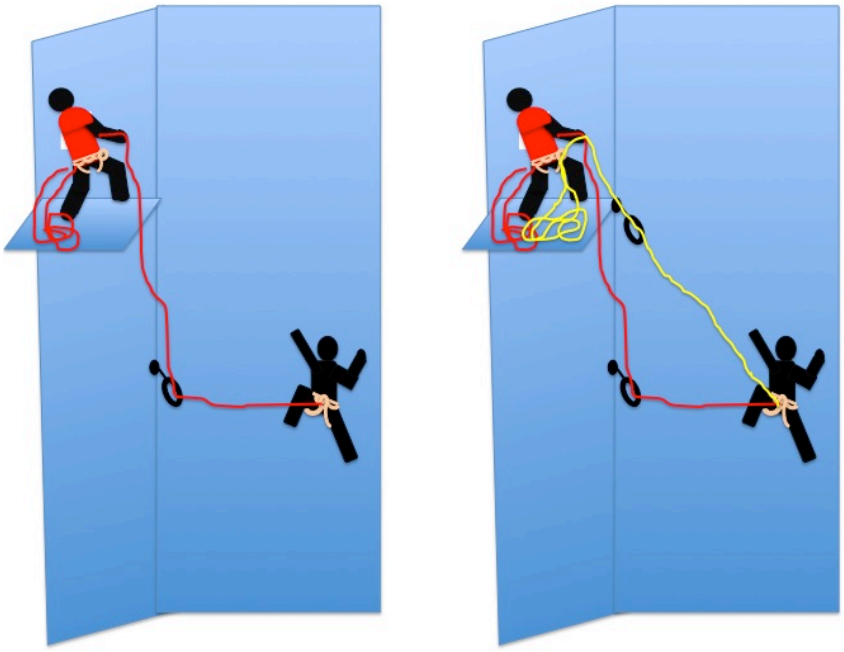
A bunch of micro's: left, in series; right, equalised in pairs, then the result equalised to a single point (note the use of limiter knots) — the latter is nice in theory but not easy to do on the lead!



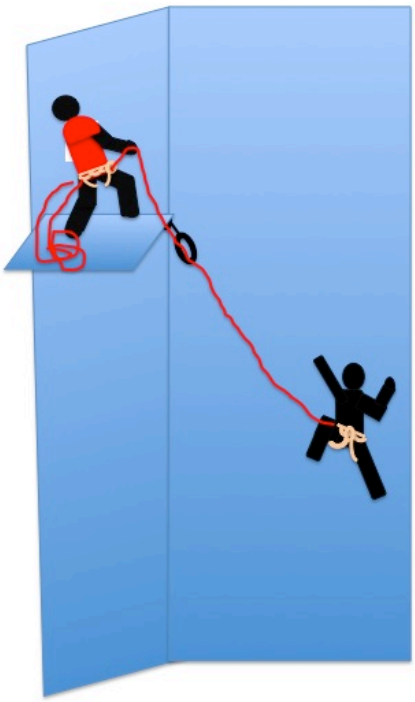
As discussed in Chapter 3, corner fall should be taken as least as seriously as a ledge fall if the vertical drop is identical. So think about the protection needed to avoid this.

2. Protecting the second

The leader is the one placing the protection, and she will naturally be interested in her own survival, so will place protection as and when need to protect herself. But she needs to take time to protect the second as well. A traverse is an obvious place where protection needs to be placed to minimise the size of fall the second might take. This means not only placing a lot of protection, it means placing it directly AFTER a hard move, as such moves are where the second is most likely to fall. A common error is to not understand the danger to seconds corners provide, and how to minimise them.



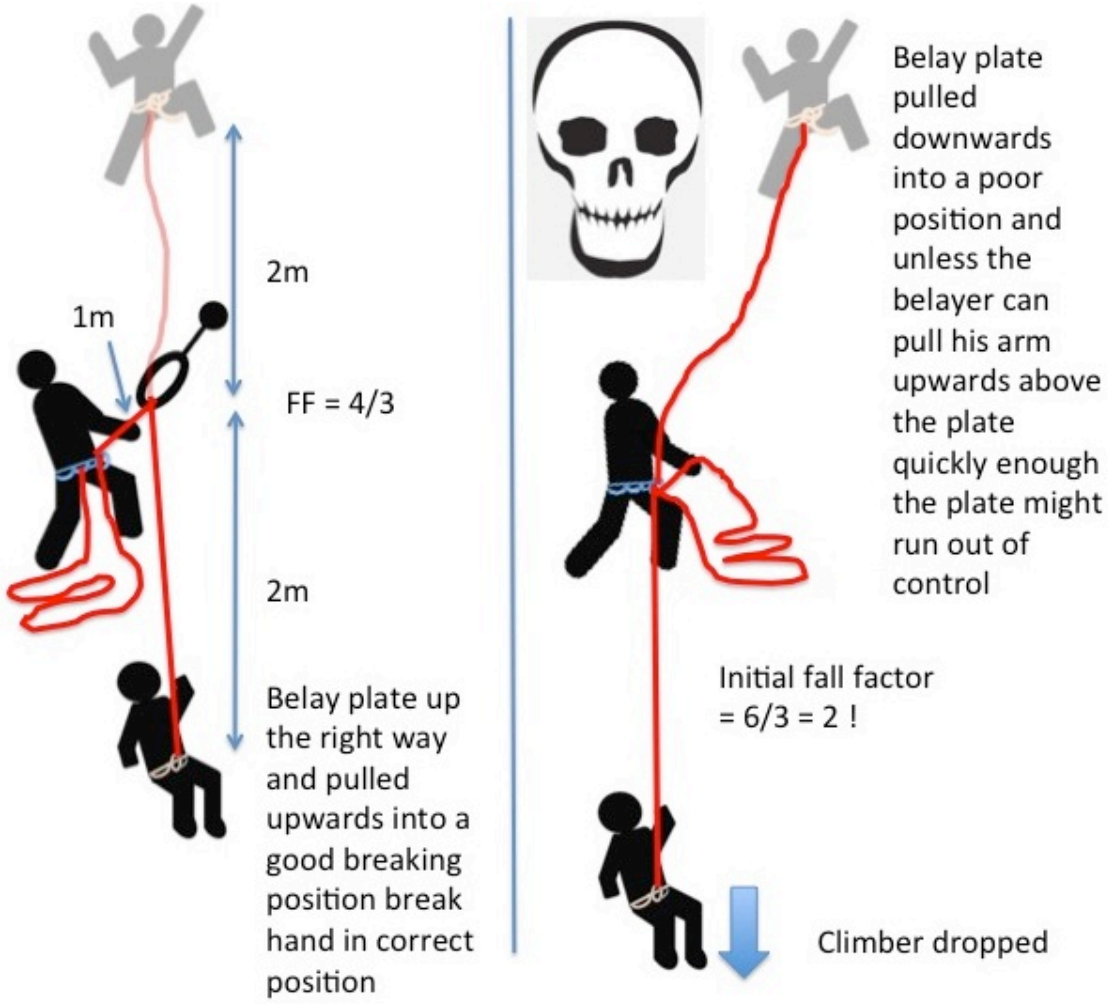
Right: limiting the consequences of a swing by using double ropes. The yellow rope reduces the height lost by the second as he falls, and hence through mgh = ½mv^2 *the speed he hits the corner.*



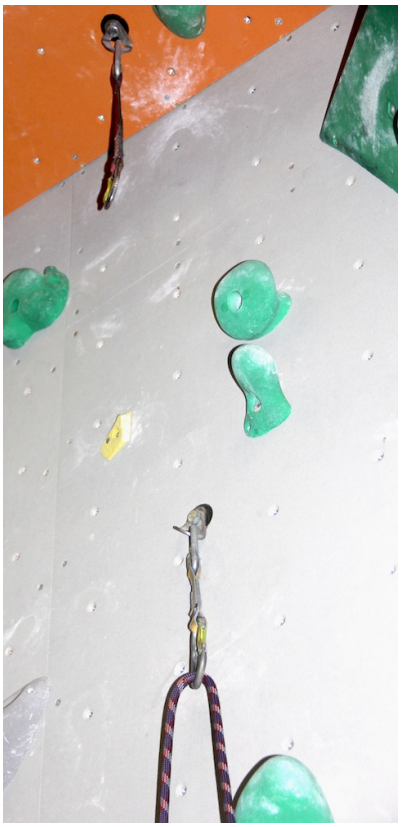
Limiting the consequences of a swing by placing the first runner in a corner high rather than low: see the images in Chapter 3's web page if this isn't obvious.

3. Protecting the Belay

If the belay fails or the belayer fails to hold the fall then you won't be safe – so protect the belay and belayer by using Jesus pieces, clipping a piece above the stance before you build the belay and occasional using chariot belays.



Protecting the belay with a Jesus piece in the left hand image. In the right hand one no Jesus piece has been used; the resultant fall factor is greater and it is unlikely the belayer will react quickly enough to get his brake hand up to his chest so it is above the belay plate..



When repeating a pitch, try and leave the first clip clipped for the next leader when you pull the rope down. Do this by unclipping the rope from the second bolt as you lower off – just as you do at the climbing wall. This not only protects the climber, but also the belay.

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4. Pieces in Opposition

Sometimes the crack is shaped so that it will hold a piece, but not in the direction we need it to so that it will hold a fall, or even stay in the rock. An example would be a horizontal crack which gets wider to the left and if the climb heads left. The movement of the rope through the piece's carabiner will work it loose over time and it will eject itself from the crack. We can solve this problem by placing another piece off to the right in a constriction that faces in the opposite direction, then linking the two pieces together. The same idea can be used with vertical cracks.

Many instructors teach clients to place a good cam as the first piece, as this is naturally somewhat multi-directional.

The first piece is often the most susceptible to being pulled upwards and out. If needed, place an opposing piece below it that can take an upward force. Linking them in the way shown ensures that even if one fails the other might stay put. The method shown works best when the two pieces are far enough for them not to entangle each other.

*awaiting image. If you really need to make sure movements of the rope won't loosen a piece in opposition, then rather than use the method above tie a clove hitch (one-handed) rather than girth hitching them. Tighten the sling between the two pieces using the clove hitch so the pieces are bolted down to the rock.

There are many ways of connecting pieces in opposition. The bottom two use a sling to ensure carabiners are not cross-loaded or wires pulled apart; however you may be hanging by one arm and not have the time to do this. Often it is not about rigging something with maximum strength, but what you can get in quickly.

Here the poor right hand wire is being used just to ensure the good left hand piece can't be flicked out: it adds little to the strength of the placement and if the left hand wire fails it will also fail. But it will help the main wire stay put as the rope pulls it around.



Here the two pieces BOTH contribute to the strength of the placement. Under load they will pull each other into place and load share. This is the same method (and the same images) as for the vertical crack shown above, but for a horizontal situation. This works best when the two pieces are far enough apart that they won't entangle each other (i.e. the two carabiners can't touch).

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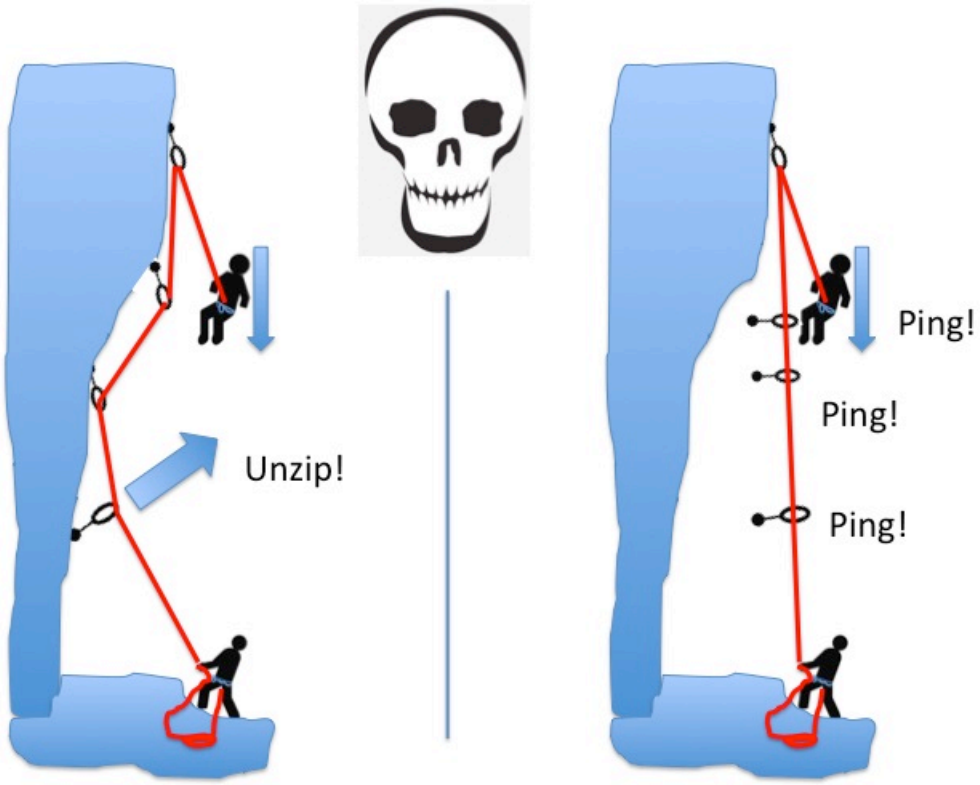
5. Don't get Unzippered

In the event of a fall the pieces below the top piece are often subjected to an upward pull. This is because the directions the ropes either side of the piece are pulling in and because of the upward movement of the rope during the fall. This means these pieces can unzipper upwards. The upward pull is often worse on the piece nearest the belayer because the belayer will be slightly away from the wall, or to one side of the first piece. If this first piece is unzippered, the second piece becomes the first piece and will be exposed to similar unzippering forces. If the belayer is far enough away from the wall, the whole pitch can unzip except for the top piece. If the top piece then fails because it couldn't hold the fall, the leader will deck.

This suggests the belayer needs to be close to the wall and the first piece needs to be able to take a downward fall (in case the leader falls before she places the second piece), and also be able to take a smaller upward force (in case the leader falls higher up after placing more pieces).

A leader will often place a low first *directional* piece simply to stop unzippering if she see a multidirectional placement, even if the climbing is easy. Threads, cams (ideally in horizontal cracks, but vertical cracks will normally work as the outward force will be small) and pieces in opposition all make good first pieces to stop unzipping. In the USA it is common to hear climbers saying: "always use a cam not a stopper as the first piece", for this reason. However it probably wouldn't be sensible to replace a solid stopper with a poor cam, better to place the wire and then try to use a cam in opposition to stop the wire unzipping.



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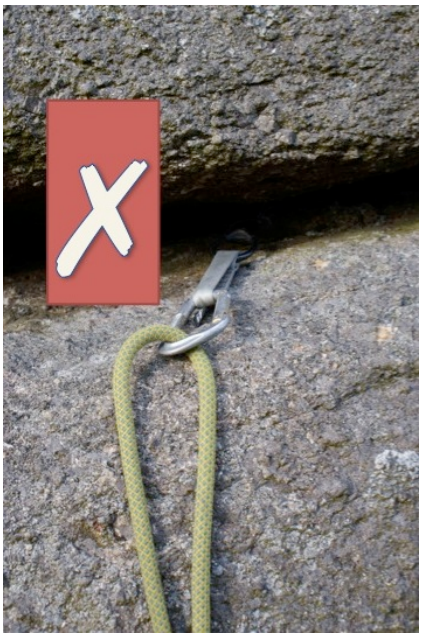
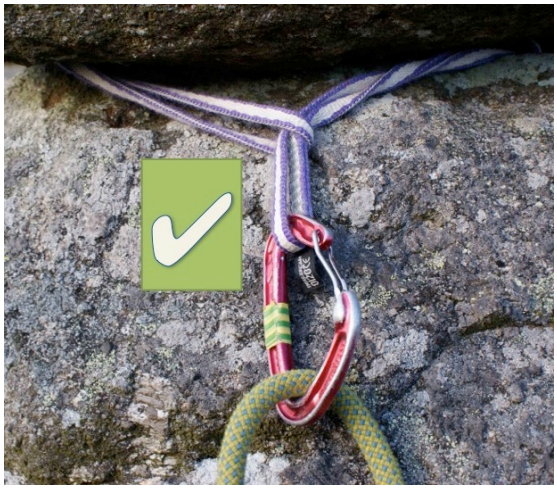
6. Extending Over an Edge and Cross-loading Carabiners



Extend wires and cams over edges to stop carabiners being cross-loaded, to stop your rope being thrashed, to reduce friction and to reduce the effective fall factor. Using two carabiners back-to-back isn't ideal, but is better than nothing. (The simple loop-one-sling-through-the-other method might seem surprising, but has been tested—see http://www.blackdiamondequipment.com/en-us/journal/climb/all/qc-lab-extending-a-cam-sling-sling-on-sling). Another reason to extend under a roof or over an edge is to stop the gate of the carabiner being opened by the lip of the edge or roof.



Avoid three-way loads or cross loading carabiners by extending placements. In the top right the extension has possibly been a bit short.

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8. Stuck Pieces

*awaiting image

Often the quickest way the remove a nut is to simply grab the extender, and violently swing your arm upwards. Make sure you don't get hit in the face. Don't do this with small brass micro-nuts as you will damage the wire where it enters the nut.

Unless it is a small wire, try using the piece's carabiner to give the wire a tap before grabbing the nut tool. Try not to put sharp-edged dents into the carabiner: tap, not hammer.

If you do have to get the nut tool out, consider clipping the piece back on the rope in case it comes unstuck unexpectedly. Strike it to loosen it then play with it to move it to a place where it can be removed.

Removing a cam by using a cleaning tool and a wire to ease the trigger bar back (you will need to use a thumb at the same time to apply pressure to the stem). This needs both hands so the second might need to hang on the rope.

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8. Use a Cleaning Sling or Clean into Bunches

Timing experiments show that one of the key differences between efficient and less experienced multipitch teams is the time that is wasted between when the second hits the stance and when the leader starts to climb again. This can be longer than the time taken for the second to climb the pitch.

THE key thing not to be doing is for the second to clip each piece separately onto his harness, then to unclip each piece separately onto an arm of the belay, then to start sorting each piece out. A second important observation is that if you are swinging leads, then if your harness is full of mess from cleaning, then re-racking whilst this mess is on your harness won't be smooth. The cleaning has to have left the pieces in an orderly fashion, or on a small number of carabiners or on a cleaning sling, so you can empty the gear loops quickly before re-stocking.

Being organised when you clean the pitch will really help here. If you are swinging (alternating) leads then the second can often re-rack sling draws and cams as he cleans, leaving only the wires to deal with at the stance. If this isn't possible (because the climbing is too hard), or he won't be leading the next pitch, clean onto a cleaning sling or bandolier, or in a small number of logical bunches. For example, if the second ends up with one bunch of wires and one bunch of cams on each side of his harness, there are only FOUR things to clip onto the anchor. The leader can then just grab a bunch of cams and re-rack.

A useful trick is for the leader to clip the three (or so) carabiners carrying the wires onto an arm of the belay whilst he is bring the second up (on a direct belay). The second then has access to these to help with the sorting. Don't forget to colour-code the wires and the carabiners they live on.

If you clean onto a cleaning sling or bandolier, and you are not leading the next pitch, simply

take it off your neck the clip it to high on the belay, or place it around the leader's neck.

If both of you rack logically, the second can often clip things directly onto the leader's harness. Although if you are both truly efficient he might not have time to do this as he also has to sort the rope out and get the leader on belay.

Second using a cleaning sling rather than clipping the removed gear to the harness, a bandolier works equally well—this can greatly speed things up at the belay; as can cleaning onto bunches.

Cleaning onto bunches. Here, one bunch of cams, one of wires; there are many other possibilities.

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