



# Libby Peter's Climbing Essentials

## No. 7 : Trad Essentials - Dynamic belaying

We've all heard of, or witnessed, falls that have resulted in a ground skimming close-call. We probably also know of leaders who've bravely taken a miniscule lob only to slam into the rock and smash an ankle. Somewhere between the two lies the perfect fall (if there is such a thing).

Once you have embraced the idea that falling off, whether as a leader or second, is an everyday part of climbing, it's logical to make yourself aware of how you can stack the odds in your favour if it does happen. Bombproof runners and anchors are obviously crucial, but understanding the dynamics of a fall is also important.

This month we consider some of the subtleties of belaying, such as what difference it makes if we use slings to equalise belays and how to decide if you should catch the fall slowly but softly, or quickly but with a jolt.

Falls have a habit of sneaking up on you so it's best to have anticipated the likely outcome and how it might impact on leader, belayer, belay and runners.

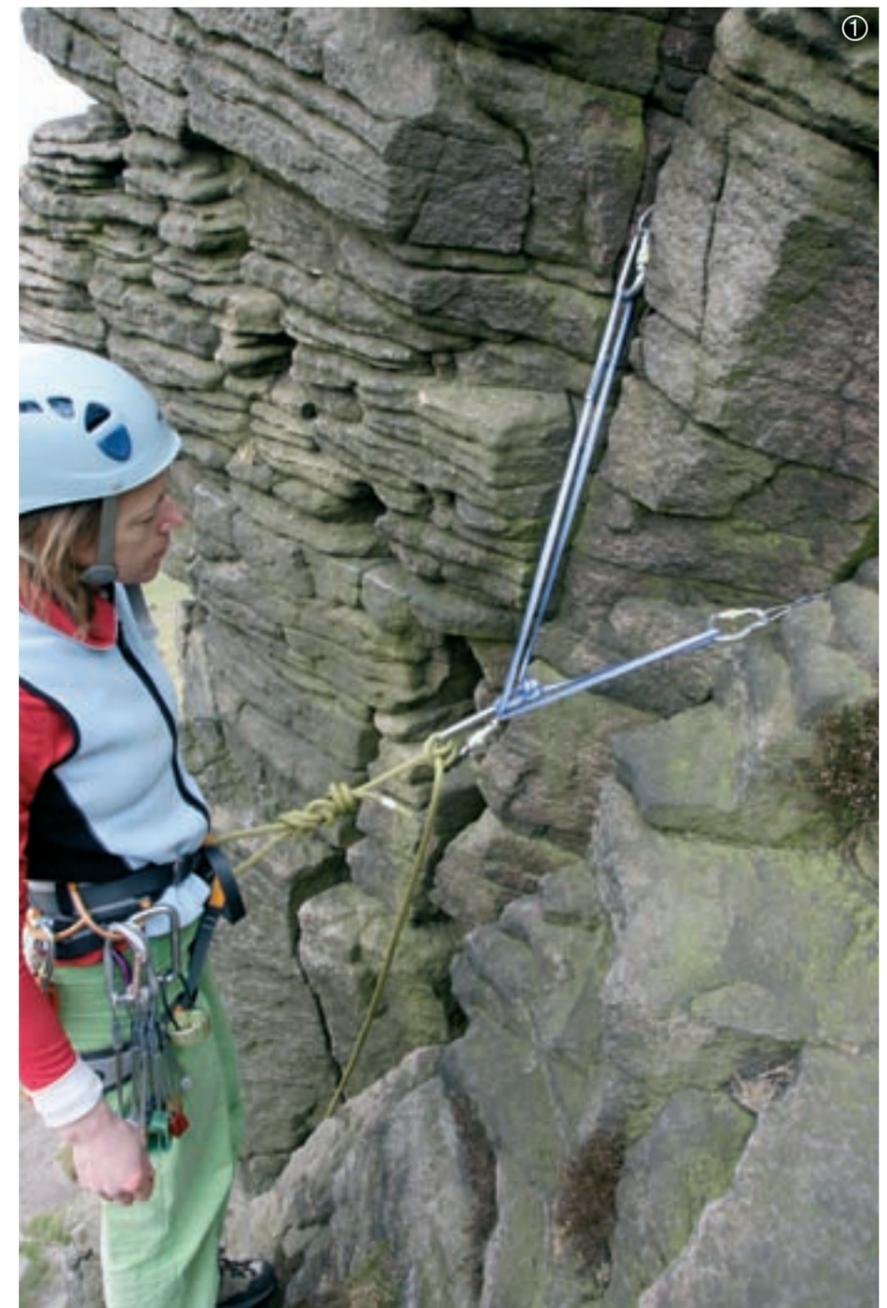
### Building belays with slings

#### Why?

Using slings to equalise the anchors creates a central, single point to attach to which has several advantage, such as:

- Provides a quick clip in point when the second arrives at the stance (even more useful if there are three of you.)
- Makes the changeover less complicated if one person is leading all the pitches.
- Uses less rope if the anchors are far back (i.e. one loop of rope back to the anchors rather than two.)

◀ Mark Stevenson belaying Rich Mayfield on **Coronation Street** (E1 5b), Cheddar Gorge, Somerset.  
All photos: Mike Robertson.





## How

The simplest system is to clip a sling into each anchor and bring them to a central point with a karabiner. Of course you'll always need to make one sling shorter so the tension is equal and this can be done using an overhand knot. In reality it's tricky to equalise the anchors effectively with this system.

A better system if the anchors are reasonably close together is to use one sling to equalise two anchors. There are a number of ways to do this and I've described a couple here.

- Single overhand (see [photo 1](#)). Clip one end of the sling into an anchor then work out where the central point is and tie a loose overhand knot. Clip the other anchor and tweak the knot to get the adjustment perfect then clip a screwgate karabiner through

both halves of the sling. As the next climber/s arrive at the belay they simply add a screwgate karabiner through the same point.

- Double overhand (see [photo 2](#)). Clip both anchors with an end of the sling making sure there are no twists in the sling. Tie an overhand knot in the folded sling to create a loop to clip into. This method uses slightly more sling so only works if the anchors are really close together but creates a tidy loop for attaching the next arrivals.

In other countries this sling equalisation system is called a cordlette and in preference uses 7mm perlon. It's worth being aware that although we use the term 'equalise' none of these equalising methods completely accurately share the load between anchors as it's virtually impossible to anticipate exactly how the



load will be applied and how the various knots will tighten etc. In other words, however carefully you set it up, the load probably comes onto one anchor before the other. The other disadvantage is that they're rigged with one direction of pull in mind.

- Self-equalising (see [photo 3](#)). Putting a cross in the sling that's linking two anchors creates an attachment point that slides back and forth. This way if the belayer shifts position the tension is always shared equally between the anchors. HOWEVER, if one anchor failed the karabiner would slide to the end of the sling and put a slamming shock load on the other anchor. It's for this reason that we don't use self-equalising systems with trad belays. The system can be improved by adding slide-limiting overhand knots either side of the cross. The equalette system used in the USA combines the cordlette principle with a self-equalising element but is rather over-complicated (google these terms if you want to know more).

## What's the problem using slings?

Nylon and Dyneema slings don't stretch (or only a tiny bit) so they don't absorb energy very well. They make up for this by being incredibly strong (typically 22kn) so there isn't a problem with slings snapping, the issue is that considerable forces are transferred back to the anchors rather than being absorbed by the rope.

## Knots in slings

Tying a knot in a sling weakens it by about half its original strength and this is more pronounced in Dyneema than nylon (51%-54% weaker in 11mm Dyneema, compared to 35%-41% in 19mm nylon). This is probably in part due to the lower melting point of Dyneema (149 degrees) compared to nylon (263 degrees).

Joining two slings with a lark'sfoot (see [photo 4](#)) also weakens the slings by up to



50%. Again this weakening is much more pronounced in Dyneema and especially in the new breed of super skinny 8mm Dyneema slings.

It's not necessary to say you should never knot slings or join them together with a lark's foot but it is important to be aware that you are creating a weakening.

## Use slings with caution.

- If either of the two anchors you've chosen is at all doubtful add a third or fourth.
- Don't clip the anchor directly to the slings from your harness – use at least a little rope (as in [photos 2](#) and [3](#).)
- If the rock and/or anchors are poor DON'T use slings, use the rope instead. Even if it takes a little longer to switch over when your partner arrives.
- If you're expecting to hold big falls don't use slings, use the rope instead.

## Ground anchors and dynamic belaying

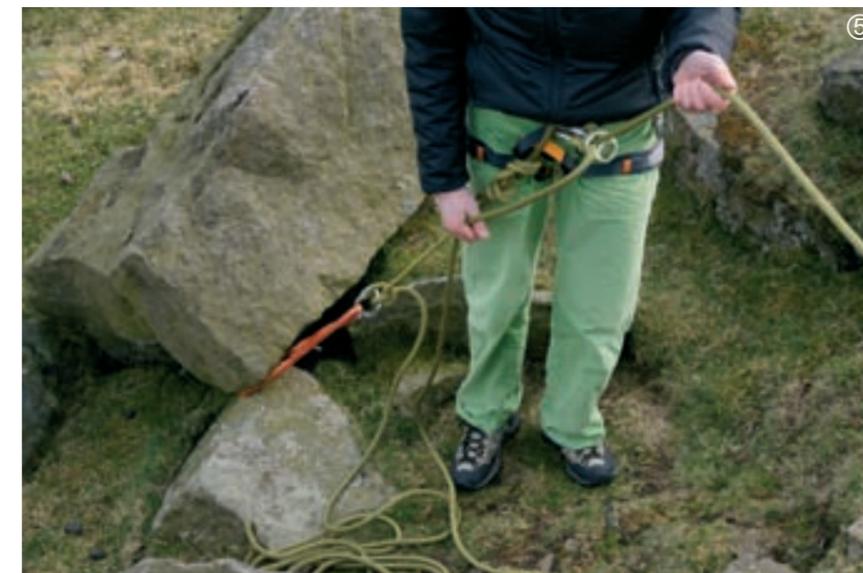
Deciding whether the belayer should have an anchor at the start of the climb is simple. If you're above the sea or have scrambled up some easy but steep ground, so there is already somewhere to fall, the belayer needs an anchor to stop them being pulled downwards off the ledge if the leader falls off with out any runners in.

You may also consider a ground anchor, i.e. an anchor that takes an upward load (as in the set up in [photo 5](#)), if the belayer is worried about being lifted up off the ground

when holding a fall. This is a good idea if the belayer is much lighter than the leader or if there's a potential fall that must be kept as short as possible, such as a hard move close to the ground.

But you need to also take into account that the system will be less dynamic with an anchored belayer so the loads will be higher on the runners and leader. So in situations where a softer fall is more important than a shorter one then it may be best not to use a ground anchor.

In these potential high impact fall situations it's also worth considering the actual belaying method. Rather than stopping the fall dead a little 'softness' can be introduced by allowing a small amount of slack to run through the system. This can be



achieved by not taking in too tight, or even paying out a little slack, or by being lifted off the ground (or jumping) at the moment of impact. These advanced belaying skills obviously take some practise and confidence to use and the wall is a great place to try them out first.

## Summary

In conclusion then, (but remember it's impossible to have hard and fast rules), slings are fine to use in belays but not if the rock and or anchors are poor, in which case it's best to use the rope. The same applies if you're thinking you may need to hold some big falls.

Avoid clipping direct to sling belays, always have at least a little rope in the belay set-up. Be aware (but not paranoid) of the reduction in strength if you knot slings – even knotted they're still as strong as most of the rest of your gear. The same goes for joining two slings with a lark's foot – if in doubt use a screwgate karabiner instead.

Be very careful when attached to a sling belay (such as an abseil station) with only a sling cow's tail – if you climb above the belay and fall off you'll generate a massive load. □

Libby has been climbing for over 20 years, she is a qualified Mountaineering Instructor and IFMGA Guide and is the author of *Rock Climbing – Essential Skills and Techniques* published by MLTUK. Her base is North Wales from where she runs the guiding outfit Llanberis Guides ([info@llanberisguides.com](mailto:info@llanberisguides.com))