

Line and Batter: Part 4 – Lines

I had thought this would be the last article in this mini-series originally planned for two, possibly three instalments. When I wrote up the notes... almost 4 pages on lines, I know I can be long winded but there are limits. So it's in two parts with a fairly arbitrary cut, and most pictures/diagrams in the second half, sorry.

In the last issue, we installed our profile- frames or bars - now for the lines and how to use them vis the placement of stone. Sounds simple, however as with all things there are all sorts of lines (in all sorts of colours) and many ways of 'installing' them, and of course there are a number of approaches. At the end of the day it comes down to personal preference (and taste - pink??), and so most of the following represents my personal preferences.

Perhaps the 'simplest method' is to tie the strings off onto the profile, or wrap them around a couple of times in effect catching themselves. This is alright if the profile is well secured, however if it is not then pulling the lines tight can cause the frame to twist or lean, or for bars to be pulled off batter and true. If this is allowed to happen in the field you have to wonder why bother with a profile, if it happens in tests it inevitably affects the marks.

I have tried many variations over the years from electric fencing cord/wire (highly resilient but difficult to get tight), and varying grades of brick line (but never ever pink), before settling for very thin brick line (whilst there are no rights and wrongs I swear by Cardoc size A brick line - I find other types/grades too thick) and bricklayers pins a dozen or so years ago.

I like to get my strings very tight, if you attach them to the profiles these would almost inevitably move even when well knocked in. I prefer to loop around the profile once, extend the line beyond the profile and pin down into the ground at an angle of less than 45 degrees (ground to string), or sometimes into a tight joint in a wall - if there is one - I'd hope there was a choice of tight joints (apparently this annoys competitors in adjacent stints in competitions who apparently knock their shins on them). Get the line tight between pin and bar pull it along, loop around other bar and pull it through very, very tightly (often the bar moves a little) before pulling it tight beyond the bar and securing into the ground. I frequently check that I have not pulled the line bars off of the correct batter. At ends the line can be a bit of a trip hazard, but really should not present that much of a problem, avoiding them as with most of walling is ostensibly just an extension of technique.

Whilst I like my strings to be almost 'guitar string' tight, in practice you probably just need them to not be very loose and drooping. I work on long lengths, so the droop potential is greater. In practice if a line droops a little along its length say 2cm it will still only be out of line at its lowest point by 3 or 4 mm if the wall is battered 1:6, which is likely to be within the tolerance of accuracy of the stone type and your own building. Depends on how accurate you want to be and how level you want your line, if you are coursing then a slack line can have very 'interesting' results. In my opinion if you're using a line to be accurate then you might as well get it right and avoid being even a little out if you can, so keep them tight. In addition if you are working in difficult ground conditions and cannot get your profile solid, then I believe a tighter line actually helps hold the profile in place. In addition I would suggest that you seem to catch and drag the line less the tighter it is, but this could just be my imagination. I also work in some very windy locations (got blown over 3 times in two weeks just before Christmas) and tighter lines distort less in the wind. Drooping and displacement over longer lengths can be mitigated by a loop securing the string to a stone set in line to the required height, with another stone sat on the loop to hold it in place. This is mentioned and illustrated in BTCV's "*Dry Stone Walling*" (1999. p.50) which suggests a rag or some grass for the loop. I first utilised cigarette papers for this - with limited success in our glorious Welsh weather, now I've upgraded to doubling up a length of insulating tape (i.e. sticky to sticky) and looping that around.

Other methods include having industrial elastic bands or bungees attached to the end of the string and a hook attaching them to the profile, so the line is always under a little tension (needs very secure profiles, and the hook tends to offset the line a little); a variety of (spring) clamps can be used to hold the line to the profile rather than using any wrapping or looping. Some people have small nails/screws in the outside edge of a wooden frame (where the frame is internal to the wall profile rather than outside it) and loop/secure string around these. Some loop

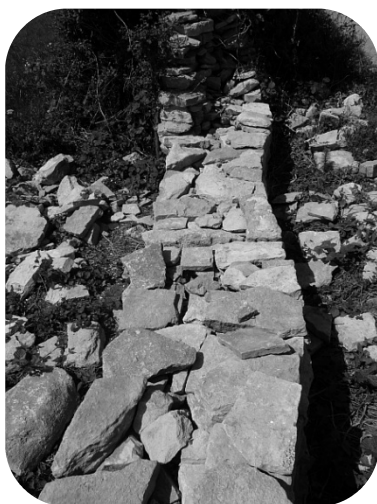


Fig 1. Poor line

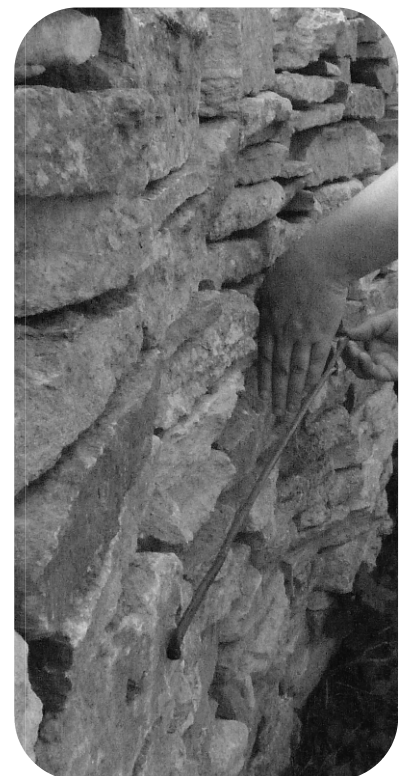


Fig 2. Hollow where stones are hand width off line

back around these and actually have two strings on each side. There will be more on double lines next time.

I suppose at some point we should ask exactly what the purpose of lines are, having noted in an earlier article that the examiners require them to be 'taut, level, correct width'. It should be obvious that their prime role is to maintain the shape and allow stones to be set in the correct plane between the profiles. If you've set everything up correctly they will definitively mark where a stone should be if they are taut. They are also in some respects just a guide, they are not necessarily prescriptive, you do not have to have every stone perfectly in line. The more you get right the more accurate and neater the wall but the odd stone placed a little out of line if that is how it is best placed in terms of internal fits and how well it sits, is probably going to improve the structural integrity and not necessarily detract from the aesthetic. Just remember this is all a question of degree, the occasional stone set millimetres rather than centimetres out. Remember that the more regular the stone the more any of these inaccuracies will show, and that in all cases the more you miss by the less accurate your wall and theoretically - all other things being equal - the less perfect, and I suppose ultimately less stable your wall.

Similarly correct width fits here. The lines will show you if dips or bulges are developing, whilst with practice you get a feel for building to batter even without lines, over any distance keeping to the 'straight and narrow' can be more difficult, and a small deviation can throw everything out. The sections of wall shown in Figs 1 & 2 show how wrong it can go - presumably without a line. When you're learning you do not need to be millimetre perfect, stability is paramount, but you do need to be aware of how inaccurate you are, more accurate than these, and always striving to improve.

Setting strings level is also useful as a guide as to how level you are setting your stones. Basically if your string is level then the horizontal axis of the stone should be parallel to it. If you are using relatively flat stone you can go as far as measuring that both ends are the same distance below the string - don't measure everything, primarily longer ones. Assuming you are working just a few inches below the line then using your hand to gauge the gap is usually accurate enough, plus the odd check of other stones. Standing back occasionally and looking at how the stones line up to the string helps. Often lines are set above ground level at each profile, and so they are not necessarily horizontal. If they are only just off of horizontal there is still a tendency to align stones axes to them and so in effect the stones slope a little. How serious a problem this is will be relative to the amount of slope, but whatever it is still a departure from the ideal and needs bearing in mind.

On steeper slopes I set a line on one side to the horizontal and leave it there, and use lines set an equal distance up on each side to maintain the line and batter. At times this can be a bit "cat's cradle-ish" (hence the horizontal line on one side only - using the stones set on this side to judge how level the stones on the other side are) but is useful as it allows the moveable lines to be used in their often overlooked function, the gauging of grading. In a random wall you still try to diminish stone size with height. Every time you set the line to a height you should be looking at your available stone and trying to use the largest before you reach the line, spreading oversized stone as evenly along the length as you realistically can, certainly avoiding grouping them (a particular tendency on steeper slopes). The more even sized (usually smaller) your stone, the less this comes into play but used well it helps to avoid having that one awkward lump that ends up much higher in the wall than would ideally be the case. Along these 'lines' the line itself also encourages good sequential process, provided you don't work above it or set the strings too far above the previous layer.

In the last issue I mentioned that the edited out more complicated mathematical aspects of batter could be found at Mark Jurus's blog <http://drystoneresource.blogspot.com>. I am pleased to announce that the newly installed Trustee Board has given permission for Mark to include all of my Professional Columns on his site, so if you've missed anything on curves, ends, corners lunkies, pillars or indeed frames you can now catch-up.

The cut has come just under half way, so next time there's even more. 4 pages on lines, I need help.

Craig Arbennigol

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