

# How to find the flag. Navigation techniques for orienteering.



You can probably navigate quite well on a walk with an O.S. map. An orienteering map has much more detail, so navigation should be easier? Yes, if you are at walking speed. But the trick to orienteering, some would say its big attraction, is to navigate at speed. This is not necessarily flat out, but at a comfortable speed you can maintain for, say, 40 mins. Navigation, even on areas you know well, becomes a different thing. Added to that is the fact that as you become tired and your brain goes into oxygen debt, you begin to make 'silly' mistakes. Mistakes that, when you get back home, you say " Why on earth did I do that?"

*In the diagrams that follow, but not the photos, the straight red line is the one printed on the map. The dashed red line is your route.*

**Techniques 1 to 5** are ones that all orienteers should know and use.

**Techniques 6, 7 and 8** become relevant on Orange and Light Green courses.

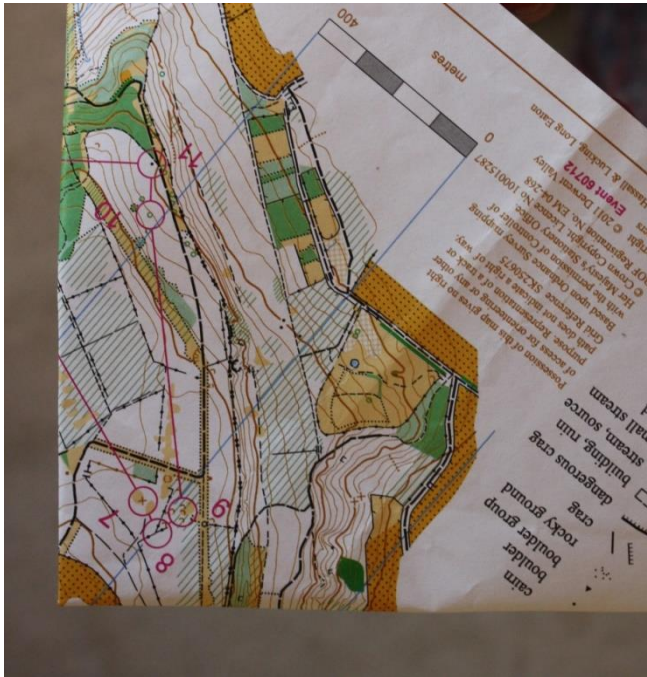
**Techniques 9 to 14** will help you in Short Green upwards.

*Technique 15 is reassuring for anyone, and **16 and 17** are particular mistakes everyone on the harder courses makes at some time.*

1. **Study the map.** Note particularly the Scale, usually 1:10,000 but you will find others. At 1:10,000, one cm on the map is equivalent to 100m on the ground. The Contour interval is usually 5m. Are there any unusual features on the key? You will sometimes get a chance to look at the map before you start, but even if you don't it is worth spending a minute on this.



2. **Fold the map.** Once you have absorbed the map-data above, fold the map so that your current leg ( only ) is visible plus a bit on either side of the red line. Refold as needed for each leg.



Folding the map makes it more manageable in a wind, concentrates your attention on just one part of the map, and makes it easier to hold a thumb-compass on the map.

**Fig 2 shows the same map as Fig 1, but folded for leg 9 to 10.**

Note printing now 'wrong way up'.

*You will now see the advisability of carrying the loose (paper) control description sheet in some kind of*

*holder. If you don't, you will be constantly unfolding and refolding the map to see the control descriptions printed there .*

3. **Orientate the map.** This is what a SatNav does automatically. You need to hold the map in front of you, so that what appears on the left of the 'red line' on the map will be to your left, and so on. A compass is a great help to orientate the map. You will need to re-orientate the map for each leg, and sometimes during a leg. ( Think of a typical roughly circular course ).

Use the magnetic needle of the compass to show you where north is, turn the map around until the top of the map faces the same direction as the compass needle.

- It is also possible to orientate the map without a compass, but for this you need to know exactly where you are, and be able to see at least two unmistakable features. This is rarely the case while orienteering!

4. **Plan your route.** Before you start running, decide the best way of getting to the control. It will be a combination of 'fastest' and 'safest' ( = easiest navigation ). It will only rarely be along the red line itself. Try to avoid ( darker ) green areas. Maybe use a path or track that is parallel to the red line, where you can run fast, and minimise the chance of getting lost ( but beware over-running when going flat-out! ).

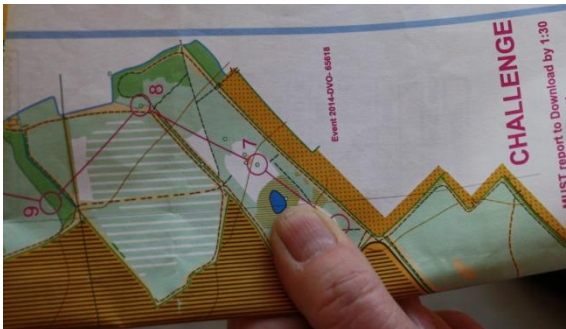


**Fig 3.** Plan the best route, 13 to 14.

*You're in a shallow re-entrant, in the brambles. Getting out of the brambles is first task ( then you can go faster ). So head east to the path ( can't overshoot, as there is uncrossable fence east of the path ). Turn left ( NE ) on the path. Follow until path T-junction at corner of the fence. Now you have short stretch in the rough open, and only a compass bearing and pace-counting to help. Or, from the same path junction, you could aim due north, hit the earthbank, turn right along it until the gap ( inside the circle ), then walk and scan the area.*

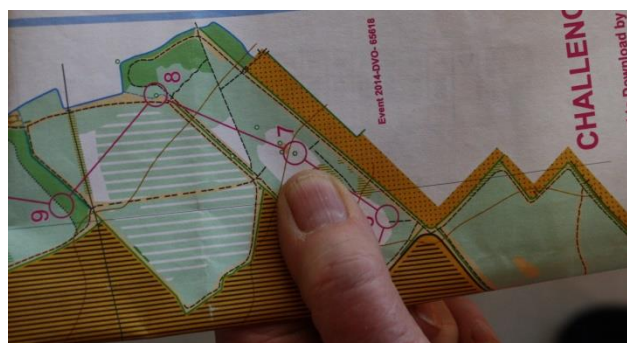
5. **'Thumbing' the map.** Put your thumb as near as possible to your current position, and keep updating it. This is to avoid you having a quick look and seeing instead another similar feature, another north-south path for example. But be aware that your thumb may hide a detail that could be important, so look under the thumb from time to time.

*Spot the difference below!*



**Fig 4a** ( left ), and **Fig 4b** ( below ). Note how

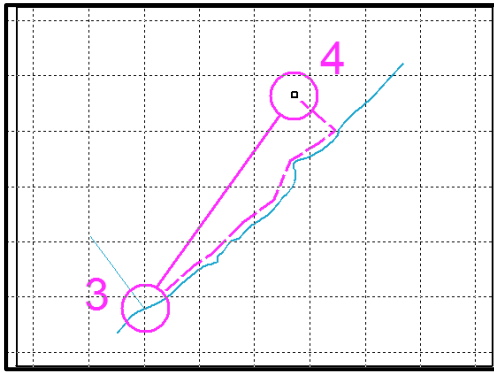
*you move your thumb along the map, from no. 6 to no. 7, as you progress on the ground.*



You can also use the tip of a thumb-compass to 'thumb' the map.

6. **Ticking-off / anticipating** features . As you travel along your planned route, tick off in your head the features on the map as you meet them –a path junction, a ruin on the left, a hill on the right, etc. This will turn into you anticipating them – “next, in about 200m, I’m expecting a small pond on the left”. If the feature doesn’t appear, either the map is wrong, or you are. 99% of the time, I’m afraid, it will be you!

7. **Hand-rails**. A hand-rail is a linear feature that goes to your control ( or close to it ), or is roughly parallel to the red line. Linear features could be paths, hedges, ditches, fences, streams or vegetation boundaries. Either follow the hand-rail, or keep it in sight.

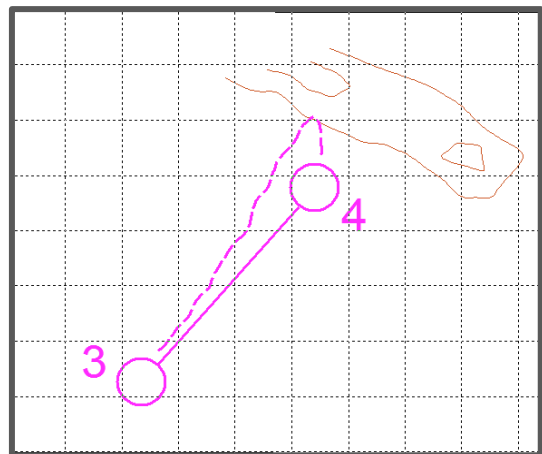


**Fig 5** Using a stream as a handrail between 3 and 4.

Note you should have a mapped feature to tell you where to leave the hand-rail, ( the stream in this case ) or you will have to *pace-count* ( see

no.13 below )

8. **Catching features**. Big, obvious, usually linear, features, as above, but which are beyond the control, so stopping you from going much too far ( although in the correct direction ). Catching features could also be contour features, such as a valley or a hill. If you have a choice of routes to a control, it may be sometimes advisable to choose the direction of approach that has the catching feature.



**Fig 6.** Catching feature ( low ridge ) beyond no. 4.

As you get more skilled *with pace-counting* ( see no. 13 below ), you will need catching features less.



9. **'Traffic lights'**. This refers to your speed. Divide the leg into a **Green** section, where you go as fast as possible, and where you can't go wrong ( famous last words! ), such as a forest track, an **Amber** section where you go slower, needing more careful navigation, such as a smaller path, and a **Red** section, where you perhaps even walk, approaching the circle.



Fig 7. Leg 14 to 15.

From no.14, Green to path (aim off to right ). Still Green as you turn left then right on second path. Green until you find earthbank crossing path. Follow earthbank east ( could be Green or Amber, depending how obvious the earthbank is ) until path. Then Amber along edge of Run until you hit the small gully. Red beyond the gully, slightly right until you hit the control.

10. **Compass bearing**. Occasionally you have no other choice but to follow a compass bearing and *pace-count*. This is reasonably accurate across open country where you can aim for a distant hill, say, or a pylon. Through woodland it is trickier. Here, following a bearing is inaccurate over any distance, and especially across a slope, so try instead to use a bearing to an intermediate, smaller, feature, and then again. But prepare in your mind to have left the bearing by a surprising amount. For example, a 5 degree error over 400m means you would be 35m away from the control. In woodland, this would mean you wouldn't see the flag. ( *Using a thumb compass means you can always follow a compass bearing.* )

How to take a compass bearing:

**10a. With Base-plate compass.** Lay the edge of your compass along the route you want to follow, but a little to one side, and in the right direction ( 2 to 3, not 3 to 2).



Fig 8a.

Turn the circular dial until the red lines you are turning are parallel to the north-pointing lines on the map, and the red arrow shape that you have turned is towards the top of the map ( ie text on map so you read it ).



**Fig 8b.**

Now remove compass from the map, and turn the whole compass until the magnetic needle, red end, is aligned with the red arrow shape underneath. Go in the direction indicated by



the whole base-plate.

**Fig 8c .**

( You can try not removing the compass from the map, and treating it like a thumb compass below, but you will find this is not easy to hold.)

**10b With Thumb Compass.** Lay the side of the base-plate along the route, but a little to the side of it, in the right direction that you want to go ( i.e. here, 5 to 6 ).



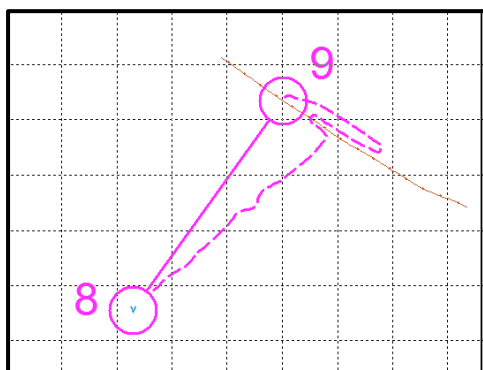
**Fig 8d** Using thumb compass, stage one.



**Fig**

**8e. Thumb compass, stage two.**

Keeping map and compass clamped together, turn the whole 'unit', and yourself, until the needle is parallel to the grid lines on the O-map, and the red end points to the north of the map ( in Fig 3b, this is the bottom of the photo. ). NB. Ignore any figures and letters on the circular dial, and also the red lines on the bottom of the dial. Your compass ( and you! ) will now be pointing in the direction you need to go.



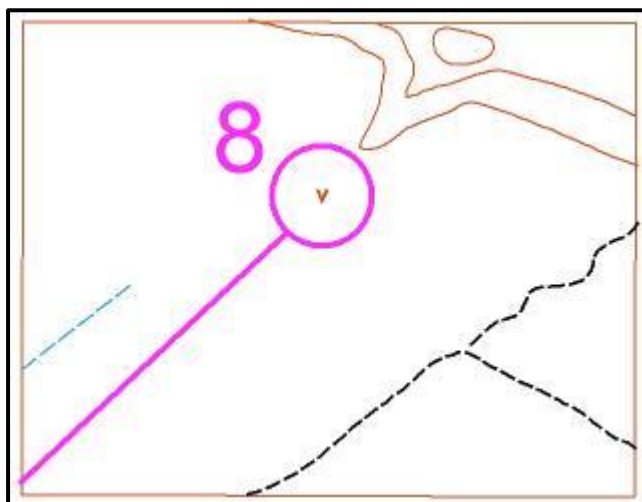
**11. Aiming-off.** If you are running on a compass-bearing towards a control on a linear feature roughly at 90 degrees to your angle of approach, it is always a good idea to deliberately aim to one side ( at least 30m to the side ). This way, when you hit the linear feature, you already know which way to turn along it, and you should be able to maintain speed until you see the control. Without this technique, you arrive at the linear feature and don't know which way to turn. You try

left for 15m, then turn back and try the opposite direction for 30m, if you still haven't found it, you go back to the original direction, but go a bit further... You can waste a lot of time this way. I know, I have!

**Fig 9**

You can also use this technique on a mid-leg feature, say, going out of the forest towards a track when you need a path leading off the opposite side of the track. Don't head directly towards the path junction, but head deliberately to one side.

- 12. Attack Points.** For advanced courses, where controls may be placed away from line features, and sometimes away from any other features at all, it is a good idea to choose a nearby, easily found, definite feature ( path junction, contour feature, and so on ) as an 'attack point'. You can run fast to this point, but may have only *compass bearing* and *pace-counting* from there on. Slowly is good now, with lots of looking round, as the paces tell you you're near ( they're never exact ).



**Fig 10.** Three possible attack points.

The path junction, and the ditch end are easy to find, but both are some way from the control. The spur to the north is much closer, so a better attack point, but would take longer to get to ( further along the path , then left on ridge, left down spur ). Your choice!

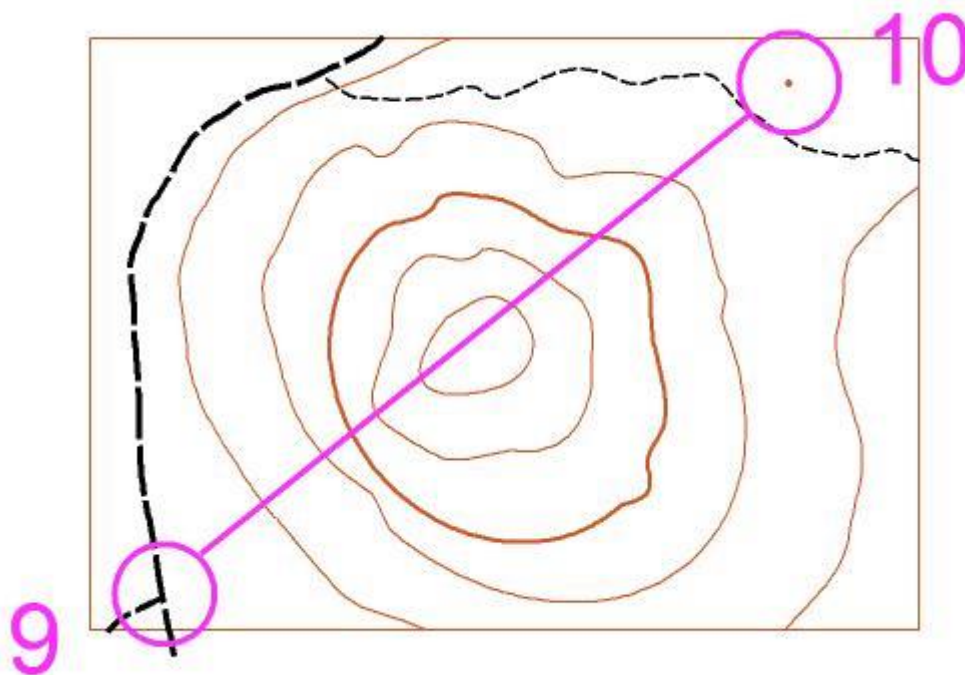
- 13. Pace-counting.** We usually count double paces,( as our distances tend to be large-ish ), so each time your, say, left foot hits the ground. Try running at normal orienteering speed round a running track - get warmed up first - counting your double paces. Then do the maths. How many of your dps to 100m? Even more useful is to learn how many of your dps to one marked 'division' on the baseplate of your compass. ( E.G. One division on my compass base-plate is 40 of my dps on a 1:10,000 map ) Now you have a good measure to estimate when to look for



a smaller path off a big one, or, with a control in the middle of nowhere, when you should start looking for the flag.

*Remember though that your pace length will vary uphill, and downhill, through thicker vegetation, and as you get tired.*

14. **Route-choice**. Where possible, the planner will try to give you one or more long legs, sometimes across most of the map. This is to give you a route choice, and deserves extra thought. There is often a long path/track run on one side of the red line, sometimes on both sides, or you can go 'cross-country', along the red line as closely as you are able. Count any contours you have to cross, going uphill, on each route. Look at the vegetation colours on the direct route. How much time might you lose navigating the red line? Are you navigating well today?



**Fig 11.** A route-choice leg

A favourite route choice is over or round: a largish hill with few paths on the direct route vs a much longer ( twice as long sometimes ) around the hill on paths/tracks. Look at Fig. 10. The choice is up and over the hill ( 25m high ), with no paths. Or round by the track then path - longer, but flat and easy to navigate. A third choice, round the hill to the east, not many would choose – no path, and relatively uncertain navigation, especially at the end. Which would you choose? Would your choice be different if the hill was 10m higher? If the steep side of the hill was on the way down? If the path route was 50% longer? If there was an indistinct path going over the hill?

15. **Relocation**. We hope you won't need to do this often! If you decide you really don't know where you are, stop. Think. Can you get back to the last place you were certain you knew where you were? Might be the last control you visited. If you can, go back, try to work out

what you've done wrong, try again. If you can't get to a point of certainty, you will need to relocate. You may also need to relocate, on a smaller scale, from a block of forest. The same technique applies:

Go out of the woods in whichever direction is likeliest to get you to a place of certainty, but this can be a place you have not visited before. Say the map shows the only large stream on the map along one edge of the map. A compass bearing that would take you there from any part of the map will get you there and you may be able to find a feature, or a combination of features, which is marked on the map. In this example, it might be a tributary, a marsh, or a bridge that will then give you certainty. Or it may be that downhill in any direction will bring you to a path going round the hill. Relocation will cost you some time, but it is worth doing it well. You don't want to have to relocate twice!

(16 and 17 are not navigation techniques, but particularly difficult errors you will sometimes make.)

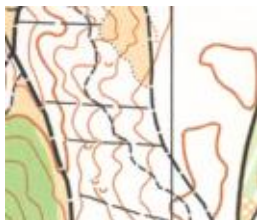
**16 Running off the map.** Not a navigation technique! But an error that does happen. Applies in large wooded areas or large open spaces, where only part is on 'today's' map.

It is possible, through lack of concentration, to go so far along a track ( esp down a slope ) that you are no longer on the area covered by the map! It usually happens when you are going fast.

Can you go back the way you've come? Otherwise, the techniques in this booklet don't really help. If you can use a compass bearing to prove that you are off the map, you are part-way to safety. For example, if the map shows a road along the north side of the whole map, you could choose a north bearing. When you have covered the maximum possible north-south distance shown by your map, and found no road, you know what must have happened. Getting back onto your map may be a case of trial and error.

**17 Parallel error.** Occasionally on a map you will find a feature or set of features duplicated nearby. If they also have the same orientation, it can be very difficult to know you have made an error. Once this is recognised, it is relatively easy to correct. If the hedge, say, doesn't have a flag at the north end, then the hedge 40m to the west will do.

*Parallel errors are not often met in the East Midlands, but a potential problem at Cannock Chase with re-entrants and spurs, in sand dune areas and in other complex-contoured areas such as the Lake District. Here is a theoretical example from Cannock Chase*



**Fig. 12**

Look at the two parallel E-W paths, on identical orientations, each going down a small re-entrant. Imagine approaching from the east, not on a path, looking perhaps for the small depression just south of the southern ( of the two ) paths. You hit the larger, north-south

path, but not exactly sure where\*, you could get on the wrong path, in the wrong re-entrant, but it would seem to fit with the map, so you must be right.....!

\*aiming-off would be a brilliant technique here, to avoid the parallel error.