

***Percy's Guide
to
12 Car Navigation***





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Introduction

- Most rally navigation is down to experience and common sense
- The target audience for the following odds and sods is those with little or no experience although the more experienced readers may discover the odd gem or gaff
- The guide will be split into the following sections
 - OS Map
 - Map References
 - Tulips
 - Herringbones
 - Spot Heights
 - Grids
 - Club Rally
 - Plot and Bash
 - Rules
 - Timing
 - Route Finding and Map Reading
 - Rallymanship
- The guide will finish off with a practice event illustrating the basic points
- Map 133 Revised August 2018 would be useful
- Most of the information in this document has been cloned from articles written by Dave Otridge of Rally Navigation Services circa 1988



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OS Map

1 Origin

The Ordnance Survey map is a transverse mercator projection and it is undoubtedly the best map available to civilians anywhere in the world. It has its main root in the Battle of Culloden Moor in 1745 – the original survey can still be seen in the British Museum in London. The one inch map appeared early in the 19th Century and the National Grid was proposed in 1938 – with great foresight, a metric grid was chosen. The change over to metric scales took place (on the maps that concern us here) in 1974-6. OS Maps are surveyed at much larger scales and reduced for production at 1:50000; this becomes significant when trying 'to read the road'.

2 Editions

When some fundamental change takes place over the whole sets of maps, such as the change to metric scale, the Series number changes. The last 1" maps were 7th Series and the interim maps, which were basically photo-enlarged 1" maps, are termed 1st Series. As the maps are gradually resurveyed and redrawn, they will appear as 2nd Series – the last of the 204 sheets was reprinted as 2nd Series in January 1988. Within a Series, various editions appear as areas are resurveyed on the normal cycle known as continuous revision. This varies from 1 – 4 years in heavily populated areas to 15 or more years or more in barren moor land and mountain areas. The Edition is shown by a letter (A, B, C etc on the bottom right of the map). Sub – Editions, that are produced to show some significant local change such as a new by-pass, appear as dashes and stars added. Dashes and stars are now being replaced by a simpler system where numbers are added to the Edition letter (eg A2 or B1). The whole set of maps was digitised in 1995 and is currently marketed as the very familiar pink covered 1:50000 Landranger Series. In February 2016 the whole Landranger Series was re-branded (new cover and price hike appeared to be the only change), map Edition letters were replaced by Revised Dates but the most significant change was in distribution to wholesalers (no refunds for out of date stock) and advertising new revisions (pre February 2016 proposed new Editions were advertised in advance post February 2016 new Revisions were advertised retrospectively).

3 The Grid

On each OS sheet (40km x 40km), a numbered grid is printed, which is common to all scales of OS maps. The grid is based on a false origin off the Cornish coast and consists of 1 kilometre squares. The numbers run from 00 to 99 and then repeat so a like numbered square reoccurs every 100km (about 62½ miles), i.e. on every third map. The grid letters, which have little use in rallying, are used to resolve this ambiguity. Have a look at the example on the side of the map, showing how to find a reference for Longmoor Fm.

This bit is fairly important – if you can't get your head round this then you're going to struggle.

Technical Information

NORTH POINTS
Difference of true north from grid north at sheet corners:
NW corner 2° 23' 142 mils W SE corner 2° 49' 150 mils W
SW corner 2° 21' 142 mils W NE corner 2° 51' 151 mils W

To plot the average direction of magnetic north join the point marked on the south edge of the sheet to the point on the protractor scale on the north edge at the angle estimated for the current year.

Magnetic north varies with place and time. The direction for the centre of the sheet is estimated at 4° 13' (75 mils) west of grid north for July 2006. Annual change is about 8" (2 mils) east. Magnetic data supplied by the British Geological Survey.

Base map constructed on Transverse Mercator Projection, Airy Spheroid, OSGB 1936 Datum. Vertical datum means sea level (Newlyn).

HOW TO GIVE A NATIONAL GRID REFERENCE TO NEAREST 100 METRES.
SAMPLE POINT: Longmoor Fm
1. Read letters identifying 100 000 metre square in which the point lies... TG
2. FIRST QUOTE EASTINGS
Locate first VERTICAL grid line to LEFT of point and read LARGE figure labeling the line either on the top or bottom margin or on the line itself... 37
Estimate tenths from grid line to point... 2
3. AND THEN QUOTE NORTHINGS
Locate first HORIZONTAL grid line BELOW point and read LARGE figure labeling the line either on the left or right margin or on the line itself... 22
Estimate tenths from grid line to point... 9
SAMPLE REFERENCE TG 372 229
For local referencing grid letters may be omitted. IGNORE the SMALLER figures of the grid number at the corner of the map. These are the British full coordinates. Use ONLY the LARGER figure of the grid number. EXAMPLE: 500000

INCIDENCE OF ADJOINING SHEETS
The red figures give the grid values of the adjoining sheet edges. The blue letters identify the 100 000 metre square.

Diagrammatic only

Series M 726
Sheet 133
Edition 7-CSSCS
© Crown Copyright

1: 50 000 scale Second Series
OS Landranger Map 133

Six figure references are the norm, they actually denote a 100 metre square but most rally organisers conveniently ignore this.

Eastings (vertical lines) are always shown first followed by Northings (horizontal lines).

The unique 100,000 metre square is denoted by TG

The unique 1,000 metre square is denoted by TG 37 22

The unique 100 metre square is denoted by TG 372 229



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Normally the reference for Longmoor Fm would be shown as
372 229

4 The Key

On the right-hand side of each OS sheet the key shows most of the symbols used on the maps. There are five different keys, Customer Information, Communications, General Information, Tourist Information and Technical Information. You would do well to familiarise yourself with all these symbols and learn by heart all those which relate to roads, tracks and footpaths.

5 Scales

The scale of the metric map used in rallying is 2cm = 1km (1:50000). This is approximately 1¼" to 1 mile. Accurate scales are given at the bottom of the map. The border up the side of the map is marked in degrees and minutes of latitude and one minute of latitude is equal to a nautical mile. Note that the longitude scale at the top and bottom is only equivalent to latitude at the equator; convergence shrinks the scale in British latitudes. There are roughly 2027 yards in a nautical mile.

6 Route Marking

You will need to mark a route onto the map. The method used will depend on how long you have to do the marking. If you receive the route several hours before the start of the rally, you can make a very neat job with tramlines. If there is less time available, such as a hectic plot and bash rally, arrows at junctions will be all that you can manage. Various combinations of these methods are used but whichever method you choose, the basic rules are:-

- Never draw lines over a road that you are going to use as you may well obscure important detail.
- Always cut off unused roads at turnings.
- Exaggerate small details (e.g. triangles)
- Never use ink for route marking as it doesn't erase too well!!
- Mark controls with an arrow at right angles to the road.

Note that the 24-hour clock is normally used and that times at each TC can be put on the map, this may save a frantic search for the time schedule during the event. Alternatively, the time allowed for each section can be shown. Another point: note that the written information at the control is on a clear patch of map and not over the detail or names of the village.

7 Fractions

The use of ½ and ¼ divisions is very common in rallying. However, in any list of references which include these divisions, it must be assumed that all the references are for points and not the 100, 50 or 25 metre squares as the theory would have it. This unwritten rule can cause some local difficulties so check with an expert navigator in your area to establish the local custom (if there is one!). Another convention which may have local differences is the matter of using roads and / or junctions more than once. As far as the RAC, and most organisers, are concerned, it is strictly forbidden. There is one common exception to this rule, when a route doubles back on itself in order to reach a refuelling stop, but normally only main roads are involved, and the instructions are given specifically.

8 Accuracy

In the days of the old 1" maps, both the grid lines and the road edges were printed in black. As long as you had an accurate Romer, the map could be relied on to give accuracies of almost a hundredth of a square (10 metres). On the 1:50000 maps however, the grid lines are printed in blue on one pass through the machine and the road edges are still black on another pass through – accuracy now relies on the colour register being perfect all over the map, a near impossibility. The register marks for each colour are shown in the corners of the grid (eg 500000, 500400, 100000, 100400) – if the six colours all coincide and are virtually invisible, you have a perfect map. But on average, with a decent Romer, you can expect an accuracy of about 25 metres.



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9 Roads

A lot more information about roads is available from the map than may seem apparent at first glance. Apart from the DOE classifications, junctions and bends which are all obvious to the layman, the map will reveal much that a rally navigator needs to know, with the addition of a little common sense and deduction – local knowledge will put the cherry on the cake, but it is not the be all and end all that many Novices imagine. Roads are classified by their colour (see the Communications Key on the right-hand side of the map).

- | | |
|---------------------|--|
| o Blue | Motorway |
| o Green | Primary Route |
| o Red | Main road |
| o Orange (or Brown) | Secondary road (also referred to as Brown) |
| o Yellow | Road |
| o White | Other road, drive or track |

The term Coloured Roads Only (CRO) means that roads shown as White on the map should be ignored; this will be explained in more detail later.



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Map References

1 Introduction

A six figure map reference is used to define a location on the OS map. Most rallies use references for part or all of their route definition and there is no point in even attempting a rally until you have mastered the basic uses of references. There are many ways of using them, some of them rather mind-boggling, but here are some of the more common uses.

2 In Order References

The simplest method of route definition utilises a list of map references; these have to be visited in the order given, unless instructions are given to the contrary. e.g. using CRO the route between a control at 143 319 and a control at 153 323 can be defined using the following list of in order references

135 328 135 340 156 340 150 333

3 Approach and Departure

References are often shown with prefixes and suffixes which give approach and departure directions. Naturally when a direction is given, it must be obeyed, or a penalty will be incurred. Directions are used by an organiser make your job more difficult, but they do considerably reduce the number of references needed to define a given route. The directions given are usually the cardinal points (N, E, S, W) and the quadrantal points (NE, SE, SW, NW) though a further eight sub-divisions are sometimes used (NNE, ENE, ESE, SSE, SSW, WSW, WNW, NNW). A decent Romer usually shows a diagram of these 16 points; if yours does not then you draw a diagram and keep it with you unless you can readily visualise SSW etc. e.g. using the example above the route between a control at 143 318 WNW and a control at NW 153 323 can also be defined using the following list of in order references:

	143 319	WNW	TC
SW	135 328	NNE	
SSW	135 340	NNE	
NW	156 340	SE	
E	150 333	W	
NW	153 323		TC

The same route can also be defined:

	143 319	WNW	TC
SSE	134 348	E	
E	145 333	SE	
NW	153 323		TC

An extra reference adds a loop:

	143 319	WNW	TC
SSE	134 348	E	
S	142 ³ / ₄ 347 ¹ / ₂	NE	GW
ESE	145 333	SE	GW
NW	153 323		TC

The abbreviations in the above table are Time Control (TC) and Give Way (GW), the fourth column is usually used to give extra information.



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The route could also be defined by giving references to ALL the coloured junctions between the two controls – this may appear harder but in practice is actually easier to plot:

	143 319	WNW	TC
ESE	130 ³ / ₄ 322 ¹ / ₄	NNE	GW
SW	136 ¹ / ₂ 333	NNE	
S	137 335 ¹ / ₂	NW	
SSE	134 348	E	
W	142 347	E	GW @ staggered crossroads
W	142 ¹ / ₂ 346 ³ / ₄	N	GW
S	142 ³ / ₄ 347 ¹ / ₂	NE	GW
WSW	149 ¹ / ₂ 348 ¹ / ₄	SE	
NW	158 335	W	
ESE	145 333	SE	GW
N	148 323 ¹ / ₂	E	
NW	153 323		TC

The route could also be defined by giving references to ALL the junctions (even though the route to be used is specified as CRO) between the two controls – this is a lot harder and will not win the organisers any friends. Also, an example of a slightly different presentation with the fractions replaced by decimals giving a ten-figure map reference (the gap splitting the ten figures is optional) and the approach and departure directions listed after the reference:

	App	Dep	Info
14300 31900		WNW	TC
14050 32125	-	-	
13550 32150	-	-	
13075 32225	ESE	NNE	GW
13650 33300	SW	NNE	
13675 33400	-	-	
13700 33550	S	NW	
13400 34800	SSE	E	
14200 34700	W	E	GW @ staggered crossroads
14250 34675	W	N	GW
14275 34750	S	NE	GW
14775 34825	-	-	
14750 34825	-	-	
14950 34825	WSW	SE	
15100 34700	-	-	
15800 33500	NW	W	
14500 33300	ESE	SE	GW
14700 33000	-	-	
14800 32350	N	E	
15300 32300	NW		TC

4 Any Order References

The use of any order map references is frowned upon in many parts of the country as it usually leads to rally cars rushing about in all directions upsetting the populace. However undesirable the method may be, you must be aware of the problem. Sometimes you will be given start and finish points. Having plotted all the points, you should count them to ensure that you have not missed one out.



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Now join them using the shortest route. Any order references have another problem in that less careful organisers allow ambiguities to creep in which does nothing for public relations and always leads to arguments and protests at the end of the rally.

5 Barred Route (Avoid References)

It is sometimes easier to define a route by listing all the points that should not be visited. Such a list must be treated as any order, even if the first few points give the appearance of leaving only one possible route. It is essential to plot accurately as some of the points may be very close to the intended route. The instructions may or may not give a finishing point; in the case of an 'open-ended' plot, the distance or time allowed may give a clue to the location of the next control. In the absence of any other info, you will have to drive the route, expecting to find the TC just before the junction where you have a route choice. A list of Avoid References will almost certainly include red herrings, just another means to waste time that should be spent driving the route to the next control.

6 Black Spots

Organisers will often give a list of Black Spots which have to be avoided for the duration of the rally. These may be to avoid institutions such as hospitals or areas which have been the subject of complaints from previous rallies. You must clearly mark these areas on your map, though taking care not to obscure any info (such as a spot height) which might be needed to plot a route card. Black spots may take the form of part or all of a grid square or radii around given points. The penalty for entering a Black Spot is Exclusion.

There is a second use of Black Spots, in a similar way to Avoid References, and the ban can normally be taken to apply only for the duration of the route card. Naturally, if you make a mistake, you will not expect to be Excluded!!

7 8-Figure References

If an organiser wants to define a location more precisely than the $\frac{1}{4}$ -tenth will allow, he may use 8-figure map references. The extra two figures are to an accuracy of 10 metres and can only be estimated with a Romer. I would suggest if you are faced with a list of 8-figure references, you plot the point roughly to the nearest 6-figure reference and then add the last two figures – this is less likely to lead to an error than trying to remember a string of 8 numbers!

Bearing in mind what has been said about the accuracy of 1:50000 maps, an 8-figure reference route card cannot be taken too literally and is really used more to cause panic and confusion amongst navigators than to define points accurately. You will probably never go wrong if you take 8-figure references to the nearest $\frac{1}{4}$ -tenth, the maximum error in doing this is 15 metres – a divider point makes a larger dot than that!

Do not confuse 8-figure reference with the 10-figure representation of a 6-figure reference including the $\frac{1}{4}$ -tenth as a decimal.

8 More Difficult Examples

So far it has been fairly straight forward, each one illustrating a basic method. On an event you will naturally expect to meet various traps for the unwary as well as variations and combinations of themes. Organisers like to penalise everyone on an event (There is no way of finding a winner if they do not do this) so at least one problem on a navigational type of event will be set to slow down the best expert in the field. This does not mean that organisers spend all their time trying to trick competitors, but some rally people will tell you that the dividing line between trickery and fair play is very thin!

9 Disguised Problems

Finally, you may come across map reference problems that have been 'dressed-up' to look like some other method of route definition. Imagine that you are at a control at a mythical spot 120455 and were given the instruction to proceed to a point 3.3km east from here and 4.9km south from here – approach South. This can easily be solved by adding 3.3E to the 120 = 153 and subtracting 4.9 from the 455 = 406. Thus, the next control is at S 153 406. Not obvious at first? Think



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about it, remembering that references represent Eastings and Northings. The hazards with this type of route card are when the distances are given from some 3rd point which may not be on the route (or even on the map) or when the distances are not in kilometres. Once again, read the instructions carefully.

10 Conclusions

It is impossible to cover all the variations of map references that you are likely to meet. The best advice (and this will become a bit of a theme) is to read the instructions carefully, understand the problem and then plot accurately – don't be careless. Remember that practice makes nearly perfect and your speed will improve, though the best navigators in the country can only achieve about 8 references a minute at a table.

11 Romer

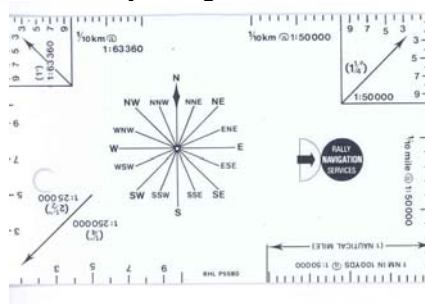
An essential bit of kit, make your own or buy one.

Don Barrow



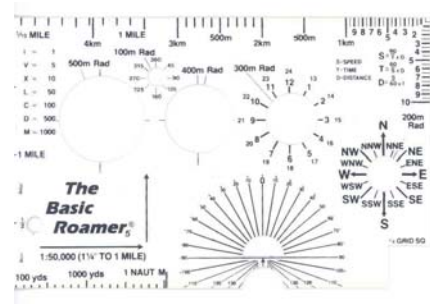
Readily available by mail order from the Don Barrow website

Rally Navigation Services



Not available although you may find one on e-bay and there is one somewhere in grid square 1479 on map 119 – I don't often get out of the car once I'm strapped in but if I do you can almost guarantee I'll lose something!

Basic Roamer



Readily available by mail order from The Basic Roamer website

I use a Don Barrow but preferred the RNS (until I lost it). I have tried a Basic Roamer but found it very flimsy – not good if you're ham-fisted. I have had problems with earlier versions of the Don Barrow when all the numbers rubbed off, but this problem seems to have been resolved.



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Tulips

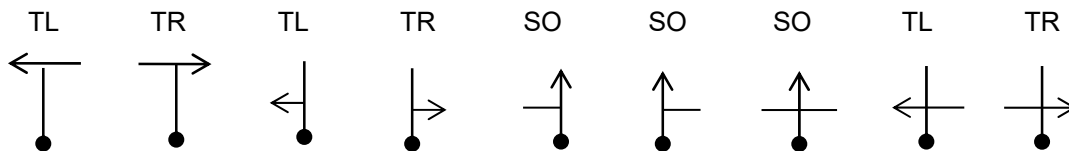
1 Introduction

Organisers are forever looking for ways and means of slowing down the navigator, so that the rally becomes a contest of crew skill rather than a mere test of driver ability. Following on from map references we will have a look at Tulips.

The tulip diagram has its origins in the Tulip Rally where the organisers needed a method of defining a route of many hundreds of miles more accurately than with a list of place names and more economically than with a list of references. With slight alterations, the method is now used extensively on International events, amongst them, our very own Welsh round of the WRC 12 Car Championship.

2 Method

In simple terms, a tulip is a diagram of a junction. Thus a 'T-junction' is shown as a large T with a ball showing the direction of approach and an arrow the departure direction. There are nine basic tulips covering the three basic junction calls:



A series of tulips will lead you from one junction to another and can be considerably quicker than plotting references. However, that statement assumes that we have found a system to make life easier but for road events the organiser's need is quite different so he will use tulips in a different way.

3 Road Book Tulips

On events like the RAC Rally where the only navigation needed is to find the way from one special stage to another, the organisers issue a Tulip Road Book (maybe with over 100 pages) which defines the whole route by a series of tulip diagrams. From each major rally control, the tulips are listed with a cumulative mileage as well as individual distances; other information such as town names and signpost directions can easily be shown. The tulips are drawn exactly as per the junction on the road (i.e. correctly orientated and showing the actual state of the junction and not that shown on the map). For example, a new motorway interchange may not yet be on the map, but it will certainly appear in the road book. There is an example on the next page of the road book prepared for the club's 2009 Midsummer Classic run.

In theory you could drive the whole route without looking at a map, but it is normal to at least plot the stage locations so that service schedules etc can be planned. You must always plot the list of stage starts and finishes provided, as it will not always be obvious from the road book where the stage finishes. Note that once on a major road, insignificant road junctions are ignored.



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Page 1		Midsummer Classic				Page 1
Distance		Tulip	Sign Post - To or Landmark @	Special Comments or Directions	Pub/Village Sign Landmark	
Inter	Total					
0.0	0.0			Set trip as you leave car park		
1.0	1.0		Level Crossing	Traffic Lights		
0.2	1.2			Traffic Lights		
0.3	1.5			A47 Scarning		
3.7	5.2				Wendling	
0.3	5.5		Longham 2 1/4	If you arrive at A47 you have gone too far		
1.1	6.6			care very sharp & narrow		
0.9	7.5			care long right into 90L care		
0.5	8.0		Beeston 1 3/4	Giveway		
2.8	10.8					
0.2	11.0		Great Dunham 1 3/4			
1.6	12.6				Great Dunham	
0.5	13.1		Castle Acre East Lexham 2		Arrow	
0.1	13.2			KESWICK		
0.4	13.6		Castle Acre	Bumpy road to PC	Arrow	
2.0	15.6			Pull in		
0.0	0.0			Zero trip		



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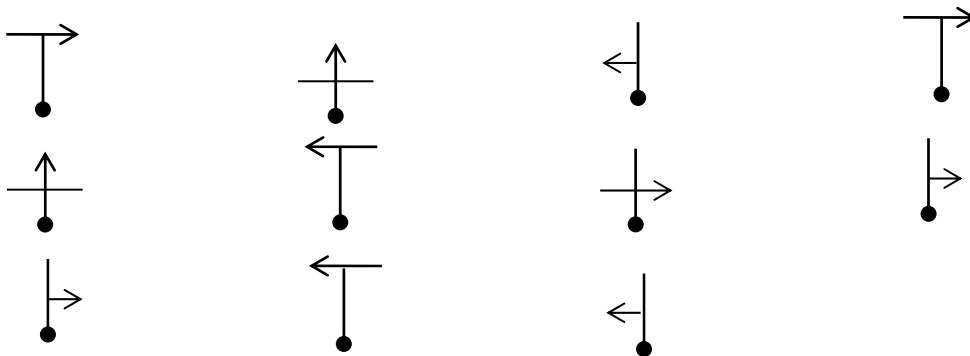
4 Club Events

The use of tulips in road rallies is normally very different as they are used to make plotting more difficult. Even the simplest route card differs in several ways from the Road Book use of tulips:

- Tulips are as map, not as road
- Distances are rarely given
- All coloured road junctions are shown and sometime whites
- Tulips are often incorrectly orientated
- Tulips are sometimes deliberately distorted
- Route information (signposts etc.) is seldom given

Back to our example, in order tulips, CRO from TC to TC:

TC @ 143 319 WNW

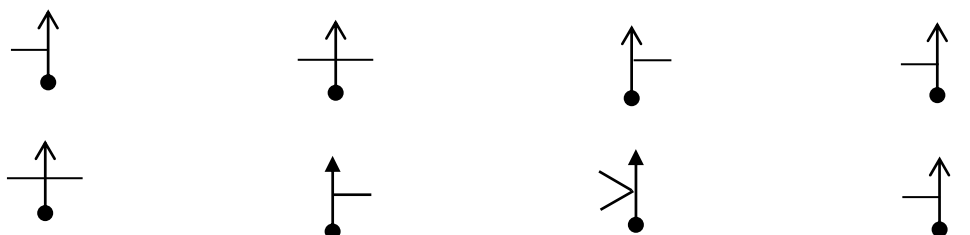


TC @ NW 153 323

5 Distortions

Organisers will sometimes deliberately distort a series of tulips to make them more difficult. Treat each tulip separately and consider whether it tells you to keep left or right at a junction; it does not matter what shape the junction or the tulip is. Alternatively, consider which direction the diagram tells you to ignore. Having decided to go left or right, look at the junction and choose a direction.

Both sets of tulips a)

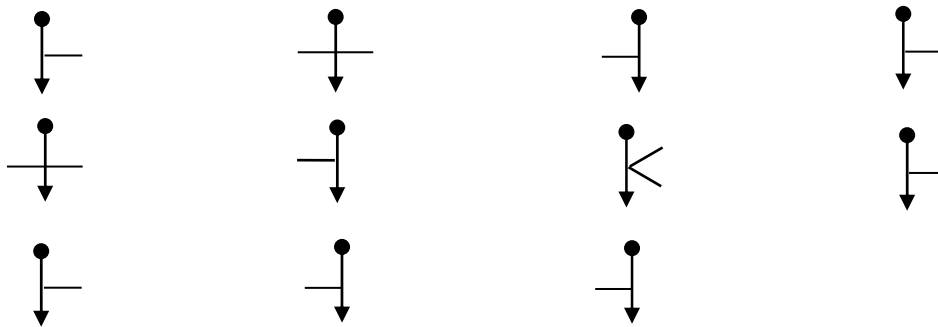




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And b)



Define the familiar route TC to TC.

I expect you found the tulips in table a) easier to plot. Expect a route card to mix up all three – the usual trick is to start off with basic ones and then include the odd distorted one.

6 Variations

Tulips may be presented in many ways, certainly too many to mention here. Some variations are listed below so that you may have an idea of the variety possible and hopefully you will not be too surprised if confronted with one.

- Tulips may or may not include white roads if the instructions do not specify then trial and error will have to be used to resolve this – sometimes white roads are shown as a broken line – but not always
- Tulips occasionally read right to left, the convention reversed
- Any order tulips are very unusual and are most difficult to define without ambiguity – however, do treat them with the utmost caution if you should be unlucky enough to come across them
- Irregular tulips (i.e. not all junctions shown) either with distances given or an instruction to take, say, every third junction
- Tulips with some or all of the balls and arrows missing – this can be easier than it sounds if all the diagrams are drawn accurately
- Mirrored tulips – fortunately extremely rare

A final point on tulips; when dealing with white roads, note that some are very small and need magnifying to decide whether they qualify as roads or not. A helpful organiser may add something along the lines of 'LOOK' to highlight an easily overlooked white. Also, when you get down to this level of detail it is essential to use the correct revision of the map.



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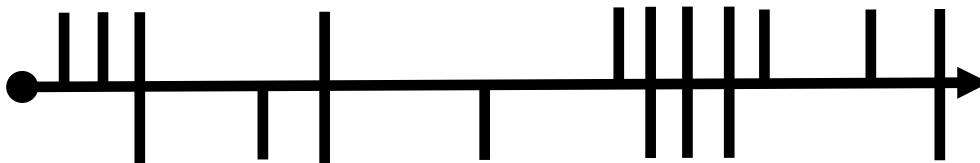
Herringbones

1 Introduction

The herringbone is sometimes known as the straight-line diagram and it is the cause of far more difficulty than it deserves. If the RAC or the AA presented you with the illustrated example below as a holiday route from west of King's Lynn to Great Yarmouth following the A47 you would no doubt cope without any difficulty?

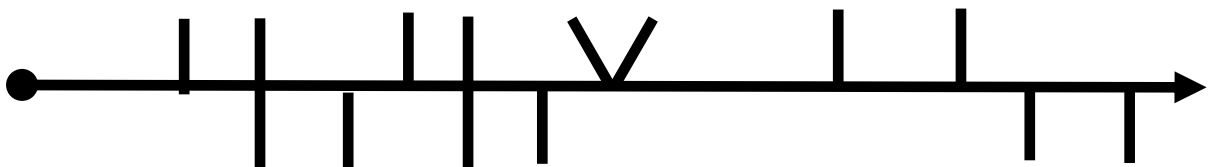


The same route can be shown diagrammatically with a straight line representing the A47 and cutting off the roads to ignore.



Conventional herringbones run from left to right – the ball and arrow are rarely shown. You may notice a similarity between a herringbone and a string of tulips.

Back to our example, compare the herringbone to the array of distorted tulips (option a).



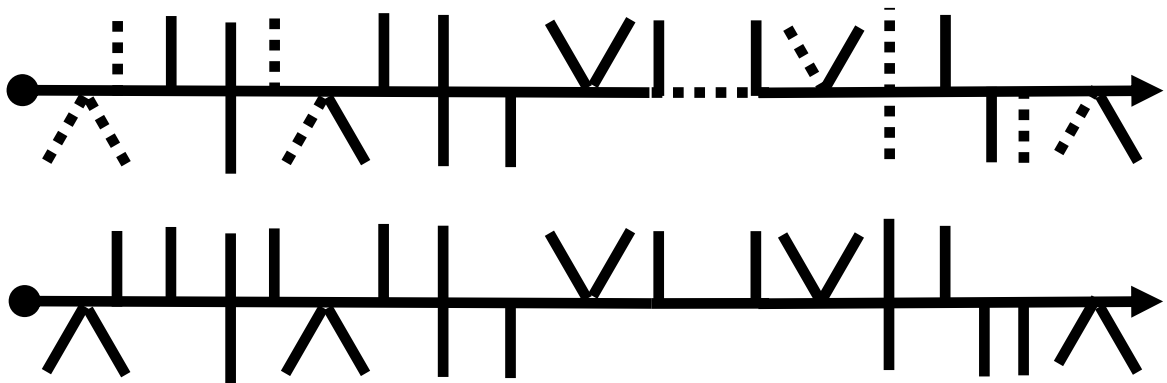


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2 Whites Included

Again, if an organiser includes whites, he may help by showing them as broken lines and there again he may not, read the instructions and if it's still not obvious then it's down to trial and error.

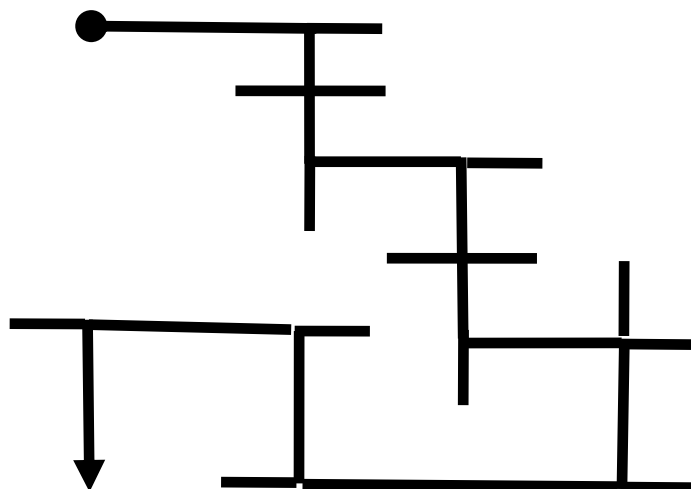
Our example again, showing ALL roads and a small diversion to illustrate the point – firstly with broken lines representing whites and secondly with solid lines for ALL roads:



3 Variations

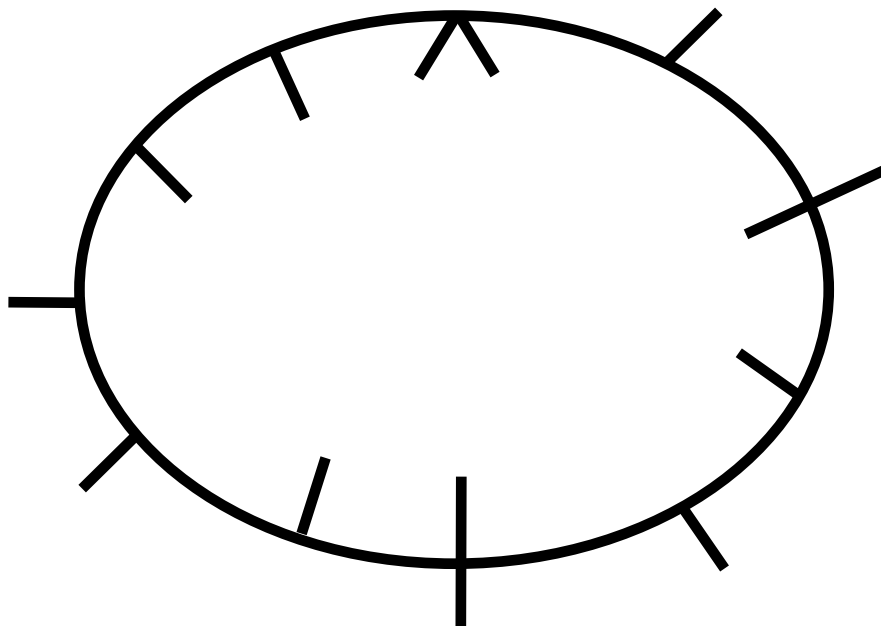
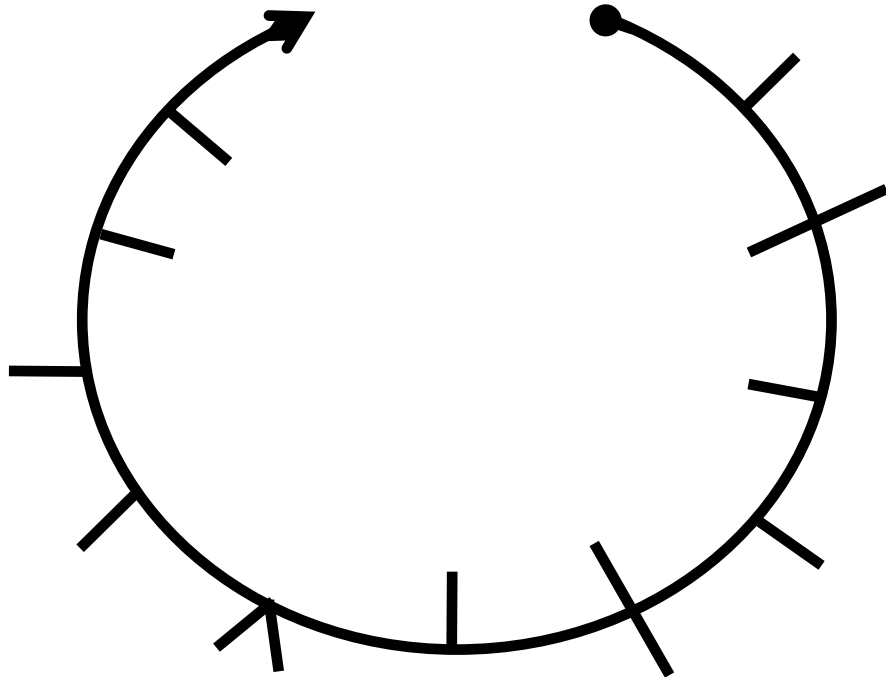
As with tulips, there are a number of variations on herringbones which organisers use to make life more difficult for the competitor. Simply failing to give any instruction will complicate any herringbone in that you must test to see if whites are included and to see if it reads left to right or the reverse. As with the distorted tulips, reading right to left is a lot harder to plot than the conventional left to right. Fortunately, the use of mirrored herringbones is most unusual.

Back to the basic (CRO) example again, with a couple of variations showing the progression to everyone's favourite – the circular herringbone:





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4 Circular Herringbone

One of the most difficult route cards that you are likely to come across is the circular



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herringbone. It is not too involved, given plenty of time and patience, but these qualities are likely to be in short supply in a rally car during an event! Bear in mind that you have not been told where to start or even which way to go around so you must have a good look for clues.

5 Herringbone Rule of Thumb

All herringbones can be tackled in a similar manner, so we can lay down a series of steps to be taken when confronted with any kind of 'bone':.

- Read the instructions carefully (if there are any!)
- Look for crossroads
- Count the junctions
- Try the convention (i.e. left to right or clockwise) without whites
- If that doesn't work, try it with whites
- Then try the reversed convention, without whites first, then with whites
- If all else fails, it's a mirror

NB If you've got to the mirror option and not solved it, you have probably made an error. This list may seem so simple as to be an insult to your intelligence, but it is intended to illustrate that much of rally navigation involves patient and methodical deciphering of the information given. A panic approach, in an effort to solve the problem quickly, usually results in a missed control and the dreaded Fail. Remember that even the top experts take a measurable amount of time to plot everything, especially circular herringbones!

6 Reversing

No, not driving backwards, though you will do plenty of that in your early days in rallying, but a solution to apparently impossible route cards. Often, when you cannot make a route card fit the available roads, it will come clear if you try to plot from the TC at the end of the section. This will obviously not always work, and the organisers may not have given the next control, but it can get you out of the mire on some occasions. Come to that, there is no harm in using any scrap of information to help solve a problem – were they giving out spectator points at the start? Obviously, these are going to be on your route, as are any rejoining points you may have been given.



Percy's Guide to 12 Car Navigation

Spot Heights

1 Introduction

For the purpose of rallying, we tend to regard all heights shown on the map as spot heights. In practice, most triangulation pillars are away from roads and can be ignored whilst most spot heights are shown on the roads.

2 Basic Use

The simplest form of spot height route card merely shows a list of spot heights with an instruction to visit them in the order given. This is comparatively easy in hilly country where the chances of two or more heights being exactly the same are slim. In areas like Lincolnshire, which are not too hilly, the majority of spot heights are the same, making such a route card difficult or even impossible.

Back to the basic example again and it is obvious that the route from TC to TC CANNOT be defined using a Spot Height route card. The three types of navigation covered so far, grid references (assuming they cover all the junctions), tulips and herringbones, are all junction specific and as such plot to show an unambiguous route from TC to TC. Spot Heights are the first of the navigation types that do not necessarily plot to show an unambiguous route, in some cases they do, in other cases they will be combined with other types of navigation and more often than not it will be left up to you to come up with the route (hopefully guided by some extra instructions i.e. shortest route).

There are two spot heights on the example route, 45 and 52. Another point worth noting, the convention on a route card is not to include 'features' at the start or finish TC. The example starts at spot height 25 and finishes at spot height 48, as a result neither would be included in the list. Another convention is that if a specific 'feature' (spot heights) defines the route then all similar 'features' (spot heights) not included on the route card should be avoided. As with Grid References, Spot Heights can also have directions of approach and / or departure. Our list could also be shown as NW 45 W and ESE 52 SE, but it's still not enough. In the example the easiest way to clarify the route card would be to include via or avoid grid references to cover the route that has no useful spot heights. The addition of two via grid references, SE 134 338 NNE and W 142½ 346¾ N, to the route card would make the route unambiguous.

3 Avoiding Spot Heights

As with references, a route can easily be defined by the listing of spot heights that should not be visited. Another convention that is used is to enclose 'features' to be avoided in brackets, as always read the instructions – if this convention is used on a specific event it should have been clarified somewhere in the accompanying documentation. Of course, the organiser will often deliberately not give you the location of the next control, in which case there is another way to tackle this problem. As the instruction forbids passing through unlisted numbers, put a cross on any turning that leads to an unlisted number and what is left will usually be the correct route. It may leave more than one route; in which case the convention is usually to pick the shortest one.



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Same start TC and finish TC as the basic example (CRO) try the two route cards (assume that you were given the locations of the start and finish controls):

SE62 W52 NNE58 ENE27 NNW38 SE43 SE45 ESE52

62N 52E 58SSW 27WSW 38SSE 43WNW 45W 52SE

Do you end up with the same route? You shouldn't, the shortest distance between 43 and 45 without any specified direction of departure is to depart 43 to the NNW.

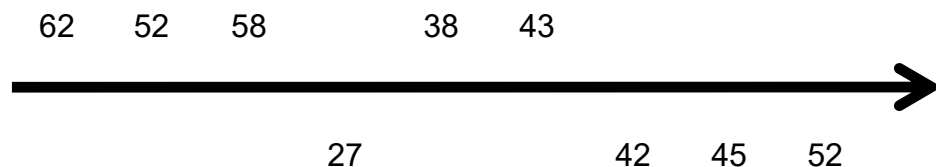
Or how about, one extra spot height adds quite a large loop to catch out the unwary.

62 52 58 27 38 43 42 45 52

4 Variations

There are fewer variations with Spot Heights than with other navigational methods:

- Any order – very difficult and rather rare. If the section covers, say, 6 miles, you could be inspecting an area of 200 square kilometres for that elusive Spot Height.
- The numbers could be written in a string without any spaces e.g. from above 625258273843424552. This is not too much of a problem subject to two factors; that you are able to recognise the list as spot heights if you are not told and secondly, that the area does not have an average height of around 10 or 100 metres; in this case the groups of numbers are not so easily separated
- Even more involved is the summing of digits in each spot height. Once you have spotted the 'method', it is just a case of resolving the ambiguities e.g. again from above 8 7 13 9 11 7 6 9 7. Mind boggling enough. How about running them together? 87139117697
- You will occasionally meet a variation of avoiding Spot Heights as shown below; the centre line implies passing through the top line of Spot Heights on your left and the bottom on your right.





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Grid Squares

1 Introduction

A route card can be defined by listing the squares or parts of squares which should not be entered (i.e. Black Spots). The reverse can easily define a route.

2 Basic Use

The simplest form of route card merely shows a list of grid squares with an instruction to visit them in the order given.

Back to the example, even the very basic example from TC to TC cannot be defined using Grid Squares, the shortest route through grid square 1334 is not the one required, it is also impossible to describe the correct route around the complicated yellow junction in the top left corner of grid square 1434. For future reference, the usual convention for referencing parts of grid squares are NE $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, NW $\frac{1}{4}$, N $\frac{1}{2}$, E $\frac{1}{2}$, S $\frac{1}{2}$ and W $\frac{1}{2}$.

The route from TC to TC would be shown as:

1432 1332 1333 1334 1434 1534 1533 1433 1432

NB the start and finish 'features' are NOT included in the list.

The addition of two avoid references to the route card would give you the correct route.

Take the shortest route passing through the following in order grid squares:

1432 1332 1333 1334 1434 1534 1533 1433 1432

Avoiding 138 340 and 142 $\frac{1}{4}$ 347 $\frac{1}{4}$.

Take care plotting the second reference, as a rule of thumb on a route card like this an avoid reference is included to divert you from the obvious route.

3 Any Order

A bit trickier but again read the instructions and be patient, though it does mean that must plot all the squares before moving, especially if you have not been given the location of the finish control.

Back to the example, convention usually has the list in numerical sequence, and it is unusual to see the same number listed twice, if you are required to visit a grid square twice then it will usually be shown with x2 etc.

Take the shortest route passing through the following grid squares:

1332 1333 1334 1432x2 1433 1434 1533 1534

Avoiding 138 340 and 142 $\frac{1}{4}$ 347 $\frac{1}{4}$.

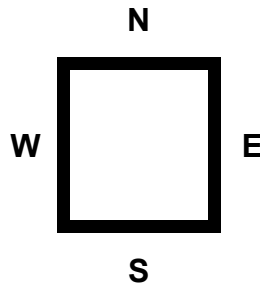


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4 Directions

Another common variation is to replace the list of grid squares with a list of directions, usually departure, but there is no reason why they can't be entry, but it will one or the other – NEVER a combination.

Assign a direction to each side of the square



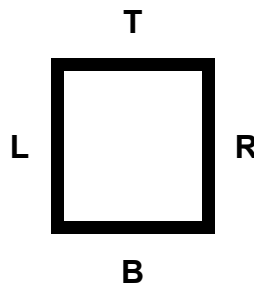
Back to the example, it still needs the avoid references to define the 'required' route, this is one example of navigation that WILL include the 'feature' containing the start TC and finish TC.

Take the shortest route departing consecutive grid squares

N W N N E E S W S E

Avoiding 138 340 and 142¼ 347¼.

A common variation:



Take the shortest route departing consecutive grid squares

T L T T R R B L B R

Avoiding 138 340 and 142¼ 347¼.

NB not all organisers will give you the explanation, all you will get is a list of letters.

Another version of the departure directions is to use the direction of travel on the road leaving the square

NW WNW NE NNE ESE SE SE W S E

Avoiding 138 340 and 142¼ 347¼.

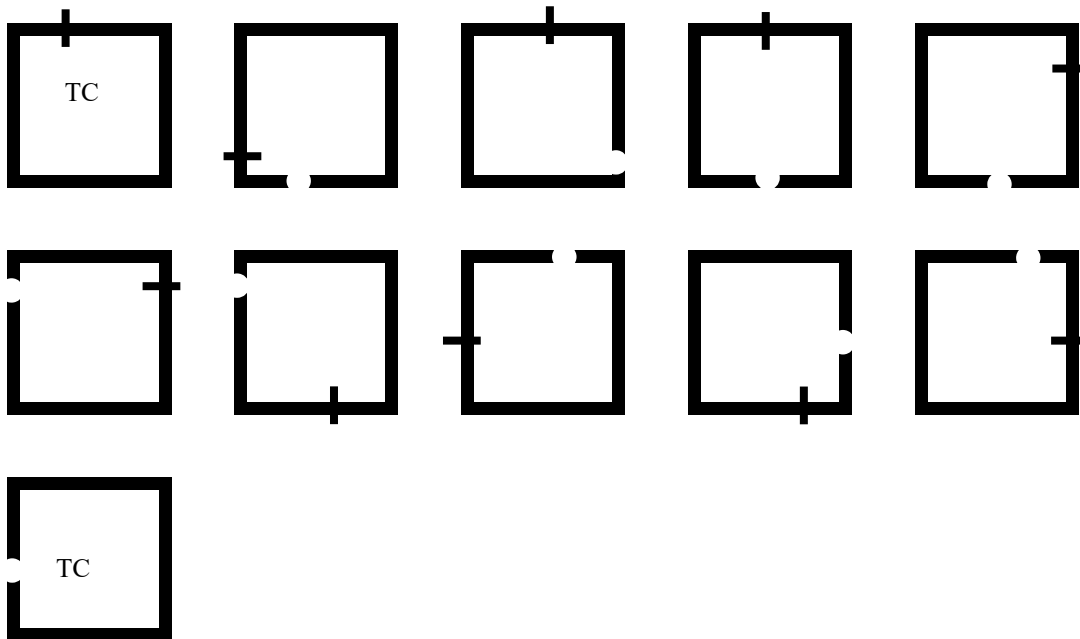
:



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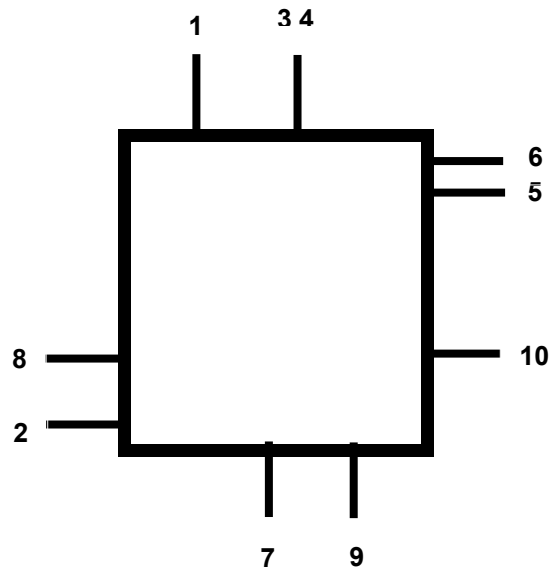
5 Variations

A list of squares with the point of entry and departure illustrated, very difficult to describe, far easier to illustrate with an example. NB notice that only one of the avoid references is required in this example. An alternative to the avoid references could be the instruction to use the longest route available in the third and fourth grid squares passed through, but this can also be quite confusing as it is not always obvious which is the first grid square passed through



Avoiding 142¼ 347¼

Or using ONE square showing ALL departure points, numbered.



Avoiding 142¼ 347¼



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Grid Lines

1 Introduction

The simplest use of Grid Lines is easy; merely having to cross successive lines in the order listed, using the shortest route across each square. Organisers will try to avoid using Grid Lines where the road only partly crosses the line.

2 Basic Use

Back to the example, again the very basic example from TC to TC cannot be defined using only Grid Lines, it needs the two avoid references.

The route from TC to TC would be shown as:

32 14 33 34 14 15 34 15 33 15

Avoiding 138 340 and 142¼ 347¼.

Take care plotting the second reference, as a rule of thumb on a route card like this an avoid reference is included to divert you from the obvious route.

3 Any Order

A lot trickier, but again read the instructions and be patient, though it does mean that must plot all the lines before moving, especially if you have not been given the location of the finish control.

Back to the example, convention usually has the list in numerical sequence, and it is unusual to see the same number listed twice, if you are required to cross a grid line twice then it will usually be shown with x2 etc.

Take the shortest route passing through the following grid lines:

14x2 15x3 32 33x2 34x2

Avoiding 138 340 and 142¼ 347¼.

4 Variations

Limited, perhaps running all the numbers together is about it.

The route from TC to TC would be shown as:-

32143334141534153315

Avoiding 138 340 and 142¼ 347¼.



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Junction Colours

1 Introduction

One of the simplest types of navigation, in theory, but well up there with circular herringbones for difficulty in plotting all but the simplest route cards. All roads on the map are coloured Blue, Green, Red, Brown (or Orange), Yellow, White so every junction on a route card can be described by the road colours forming the junction. These colours are usually truncated to their first letter so we end up with B, G, R, B, Y and W. The difficulty comes from the convention used. Consider the crossroads in Grid Square 2336 – A149 / B1436 / Yellow – approach on the Yellow / depart on the A149 towards Cromer). Possibilities are left to right in order of grade (RRBY), first letter for the road colour you enter the junction on and the last letter the road colour you leave the junction on (YRBR), first letter for the road colour you enter on and then the road colours as they appear clockwise (or anti-clockwise) (YRBR). It is obvious that although every junction is defined the required route has to be derived by considering the next plot, or plots, in the sequence. A helpful organiser may help by distinguishing between the two types of Yellow road shown on the map (very simply Y for the fat Yellows and y for the skinny Yellows – trust me a string of YYY and YYYY junctions is an absolute nightmare to plot, even when separated by a space). Most organisers will use the first in last out convention, hopefully. Consider a lay-by, organisers like to put code boards in a lay-by, using the first in last out the two instructions YWY YWY would NOT pass through the lay-by but YYW WYY would pass through the lay-by.

2 Basic Use

Back to the example, again the very basic example from TC to TC, even though every junction is included on the route card it is NOT always possible to define the route without ambiguity, organisers need to be very careful when using this type of route card.

Using the first in last out convention, the route from TC to TC would be shown as:-

YYY YYYY YYY YYY YYYY YYY YYYY YYY YYY YYY YYY

String them all together and it becomes impossible:

YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY

Even adding the fat and skinny convention its still mission impossible:

yYYYYyyYYYYyyYYYYyyyyyyYYYYYyyyyyyyyyy

But add some whites and it becomes manageable:

yWWy yWy yYY YyyY YWY YWY yYY YYYy yyy
yYYY YWY YWY YYWy yWWy yyy yyy yWy yWyy

Or even:

yWWyyWyyYYYYyyYYWYYYWyyYYYYYyyyy
yYYYYWYYWYYYWyyWWyyyyyyyyyWyyWyy

3 Variations

Limited, perhaps running all the letters together is about it.



Percy's Guide to 12 Car Navigation

Junction Instructions

1 Introduction

One of the simplest types of navigation, in theory and practice. Simplicity itself, what to do at each junction, turn right, turn left or go straight on. Basically a 'verbal' tulip or bone from a herringbone.

2 Basic Use

Back to the example, again the very basic example from TC to TC, even though every junction is included on the route card it SHOULD always be possible to define the route without ambiguity.

The route from TC to TC would be shown as:

TL SO TL TR SO TL TR TR TR TL TL

3 Variations

Not too many apart from the obvious one of running all the letters together.

Expanding the list of instructions from the 3 basic ones to make the instruction describe the junction in more detail:

TR RX RT FR HR TL LX LT FL HL SO SOX

The instructions above define no particular route:

TR	Turn Right
RX	Turn Right at Crossroads
RT	Turn Right at T Junction
FR	Fork Right
HR	Turn Hairpin Right
TL	Turn Left
LX	Turn Left at Crossroads
LT	Turn Left at T Junction
FL	Fork Left
HL	Turn Hairpin Left
SO	Straight On
SOX	Straight On at Crossroads

Under certain circumstances routes with no crossroads can be shown using only two instructions:

ML (miss a road on the left)

MR (miss a road on the right)



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Junction Directions

1 Introduction

A combination of the Grid Square departure (enter) direction and the junction colour methods. Two directions for each junction, usual convention is to arrive at the junction from the first direction and depart from the junction in the second direction.

2 Basic Use

Back to the example, as every junction is defined very specifically this method will give you an unambiguous route TC to TC. Beware, the interpretation of direction will vary from organiser to organiser, it is good practice to consider the previous and subsequent instructions, just to make sure that you are singing from the organiser's hymn sheet.

The route from TC to TC would be shown as:

ESE	NNE	SW	NNE	S	NW
SSE	E	WNW	ESE	W	NNW
SSE	NE	WSW	SE	NW	W
ESE	SE	N	E		

3 Variations

One or two available, although running all the letters together is very difficult and unusual.

Sometimes only the departure (or enter) direction is given:

Depart consecutive junctions in the direction shown from TC to TC:

NNE	NNE	NW
E	ESE	NNW
NE	SE	W
SE	E	

Or every alternate departure (or enter) direction is given:

Depart alternate junctions in the direction shown from TC to TC:

NNE		NW
	ESE	
NE		W
	E	



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4 Clock Face

Another variation is to describe the arrival and departure directions as though they were times on a clock, usual convention is to arrive from the hours and depart on the minutes. Below is a table showing the approximate relation between compass directions and the clock face.

Direction	Hours (12)	Hours (24)	Minutes
NNE	01	13	05
ENE	02	14	10
E	03	15	15
ESE	04	16	20
SSE	05	17	25
S	06	18	30
SSW	07	19	35
WSW	08	20	40
W	09	21	45
WNW	10	22	50
NNW	11	23	55
N	12	24	00

Obviously only an approximation but it does work, the minutes may not be shown as multiples of 5, but don't worry.

The route from TC to TC would be shown as:

03:05	07:05	06:50
05:15	09:15	09:00
06:10	09:25	10:45
03:25	12:15	

Or on the 24-hour clock:

15:05	19:05	18:50
17:15	21:15	21:00
18:10	21:25	22:45
15:25	24:15	

NOTE: the table at the top of the page is only an approximation.



Percy's Guide to 12 Car Navigation

Variations

1 Introduction

The examples below are moving towards Table Top territory but you may come across some of the route cards in their simplest form.

2 Combinations

Any route card which consists of a list of numbers (map refs, grid lines, spot heights, etc.) can be combined into a single string. Though this may look difficult, it can still be tackled in a logical way. The usual combination is grid lines and spot heights, with an occasional grid reference included to keep you on your toes.

Back to the basic example:

321433341343451414334715344515523315

3 Roman Numerals

Any route card which consists of a list of numbers (map refs, grid lines, spot heights, etc.) can be shown with the numbers represented by Roman Numerals. It would be almost impossible to decode the string if each number was 'coded', even if the numerals are strung together the numbers decoded would be the actual value of the spot height, grid line etc with the grid references split into two.

Example from above:

XXXII XIV XXXIII XXXIV CXXXIV CCCXLV XIV

CXLIII CCCXLVII XV XXXIV XLV XV LII XXXIII XV

4 Substitution

Almost any route card can be represented by simple substitution; either replacing numbers with letters or vice-versa:

Simple substitution:

A==1 B==2 Z==26

Reverse substitution:

Z==1 Y==2 A==26

Key substitution: pick a 10-letter word as the key, a good local example would be.

S C U L T H O R P E

S==0 C==1 E==9 or S==1 C==2 E==0



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Basic example – three different route cards from earlier – can you pick them, one with key substitution, one with simple substitution and one with reverse substitution:

LUCTLLLTCCLTLTHCTCTLLTRCHLTTHCHHULLCH

20121915201220181915201220182018201820122012

61566992315239



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Motorsport UK

1 Introduction

New for the 2020 revision, a summary of recent changes to the sport's governing body.

2 History

Rallying is governed by the portion of the law known as the Motor Vehicles (Competitions and Trails) Regulations. As a competitor, this is of little consequence to you as any event that you enter should conform to the law. Control of all FIA recognised motor sport in this country comes under the RAC Motor Sports Association. Annually, the RAC Motor Sports Association publishes the Motor Sports Yearbook (known universally as the 'Blue Book') which contains the rules governing all forms of 4-wheeled motor sport. In late 2018 the RAC Motor Sports Association was re-branded as Motorsport UK. In late 2019 Motorsport UK licences and permits were re-structured.

3 Pre 2020 Licences & Permits

Taken from the 2019 Blue Book:

3.1 Competition Licences & Fees

3.1.1 Rally Non-Race

3.1.1.1 National B £46

3.1.1.2 Clubman £29

3.2 Permits & Fees

	Clubmans	National B
--	----------	------------

3.2.1 Road Rally

3.2.1.1 Road Timed	£21.45	£22.15
--------------------	--------	--------

3.2.1.2 Road	£8.25	£8.95
--------------	-------	-------

3.2.1.3 Navigation	£8.25	£8.95
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3.2.1.4 * Navigational Scatter

3.2.1.5 * 12 Car Rally

3.2.1.6 Endurance Road	£8.25	£8.95
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3.2.1.7 Targa Road	£8.25	£8.95
--------------------	-------	-------

3.2.1.8 Historic Road	£8.25	£8.95
-----------------------	-------	-------

3.3 Fees per entry apart from those marked * which run under a COE event fee of £26 (see para 6)

4 2020 Licences & Permits

Taken from the 2020 Blue Book

4.1 Competition Licences & Fees

4.1.1 RS

4.1.1.1 Interclub £69

4.1.1.2 Clubman FOC

4.2 Permits & Fees

	Clubmans	Interclub
--	----------	-----------

4.2.1 Road Rally

4.2.1.1 Road Timed	£26.45	£27.15
--------------------	--------	--------

4.2.1.2 Road	£13.25	£13.95
--------------	--------	--------

4.2.1.3 Navigation	£13.25	£13.95
--------------------	--------	--------

4.2.1.4 * Navigational Scatter

4.2.1.5 * 12 Car Rally



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4.2.1.6 Endurance Road	£13.25	£13.95
4.2.1.7 Targa Road	£13.25	£13.95
4.2.1.8 Historic Road	£13.25	£13.95

4.3 Fees per entry apart from those marked * which run under a COE event fee of £27 (see para 6)

5 Is this of any relevance?

Well yes, before 2020 all that was required to compete on a 12 Car was that both driver and navigator held a valid club card from a MSA recognised Motor Club (either the organising club or one of the invited clubs listed in the event ASRs), from 2020 onwards to compete on a 12 Car both driver and navigator must hold a valid card from a Motorsport UK recognised Motor Club plus both driver and navigator must hold as a minimum a valid Motorsport UK RS Clubman licence. Plus, the original version was written in 2009 and an odd reference to how things were then may slip through.

6 Certificate of Exemption (COE)

A 12 Car Rally runs under a special permit which greatly reduces the entry fee. Very simply for a COE the fee paid to Motorsport UK in 2020 is £27 so for a full entry of 12 the cost per entry is £2.25 – the COE fee is paid up front when the permit is applied for and is non-refundable. For a Road Rally (Road) / Navigation with 12 entries running under a Clubmans permit the fee paid to Motorsport UK is £159.00 and under an Interclub permit the fee paid to Motorsport UK is £167.40. For a Road Rally (Road Timed) with 12 entries running under a Clubmans permit the fee paid to Motorsport UK is £317.40 and under an Interclub permit the fee paid to Motorsport UK is £325.80. This is a very simple over view, other permit fees apply to non-COE events.

7 20 / 20 Road Rally

There is also a mythical event type (mentioned here and there in the Blue Book but only in passing) which allegedly fills the gap between 12 Car and Road Rally – again overly simplified it is restricted to 20 cars running under a Clubmans Navigation permit with the associated permit fees.



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Club Rally Format

1 Introduction

So far, we have concentrated on methods of putting a rally route onto a map; now we turn our attention to the format of events that you meet on any road rally that you attempt.

2 Types of Event

There are two types of event that you may be interested in.

- Navigation
- Road Rally

The differences between Navigation and Road Rally are fairly subtle and not worth going into here, Road Timed sections timed to the second allowed, Road sections timed to second NOT allowed, Endurance Road and Targa Road and Historic Road are out of scope.

The event will be run under one of two permits:

- Clubmans
- Interclub

A 12 Car Rally is a Navigation event run under a Clubmans COE permit – crews MUST hold a minimum of a Motorsport UK RS Clubman licence and MUST be members of the Organising Club (or one of a maximum of fifteen invited clubs as listed in the ASRs).

The next step up is a Navigation or Road Rally event run under a Clubmans permit - crews MUST hold a minimum of a Motorsport UK RS Clubman licence and MUST be members of the Organising Club (or one of a maximum of fifteen invited clubs as listed in the ASRs).

The top step is an event run under an Interclub permit, as well as a club membership card from either the Organising Club (or one of the invited clubs; 45 clubs may be invited or any number of Registered Championships and four Regional Associations and / or Recognised Groups as listed in the ASRs) both crew members must have hold a minimum of a Motorsport RS Interclub licence.

3 Regulations

Full details of an event are given in the Additional Supplementary Regulations (ASRs or Regs. for short) which appear roughly six weeks before an event. For a local club event then they will be available from the club, or for an event further afield then they should be available from your club's Competition Secretary or from the Organising Club direct.

The ASRs will define the type of event, rules under which the rally will run, map(s) required, start and finish venue, time table and officials.

4 Entry Form

The next step is to fill in the Entry Form and send it to the event Entries Secretary (with the entry fee). The Entry Form will be found in the ASRs, it is important to fill in as much information as possible on the Entry Form; incomplete sections irritate event organisers (and may send your entry to the bottom of the list); the most important bits are Driver Name, Navigator Name, Class Entered and Car Details. It is also useful to include at least one address to allow the organisers to send information (most events that do not rely on the internet for communication will expect you to provide 3 address labels for entry receipt, finals and results).



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The Entry Form may also offer the opportunity to take up any Event Insurance Cover arranged by the Organisers. Most private car insurance policies do not cover rallies, the onus for third party insurance cover rests 100% with the driver, companies such as Jelf and Richard Egger will provide blanket cover for a rally (currently £17.50 per 12 car from Jelf); this does not cover damage to your pride and joy but does cover any damage you do to a third party. Depending on your age and car several insurance companies will extend your private car insurance policy to include rallies (for a small extra premium), this is a far cheaper option if you intend to do several events e.g. a 6 round 12 car championship will cost you £105 through Jelf, worth asking around to find out what other crews do.

5 Class

Road rallies are seeded by class, the class based on the crews (usually navigator) experience. The number of classes and class rules vary from event to event but will be detailed in the ASRs. There are two main class structures – 4 class (1 – Master, 2 – Expert, 3 – Semi-Expert, 4 – Novice) and 3 class (1 – Expert, 2 – Semi Expert, 3 – Novice).

For a 12 Car the organisers usually allow the crews to pick their own class. For higher status events class is based on previous results, current Interclub rules follow the general rules of Class 1 Master for a crew where either member has finished 1st o/a on an Interclub / Nat B event, Class 2 Expert for a crew where either member has finished in the top 5 on an Interclub / Nat B event, Class 3 Semi-Expert for a crew where either member has finished in the top 15 on an Interclub / Nat B event, Class 4 Novice everyone else.

The running order for an event is arranged in class order with seeding within a class allocated by the organising team based on a crew's previous results.

6 Preparation

As a navigator you will need to have sorted out your office and should have the following to hand:

- Maps (listed in the ASRs)
- Map Board
- Romer (including 4 or 5 feet of string to hang it around your neck)
- Car map reading light (home made or commercial)
- Map Magnifier / Poti
- Torch (head torch preferably)
- Clipboard (for time card)
- Digital Clock
- Assortment of pencils (2B / 4B), pens, rubbers and pencil sharpener
- ASRs
- Finals
- Blue Book



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7 Start

The ASRs or Finals will give details of where and when to report. You should try to comply with the organiser's instructions; there are enough problems at the rally start without adding to them! The procedure varies from event to event but will roughly follow this pattern:

- o Noise Test
- o Scrutineering
- o Parking
- o Signing-On
- o Start

Noise Test: A check that the car is not too noisy – the higher the status of the event the stricter the rules. You will probably pick up a Process Card at the Noise Test; this will be signed by the Noise Test Official when you pass.

Scrutineering: A check that the car is safe and legal - the higher the status of the event the stricter the rules. Mandatory items at all levels are a proof of tax, a red warning triangle, road legal tyres and a full set of working electrics (lights, indicators, wipers etc.). The Scrutineer will sign your Process Card when you pass.

Parking: Usually the Noise Test and Scrutineering will not have been carried out at the start venue, you may be allocated a specific parking spot or it may be a free for all – depends on numbers and available space, as always follow the organisers instructions.

Signing-On: Collection of Time Cards, Route Information, Extra Finals etc. There will probably be two signing-on areas, one for competitors and one for marshals. Find the correct one and follow the process – usually in the order hand in your Process Card; show membership cards / licences; fill in the bits you missed out on the Entry Form (this does irritate organisers); both crew members sign on (Motorsport UK sheet); driver sign on (Insurance sheet); collect rally pack. There should also be a clock showing official rally time, set your digital clock to the same time. There will also be an Official Notice Board, look at this and note any amendments.

Start: The precise sequence at a Start will depend largely on the style of rally; if it is highly navigational, little route information will be issued whereas an event biased towards the drivers talents may well issue details of the whole route up to two hours before the start. You must utilise the time available to the full, plot everything you are given plus any 'gen' you can glean (e.g. spectator information). Whatever the style of the event you will start in numerical order at one-minute intervals.



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8 Competitive and Non-Competitive Sections

Most road rallies are run in areas where concentrations of houses are too great to allow cars to be driven flat out all night. The Organiser will get around this by splitting the route into competitive and non-competitive sections, lowering the average speed in built-up or sensitive areas. These slower sections are also known as Neutral Sections. Some very easy (e.g. very straight) competitive sections may also be set at a lower average speed to enable crews to regain time lost, usually known as Transport Sections.

Time for some definitions taken directly from the Blue Book (2020 edition):

Section Rallying R:

Types of Section

10.1. The following terminology and restrictions apply to all Rally sections.

10.1.1. No other title or description will be valid.

10.1.2. No section will have a Flying Finish time control.

10.1.3. No section will have any award for Competitors who equal or improve upon the section time schedules or record the fastest times or least penalties on any sections.

10.1.4. At the start of any Section or Special Test held in whole or in part on private property the organisers must provide a Medium Spill Kit.

Standard Sections

10.2. A Standard Section may not use the same stretch of road more than once, nor include any intermediate Time Controls.

Where a Standard Section is timed to the second it must not:

(i) Pass through any area that has more than 20 occupied dwellings within 300m radius of the route, unless written agreement is given by all the householders within that area and Motorsport UK has given its permission.

(ii) Join or cross any A-class road (except where there is a manned control at which competitors must stop at the junction) or start on or use an A-class road for more than 200m continuously.

(iii) Start the first car before 23.59hrs, and the last car, including any lateness, must finish 1/2 hour before sunrise.

(iv) Include any area or point where competitors are required to observe special restrictions as to their driving behaviour, except for observing signs warning of natural hazards. Quiet Zones or other restrictions are specifically forbidden.

10.2.1. Organisers may erect signs warning of natural hazards.

10.2.2. Standard Sections must not include any road with a 30 or 40mph limit without the express permission of the RLO.

10.2.3. Standard Sections must not require competitors to average more than 30mph.

10.2.4. If timed to less than a minute, Standard Sections must not use any private property, other than Footpaths and Bridleways and Restricted Byways, for which approval has been granted by the landowner and the Highway Authority.

Neutral Sections

10.3. A Neutral Section must be used to take competitors through a PR-sensitive or densely populated area.

10.3.1. It must be completed by Competitors without the use of auxiliary lighting, except as permitted by law in conditions of poor visibility. Organisers must remind Competitors of this requirement in their SRs.

10.3.2. Neutral Sections must not:

(a) Be timed to less than one minute.

(b) Permit Competitors to make up time on the public road.

(c) Have any lateness penalty applied, except for Maximum Lateness.

(d) Have an average speed of more than 20mph, except on M, A or B-class roads.



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Regularity Sections

10.4. *The locations of the Start and Finish of Regularity Sections must be given to Competitors in advance.

10.4.1. Each Regularity Section must contain at least one Intermediate Time Control, the location of which must not be given to Competitors in advance.

10.4.2. Competitors must be advised in writing before entering such a section whether they are required to stop at Intermediate Time Controls, which should be identified by a control board.

10.4.3. Adherence to the time schedule in a Regularity Section will be assessed by comparing the time of arrival at any Intermediate Time Control or the Finish Time Control with the time of arrival at the immediate preceding Time Control. Timing, whether or not the car is required to stop, will be at the moment of the car entering the Time Control area.

10.4.4. Penalties (which must be specified in the SRs) will be imposed for stopping within sight of but outside the control area of any Intermediate Time Control and the Finish Time Control.

10.4.5. Competitors will not be required to maintain an average speed in excess of 30mph.

10.4.6. May only be included in the following rallies as defined by Permit: Historic Road, Endurance Road, Targa Road, Navigation, Veteran, Vintage and Economy.

10.4.7. Consistency Test. May only be run under a Historic Road Rally Permit and at a venue with a current Motorsport UK Track Licence. Written Motorsport UK approval must be obtained for any Consistency Tests by submitting detailed diagrams and written explanations of their format and finishing procedures, before the event.

Transport Sections

10.5. A Transport Section is used to transport Competitors between other types of section where the route is not PR sensitive or densely populated.

10.5.1. These Sections must not be timed to less than one minute nor less than four miles in length and must not have any lateness penalty applied, other than for maximum lateness.

10.5.2. They must comply with 12.7.

10.5.3. If using roads where a 30mph or 40mph limit is in force, a lower average speed must be imposed depending on the proportion of restricted roads in the section.

Special Tests

10.6. Written Motorsport UK approval must be obtained for any Special Tests by submitting detailed diagrams and written explanations of their format and finishing procedures, before the event.

10.6.1. These tests must be designed so that no Competitor can be expected to exceed an average speed of 30mph (40mph for Endurance Road Rallies).

10.6.2. No benefit must accrue to any Competitor who exceeds this speed.

10.6.3. Test finishes must be arranged so that there can be no possibility of a Competitor completing a test whilst a previous Competitor blocks the Finish.

10.6.4. Flying finishes are not Permitted.

10.6.5. Vehicles must comply with 18 or 19 as appropriate or 20 for Endurance Road Rallies.

10.6.6. Passengers may not be carried in the rear seats of open cars.

10.6.7. Rallies with Special Tests may not permit vehicles of commercial type, such as vans/pickups (J5.20.6).



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9 Controls

A control is normally an area of radius 50 yards around the point at which the marshal is operating. The point of entry into the control on the correct route is normally marked with a Control Board. Passing the board constitutes entering the control and the marshal can then penalise you for wrong direction of approach. There are often other offences given in the ASRs in relation to controls, such as a ban on reversing, turning round or passing through more than once, all of which help penalise those not following the correct route.

More from the Blue Book (2020 edition):

Section Rallying R:

Controls

11.1. Controls, checks and test sites must open at least 15 minutes before the due time of arrival of the first car, and close 30 minutes after the due time of arrival of the last car, unless the SRs specify otherwise.

11.1.1. *The SRs will specify what penalties will be applied for stopping within sight of any control and for early or late arrival at any control on a Regularity Section.

11.1.2. If at any control or check due to be operated by Officials, the Officials are not present during the whole period when the competitors may report, all performances at that point will be ignored in compiling the results (except as provided for in 8.5).

11.1.3. All performances will also be ignored if a control or check is not sited at the location specified in Official documents

11.1.4. The onus of ensuring that all the information required is clearly and legibly recorded at the appropriate time and place rests with the competitor.

11.1.5. Should any entry on a Time Card not be legible or not appear authentic, it can be considered not to have been made.

11.1.6. Organisers must refer to Marshals' check sheets in case of doubt.

11.2.1. If there is a discrepancy between the time allowance shown by the Organisers on a Time Card and that shown on any other document, the Time Card value will be taken to be correct, unless previously amended in an official bulletin.

11.2.2. It is an offence for any Competitor to continue in an event until the information required by 2.3.2 is provided.

Types of Control or Check

Route Check

11.3. An unmanned check to prove a Competitor's adherence to the correct route.

11.3.1. Proof of passage will entail the Competitor recording the symbols from a Code Board that must be placed facing oncoming Rally Cars.

11.3.2. The Code Board will be not less than 315 sq cm and will show not more than five black numbers or letters (or a combination of both up to a maximum of seven) and be the right way up on a contrasting background.

11.3.3. The size of the letters and numbers will be not less than 7.63cm with a minimum of 1.27cm stroke width.

Passage Control

11.4. A manned control established to prove a competitor's adherence to the correct route.

11.4.1. It cannot be located less than 500m from any other manned control.

11.4.2. The only information permitted to be recorded is the Marshal's signature or stamp and the authentication of the records held by the competitor.

Time Control

11.5. A manned control established to record the time of a competitor who must come to a stop for the purpose.

11.5.1. It can additionally record the direction of approach and departure of the competitor.



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11.5.2. The only other information permitted to be recorded by the Marshal is the authentication of the records held by the competitor.

11.5.3. These records, to be valid, must be signed by the Marshal with the Competitor not being required to make any entry on the Time Card.

Main Time Control

11.6. Organisers may designate certain Time Controls (11.5), such as Start Controls and Restart Controls, as Main Time Controls (MTCs).

11.6.1. Competitors failing to visit or reporting outside their maximum lateness at MTCs will be considered to have retired.

11.6.2. Early or late arrival or departure will be penalised in accordance with 13(e) or (f).

11.6.3. An example of all Official boards must be on display at documentation for the event.

10 Paperwork

The standard of paperwork on club rallies varies from almost International standard on some to downright abysmal on others. Many competitors will tell you that the standard of paperwork is sometimes a fair guide to the overall standard of the event. There is nothing wrong with cheaply produced paperwork as long as it is readable, and the content is good, but the latter will only be apparent to you as you gain experience. Never be afraid to ask the experts if they feel that an event is suitable for you (i.e. don't ask if it is a 'good' event, but ask if it is suitable), as 'good' events are defined as those suitable for experts!

11 Experience

Many beginners do their first rally and retire or are excluded simply because they did not know what was going on. Before attempting a rally, you are strongly recommended to go marshalling and spectating on a rally of a similar type to the one you intend to enter. Don't just go to watch the cars; try to see the crews go through the start formalities and see some action at different types of control en route.



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Rules

1 The Law

Rallying is governed by the portion of the law known as the Motor Vehicles (Competitions and Trails) Regulations. As a competitor, this is of little consequence to you as any event that you enter should conform to the law.

2 The RAC

Control of all FIA recognised motor sport in this country comes under the RAC Motor Sports Association. Annually, the RAC publishes the Motor Sports Yearbook (known universally as the 'Blue Book') which contains the rules governing all forms of 4-wheeled motor sport.

3 Blue Book

The 2020 Blue Book is in four sections. Structure of the Sport, The Regulations, Appendices and Motor Sports Directory, (page 6 has a section titled 'How to use this Book'. The Regulations are the bit you're interested in, split into COMMON REGULATIONS (all branches of motor sport) and SPECIFIC REGULATIONS (sub-divided into sections for each branch) with the section R: Rallying of interest. NOTE: paragraphs shown in red indicate rules that have changed for 2020 and there are a lot of changes!

4 COMMON REGULATIONS

Much of the early part is to do with the organisation of events. Sections D: Organisers, G: Officials – Regulations and Licensing, H: Competitors: Licences, J: Competitors: Vehicles and L: Competitors: Permitted Tyres will provide useful information.

5 SPECIFIC REGULATIONS – R: Rallying

This is the rally navigator's bible. It is a very good idea to read this very carefully and digest as much of it as you possibly can. Note that paragraphs shown in *italics* indicate a regulation that MAY be amended in the event ASRs. Note that paragraphs shown with an asterisk (*) indicate a regulation that MUST have further information provided in the ASRs.

Of interest:

- H Appendix 1: Charts and Diagrams
 - Chart 7: Competitors Minimum Ages (page 141)
 - Chart 26: Competitors Minimum Acceptable Licences (page 142)
- R 5 Competitors' Regulations
- R 7 Specific Regulations for Road Events
- R 9 Route
- R 10 Types of Section
- R 11 Controls
- R 12 Timing
- R 13 Penalties see Appendix 1 Chart 13: Penalties (page 329)
- R 14 Documentation
- R 15 Results
- R 16 Additional Regulations for Specific Events



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- o R 18 Technical Regulations

Do not expect to be able to understand all the rules at once, as many of them will fall into place as you do your first events. Discuss the rules with the driver before the event; it is important for him to know what he may do and what he may not do.

6 ASRs

Most ASRs appear in the standard Motorsport UK layout. This is not ideal, but it does lead to a lot of similarity between ASRs, making the finding of various rules easier. Some items are merely alterations to SRs and are referenced purely by paragraph number so the Blue Book is essential to decipher them. ASRs give details of start/finish, timing, control procedure, awards, fees, noise checks, refreshments, photographs, insurance, etc. Before setting off for the start of the rally, it would be wise to go through the ASRs and underline the important items, mainly those which are different from the last rally that you did or perhaps, those things that you got wrong last time!

7 Final Instructions

The finals give more detail of the start procedure, as well as any ASR amendments (printing errors etc.). They may give a list of Black Spots which should be dealt with at home, do not leave it until you get to the start, as you may be too busy.



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Timing

1 Introduction

The methods of timing rallies are basically simple yet are often misunderstood. Along with a failure to read and digest the rules, timing errors are the downfall of many a Novice. There are many traps for the unwary but there is no substitute for experience. However, if you want more advice than this and the Blue Book provide, the best person to talk to is a competitor who organises rallies.

2 History

For many years road rallies were run to a system known as Targa Timing. This enabled organisers to set average speeds in excess of that allowed by the Law. With effect from 1st January 1988, the MSA banned Targa Timing. However, you might meet it overseas, so a description is included. You might also meet it on a 'pirate' event, but these events are illegal and might lead to you being blacklisted by Motorsport UK; this would be the end of your rally career.

There are now only two types of timing allowed by Motorsport UK. These are Scheduled Timing and Target Timing. Each system is defined in the Blue Book (Schedule Timing R16 and Target Timing R 31); a simplified version is given below.

Do not confuse Targa Timing with Target Timing.

Scheduled Timing is used for Road Rallies and Target Timing is used for Stage Rallies.

3 Targa Timing

In this system the start clock of an event is set to BBC Time and subsequent clocks are set back (i.e. to run late) by the amount of time allowed between the start and that clock. Consequently, for an event starting at 00:01, so long as he maintains the average speed set by the organiser, competitor No 1 will reach each control as the clock reads 00:01. This system is easy to use once you have understood it, is easy for results computations but does not allow competitors or 'other bodies' the means to check the set time of any of the clocks. Good fun but nowadays a no-no!

4 Target Timing

On a target timing event, each road section of stage is given a target time. Road sections must be driven in precisely this time and penalties are given for early or late arrival. In practice, where a car is ahead of time, it can wait outside a control until the correct time. The main aim of target timing is to avoid excessive speed on public road sections. It also stops lateness incurred on one section being made up on later sections, again to the benefit of public safety.

On the stages however, the target time is the maximum time allowed for the stage and will also be the maximum penalty for the stage. The ideal time for the stage is the Bogey Time and this is the minimum penalty that can be incurred.

5 Scheduled Timing

On a scheduled time event, a car is due at each control on the route based on its schedule for that route. Consequently, sections are not isolated from one other as they are in target timing, but lateness incurred on one section is carried forward throughout the event and can sometimes be regained. However, lateness is only penalised once, so that a car 10 minutes late at TC2 may also be 10 minutes late at TC3 without further penalty. This concept is known as penalty free lateness. Bear in mind though, that if lateness is regained, it can then be lost again with the relevant penalty. What penalty free lateness does not give is any extension of maximum lateness (normally 30 minutes).

6 Sections Timed to less than One Minute

Where a section timed to the second forms the start of a section timed to the minute then the seconds are ignored when calculating the due time at the next control. Where a section timed to the



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second forms the start of a section timed to the second then the seconds are included when calculating the due time at the next control.

7 Regaining Time

One of the laws governing rallying sets a maximum average speed (presently 30 mph) allowed for a time schedule and a maximum (presently 40 mph) that a competitor may achieve on any section of the route to regain time. This gives rise to the so called '3/4 rule' If you are running late and enter an easy section where it is possible to regain time, you are allowed to complete the section in $\frac{3}{4}$ of the time allowed (in other words, average 40 mph on the section). Put another way you may regain up to $\frac{1}{4}$ of the time allowed for the section. Even though the rally may appear to be run to some other average speed, this proportion rule still applies. As it is only possible to regain whole minutes, you must always round down the fractions, thus on a 19 minute section you may only regain $4(\frac{3}{4})$ minutes, whereas on a 20 minute section 5 minutes may be regained. On sections of 8 minutes or less (up to 4 miles) the rule does NOT apply, and ANY amount of time may be regained. NB The penalty for breach of this rule is hefty – 30 minutes or 1 Fail for the first time and Exclusion for the second offence. This is probably the cause of more non-finishes on rallies than mechanical failure – BE WARNED.

As a rule of thumb, never regain more than $\frac{1}{4}$ of the time allowed (ignoring fractions), this will not always allow you to regain the maximum allowed under the $\frac{3}{4}$ rule but will prevent you trying to regain too much time.

8 Maximum Lateness

Because controls cannot stay open all night, each control will normally close 30 minutes after the scheduled time of the last car. So, if the last car is more than 30 minutes late, he will miss the control. This would be unfair on the last car as all other competitors would have longer in which to visit each control, so to make it fair to all numbers, each car is deemed to have missed a control if it reports there more than 30 minutes after scheduled time, even if a signature and time are recorded. This is known as 'Outside Total Lateness' or OTL. Bear in mind that having gone OTL, you are still going to drop time and will become further late so the next control will also be OTL and so on. Each time you visit a control OTL you will incur 1 Fail and on the results of a rally, there will always be a lot of cars in the Novice class with a great string of Fails, all caused by OTL. Once you are OTL, there is absolutely no point in continuing along the route, you must 'cut', in other words, miss out a portion of the route in order to regain time. By cutting a small loop you may save the odd minute but OTL will loom large again very soon so a large and bold 'cut' is needed. Good cutting is an art, only learned with experience but generally, do not wait until you are 31 minutes late, but start looking for a suitable loop to cut when you are in the twenties. If a fuel halt is due soon it may be worth hanging on in the hope of scraping in within the 30 minutes but otherwise look for a large loop with the minimum of controls, ideally one with only passage checks (especially if they are penalised by marks lost rather than Fails). It is important to rejoin the route during or at the end of a competitive section. If you rejoin at the end of a non-competitive section, you will not be allowed to regain time and will have achieved nothing by cutting a section of the route.

9 Non-Competitive Sections

Organisers nominate sections through sensitive villages etc. as Neutral Sections. This means that you must not regain any time. The penalty is usually the minimum of 1 Fail (on some events per minute!) and the second offence is Exclusion. Be sure to mark your map clearly 'Neutral' as a reminder. There should be no lateness penalty at the end of a Neutral Section.

10 Penalties

The aim of penalties is to find a winner; the crew with the lowest penalties wins the pot of gold. Penalties come in two forms, Time and Fails. The Blue Book lays down a set of standard penalties, R Appendix 1 Chart 13: Penalties (page 329), but most events will vary them. Note that some of these may only be varied upwards and that missing a control, or an error of direction is a far greater offence than being late. Passage Checks vary from 5 minutes to 1 Fail. 1 Fail is worth more than any number of minutes – a crew with 3 Fails and 79 minutes will beat a crew with 4 Fails and 2 minutes. So – avoid Fails like the plague!



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11 Delay Allowance

The important thing is to bear in mind that it is the competitor's own responsibility to claim delay allowance. It rarely features in road rallies but is quite common on stage rallies. Most of the hold-ups on a road rally are not of the organisers making (such as having to follow a slow lorry along part of the route) and so that it is just bad luck. This is known as 'force-majeure'.

12 Regularity

A true regularity section involves driving along a given route as closely as possible at the set average speed, which might be something like 22.4 mph. Secret controls are set up which time on sight (i.e. no waiting is allowed) and penalties are applied for being early or late on the precise average. The ideal equipment for this is a trip meter and clock but normally you will have to get by with an accurate odometer, a pocket calculator and a couple of stop watches. Regularity combined with Plot and Bash is seriously hard work. Don't worry, modern rallies have 'borrowed' the best bits and a 'road rally regularity' will retain the secret check timed to the second, usually run on a challenging stretch of road or on private land, the position of the secret check and the nature of the roads usually making it quite difficult to maintain the average speed. It is also quite common on this section to find that the marshals at the secret control are unable to 'see' beyond the control board giving the opportunity to wait in the unlikely event of an early arrival.

13 Marshals Check Sheets

On all better events the organisers will ask the marshals to keep a check sheet, showing times given to competitors, details of any wrong directions, other penalties and of any errors or alterations made by the marshal. The check sheet is used to resolve difficulties when competitors present altered time cards, they resolve cases where a marshal realises an error too late to alter the time card and they guard against cheating. The check sheet is not an official document as far as Motorsport UK are concerned but it is always accepted by the Stewards as a record of events. The check sheet is of value in verifying the order in which cars passed any control because certain astute navigators do sometimes try the strangest tricks to outwit other crews as well as organisers. A good check sheet will ensure that the event's results are decided fairly and many an ill-founded protest has been undermined by this document.

More from the Blue Book (2020 edition):

Section Rallying R:

Timing

12.1. All sections must be timed according to the requirements of Scheduled Time by watches that read to correct GMT/BST time of day.

Definitions for Scheduled Timing

12.2. Standard Time is the time of day a notional Competitor number zero would be due at any control or check.

12.2.1. Scheduled Time is the actual time of day each Competitor is required to be at any specific point.

12.2.2. Scheduled Time can be calculated for any point by taking a Competitor's Competition number, multiplying by the time interval between Competitors at the start, and adding the result to the standard time at that point.

12.2.3. Delay Allowance is an allowance free of penalty granted to specific Competitors following a delay under the instructions of an authorised Official of the event. Any Delay Allowance must be recorded in writing on the Competitor's time card by that Official.

12.2.4. Due Time is the time a Competitor is due at any control or check inclusive of any previous lateness.

12.2.5. Penalised Time is the difference between Due Time and an earlier or later arrival time.

12.2.6. Penalty Free Lateness allows a Competitor late at one control to be an equivalent amount late at a succeeding control without incurring further penalty.



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12.2.7. Outside Total Lateness (OTL) is the point where a Competitor is considered not to have visited a control or check being more than 30 minutes past the Scheduled Time (including any delay allowance), unless the SRs specify a different period.

12.3. The time of arrival at or departure from a control other than intermediate and final controls of Regularity Sections (where 10.4 apply), will be the time at which the Time Card is presented by the Competitor concerned, providing all crew members and cars are within the control area.

12.4. Exceptions to 12.3 are:

12.4.1. In the event of a competing car obstructing other Competitors through being halted or unduly slowed down near a control, the Officials may instruct the Driver to proceed and may then record the time as the time when this instruction is given.

12.4.2. In the event of a Competitor presenting a Time Card to Officials at a time when the car is outside the control area, the Officials have discretion as to whether or not to make a record on the Time Card.

12.4.3. The onus of presenting the Time Card rests with the Competitor.

12.5. The time of reporting at controls will be recorded to the preceding whole minute when penalties are imposed per minute (for example nine minutes 59 seconds will be recorded as nine minutes.)

12.5.1. When a penalty is imposed for timekeeping error of less than one minute, the time will be recorded to the preceding second.

12.5.2. Where a control at the end of a section timed to the second also forms the start of a section timed to the minute, the time of departure will be considered as being the same as arrival ignoring any seconds.

12.6. The Organisers can require any Competitor who is late to reduce their lateness by either foregoing or reducing any period of time provided for remaining at a control or official halt.

12.6.1. Competitors may themselves reduce lateness without penalty in the following ways, providing the Section is not defined as Neutral (10.3) and unless either forbidden to do so by the SRs or if by so doing they commit a breach of 12.7.

(a) By reporting at any control following one at which a penalty was applied for lateness at any time not earlier than Scheduled Time.

(b) By missing a Control or Controls. The Competitor will be penalised in accordance with 13(a) or 13(b) for every control missed. On re-joining the route at a control at the end of Standard Section, the Competitor will be permitted to restart without further penalty at any time between their original Scheduled Time and their Maximum Permitted Lateness in relation to their original Scheduled Time. If the re-joining control is at the end of a Neutral Section, and the Competitor has missed the control at the beginning of a Neutral Section, they will only be Permitted to restart without further penalty at their Official corrected time based on the time of arrival at the last control visited within maximum lateness.

(c) If the need arises for an Organiser to extend Maximum Permitted Lateness, this can only be done at a point on the route at which Competitors are required to report to avoid disqualification. Maximum Permitted Lateness can then only be extended for the following part of the route and cannot be applied retrospectively for earlier sections.

These provisions are subject to standard condition 4 of the Motor Vehicles (Competitions and Trials) Regulations where applicable.

12.6.2. No Penalty Free Lateness or official delay allowance that has been either reduced or foregone as Permitted by 12.6 can be reclaimed. However, this does not exclude fresh claims based on new circumstances.

12.7. A Competitor found to have traversed a distance greater than four miles between two consecutive time controls in less than three-quarters of the time specified by the Official time schedule will be penalised in accordance with 13(l). In calculating the penalty, any fraction of minute will be ignored. The 3/4 rule does not apply to sections of less than 8 minutes scheduled duration. This does not preclude the organisers providing specific sections for time recovery.

For example:

12.7.1. In a nine minute section, a penalty is imposed if a Competitor completes a section in less than six minutes.



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12.7.2. In a 10 minute section – seven minutes.

12.7.3. In an 11 minute section – eight minutes.

12.7.4. In a 12 minute section – nine minutes.

12.8. Times will be recorded to whole minutes unless the SRs state otherwise.

12.8.1. Any portions of the event to be timed to seconds will be clearly indicated in the Route or Time Cards.

12.8.2. Any timing to less than one minute will be recorded on equipment as detailed in 2.7.

12.8.3. Competitors will be timed by the Official timepieces in the charge of Officials, unless the SRs state that watches carried by the Competitors can be used.

12.9. *If Competitor's own watches are used, they must be of a size and type to enable the dial to be read clearly and must be sealed.

12.9.1. The requirements for sealing watches must be stated in the SRs.

12.9.2. The Organisers may reject any watch that cannot be satisfactorily sealed or read.

12.9.3. If any sealed watch varies from official time by more than one minute, the competitor concerned will be timed by Official clocks from then on, unless the SRs make provision for the replacement or re-setting of the watch concerned.



Percy's Guide to 12 Car Navigation

Plot and Bash

1 Introduction

Plot and Bash is defined as keeping the route from the competitor until the moment he leaves, so that the route is a complete surprise. Since the rule changes in 1988 it has become aligned to the 'Very Navigational type of Event' and is almost compulsory for events run in England.

2 Why

The use of Plot and Bash very clearly reduces the average speed that a car can achieve as the navigator struggles to plot the route, tell the driver which way to go and stay ahead of his own position on the road. This would appear to be enough reason for its use, but strange to relate, some people actually enjoy it (masochists!) and these are generally the navigators who are good at it.

3 Forms

Plot and Bash can appear in several basic forms:

- Whole route available as you leave the start
- Sections of route available at MTCs
- Route cards issued at most controls on route
- Any combination of the above

4 Pressure

One of the main effects of Plot and Bash is to put the navigator under pressure, which manifests itself in the form of increased nausea, sweating and of course, mistakes. Drivers can always make a significant contribution to reducing this pressure by being patient and trying to understand the navigator's problems (not a bad principle !). A smooth driving style is a great help, as ragged stop-start driving is no use at all when you have no idea which way to go at the next junction. If a problem defeats you completely, don't be shy; ask the driver as it is amazing how often a fresh look at a problem will spot the solution immediately.

5 How to tackle Plot and Bash

Plot and Bash is easier to tackle if you have a plan of action. I can give some guide lines, but first, let's see if it must be tackled the hard way every time. On some events where the whole route is issued at the start time, it is often only necessary to plot as far as the first Neutral section and thereafter, each section can be plotted in the comparative calm of a meander through some sleepy hollow. If sections offer penalty free lateness (see later), you may choose to stop and plot great chunks of the route at your leisure, but be aware that even if you are not incurring a penalty, the clock is rapidly reducing your lateness allowance (usually 30 minutes but may be less).

6 Plot and Bash Rule of Thumb

- See if the route card can be converted to 'relaxed plotting'
- Inform the driver that he is on his own (i.e. you are plotting and not bend calling)
- Read the instructions carefully and understand the problem
- Decide if the problem can be tackled going quickly, slowly or must be stationary
- Inform the driver of the style of driving needed
- Always drive to the first junction whilst studying the problem
- With long sections to plot, you must decide whether to tackle it bit by bit as you go along or to solve the whole section in one go. This may resolve itself, if you are plotting on one



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section of map and driving on another or perhaps even be working on one map whilst still navigating on another map.

This Rule of Thumb is not foolproof but at least it will bring a little logic to a problem which is all too often tackled in a neurotic 'cannot cope' fashion.



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Route Finding and Road Reading

1 Introduction

No matter how good you are at plotting the most intricate of route cards, if you cannot tell the driver which way to go, there is no chance of winning a rally. This is the most basic requirement of a road rally navigator and is the most difficult to learn. As with many other facets of rallying, there is no substitute for experience, but here a few pointers to stop you making the obvious blunders.

2 Information

To achieve his aim, the driver needs certain information. You may not have all of it, nor may you have time to pass it all on (i.e. when plotting and bashing), so consider the ideal situation of a pre-plotted route on a well marked map where information and time are plentiful.

The driver wants to know, in no particular order:

- PACE – as you become more experienced you will be able to tell the driver, to fairly fine limits, how quickly he needs to go. To begin with, just state competitive or relaxed.
- NOISE – the organiser will say where he wants quiet and perhaps minimum lighting. It is up to you to tell the driver; the fact that you forgot will not impress the DSO.
- ROUTE – this is discussed more fully later but to illustrate how it is vital to stay on route, work on the basis that to overshoot a turning by a mere 5 yards will cost about 30 seconds, an overshoot that means turning round in a narrow lane may cost 2 minutes, while getting lost invariably loses 5 minutes or more. Do that just 5 times in the night and you are nearly OTL, without even considering the time lost through the driver not being able to match the pace of the front runners.
- HAZARDS – some hazards are evident from the map (e.g. fords, bridges, sharp bends, level crossings etc.) while others may come from marked maps. The organisers will often tell you of those which constitute a danger to road safety (e.g. Give Way after blind brow) and they may also take pity on your car by mentioning the worst bumps on white roads.
- BENDS – some navigators feel that a driver should cope with the road as he comes to it but most past the beginner stage will offer at least some information from the map.
- SURFACE – the map is of little help here as quite a few whites are in very good nick whilst the odd yellow is diabolical. Marked maps could be used but you must realise that the seasons affect roads badly – a smooth loose track becomes a muddy morass or an ice-hard car breaker during the rally season. Remember, marked maps are now illegal.
- CONTROLS – it is always better to be forewarned of controls, if only to be able to dip the lights – marshals get a bit tetchy when blinded.

3 Presentation

When two people rally together for a number of events, they will develop an understanding on information. Your problem as a beginner, or a more experienced navigator changing drivers, is to acquire a system of passing information which is easily understood by the majority of drivers. There are many shades of opinion as to the best methods, here is one option. All that really matters is that your driver understands your method; someone who does not speak English can be trained to respond to a limited vocabulary and the choice of words does not matter (e.g. ruler and lager to mean left and right).

The first thing to remember when a driver is concentrating on his driving (as he should be), his hearing is attuned to only one thing, the sound of his beloved (and expensive) motor. Consequently, you must not bombard him with irrelevant rubbish and if you pass more than a couple of items of information at a time, he will forget all of them. Your voice should be clear and confident but



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no louder than the internal noise of the car demands. Save the increased voice level for the more urgent instructions, e.g. call a 90° right at the end of a long straight more loudly than a 10° right.

4 Trust

Both with information from a map and from pace notes, it is vital that the two crew members trust one another. A driver who constantly frightens his navigator needs to find a new partner. No navigator works well when his concentration is disturbed by fear (though an occasional flow of adrenalin does sharpen the wits). Similarly, a driver who is constantly being given dud information will soon lose faith. The important thing to remember is that when you make an error, own up immediately. The further off route you go, the more infuriated the driver will become when he realises that you are trying to kid him on. You have to be very clever to pull the wool over a driver's eyes for long; if you are that clever, you should not need to do it anyway.

5 Junctions

The key to good route finding is to be able to appreciate what a junction will look like from its representation on the map and then to tell the driver accurately what he needs to do at that junction. It is all too easy to forget that the driver has not seen the map. Types of junction vary so some examples are given below; work on the assumption that all junctions are 90° unless otherwise stated. Spoken words are in CAPITALS

- Always mention main roads and other specified give ways and this information should come before the direction so that it sinks in.

B ROAD CROSSROADS – STOP - GIVE WAY – TURN RIGHT

or

A ROAD – STOP – GIVE WAY – FILTER LEFT

- When missing turnings, always mention the fact that there is another road.

IGNORE LEFT

or

MISS ONE RIGHT

- If you want to make a turning, use one description all the time.

SLOT LEFT

or

TURN RIGHT

or

JUNCTION, GO LEFT

- Other than for simple junctions, preface the instruction with a description of the junction so that the driver can picture it and absorb the direction.

STAGGERED CROSSROADS - TURN RIGHT

or

T-JUNCTION – STOP – GIVE WAY – GO LEFT



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- The longer the instruction, the more carefully it needs to be said.
- Where junctions are not 90° an extra piece of information is needed. It is not wise to use every grade from 10° to 170° as the driver has enough to think about with the main road stops, directions and funny shaped 6-way multi-junction so stick to
 - FORK
 - SLOW FORK
 - 90°
 - MORE THAN 90°
 - HAIRPIN
 - IMPOSSIBLE HAIRPIN

The last item will only be known from local knowledge or marked maps.

6 Difficulties

Certain types of slot are predictably more difficult to find than others. Even though the map is right in 90% of cases do not take anything for granted and concentrate all your efforts into identifying the junctions. The layman expects most turnings to have sign posts but rally organisers seem to find all those without and the odd sack has been known to find its way over a strategic post! Another major source of errors is turning off main roads, especially to the right. Wide or dual carriageways may put the right-hand edge of the road out of the car's headlamp beam and opposite direction traffic, forcing the use of dipped beam, will often be the reason for an overshoot. Also, on main roads, overtaking can be a very dubious advantage when looking for a turning. If in doubt, slow down. Main roads are also more frequently aligned with minor roads so there is a greater risk of the map being inaccurate.

We have already mentioned the lack of sign posts and at high speed with a demanding driver, finding slots can be a problem on the minor roads

- Many white roads look like field entrances (they often are just that) and there may be several entrances in the space of a few hundred yards.
- A turning which is just around a fast bend on the inside of the radius is easily over shot, especially when a house obscures the turn and a gate will make it even more difficult.
- Farmyards can be very difficult, especially in Wales. A lane, running into the yard, with no indication of which gateway is the way out.
- Sign post sometimes play tricks at staggered crossroads, where the post is by the further turning.
- Not as Map (NAM) junctions should also be noted for future reference, the worst type being where a road is completely missing off the map. Once again back to basics and keep a careful watch on the bends when departing to ensure you are on the right road.
- Grass triangles (GT) where the organisers require you to take the longest route around a grass triangle, usually on a T-Junction, are one of the hardest calls to make.

7 Bends

So far, we have only covered junctions and the problems of finding them. One of the best methods is to relate junctions to the bends in the road. If you are busy with Plot and Bash, there may not be time to notice anything other than the more severe bends but if there is time to spare follow the bends on the map down to every slight curve. Whilst you are doing this it would be a shame not to pass on at least some of this information to the driver; it should enable him to proceed more safely at his present speed, or to go faster. Once again, there are many ways to present this information; illustrated are the two main systems and you must choose the one that suits your partnership. The degrees method is probably used by about two-thirds of the navigators in the country.



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- Degrees - Bends are described simply by the angle of corner as shown on the map. The number of possible grades is reduced to avoid comprehension problems and a suggested list might be: 10, 20, 30, 45, 60, 75, 90, 120, 160. In most cases these last two are replaced by OVER 90 and HAIRPIN as few people can imagine these large angles easily. The actual calls made are TEN RIGHT, TWENTY LEFT etc. Any sweeping bend (there are many on main roads) can simply be prefixed with LONG.
- Plain Language – In this system, degrees are replaced with words which suggest how fast the corner may be taken:- VERY FAST, FAST, MEDIUM FAST, MEDIUM, MEDIUM SLOW, SLOW, 90 (well how else would you call it?), OVER 90, HAIRPIN. Some navigators add FLAT to the list but may prefer to save that for hazards where there is known to be no problem despite the appearance of a potential nasty (e.g. straight road over blind brow).
- Limitations – You must appreciate that encouraging the driver to go faster than he can see can be very dangerous, so bend calling must be treated with great respect. Get a lot of practice in first, over varying territory at moderate speeds, before trying anything competitive. You may well make an error that leads directly to a damaged car – do you think it is fair for the driver to ask for a contribution towards the repair? Few do but it has been known so discuss it before it happens. Even the best are not perfect. Places where errors are more likely to be made are on whites and unfenced roads, where the maps are definitely less accurate. Certain areas are known to be in error and if the roads are very twisty not all the bends could be shown at the scale of the maps used in rallying.

8 Words

Having tried the various methods in practice, you can now select your final choice and brief the driver on what to expect. Stick to the same thing throughout a rally; try to use simple words and avoid any two that sound alike. Too bad about RIGHT and WHITE!

9 Distances

Once more there is a wide choice of units (fractions or tenths, miles, kilometres, yards, metres etc.). As a starting point, try kilometres for anything over one kilometre and hundreds of metres for anything less than one kilometre. With experience you will develop a sense of distance and even if it is slightly out, the most important thing is to be consistent. If the driver knows what you mean by 200m, that's fine. Bear in mind that at 60 mph, 50m is past in $1\frac{3}{4}$ seconds so that is too small a unit.

10 Responses

Some navigators never look up when bend reading, relying on the movement of the car to follow the road while others rely on a reply from the driver to every call. Do not let him use the word RIGHT; YES or OK or just a grunt is better than nothing. Some prefer drivers to keep quiet, except when a call is not understood. If you have to give a long and complicated instruction, start well before the junction or hazard and let the driver know this one is complicated, say LISTEN CAREFULLY. If you should ever freeze for any reason, at least stammer out SLOW DOWN or agree on a hand signal meaning the same.



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Rallymanship

1 Introduction

Now you've read all the words and you're ready to go out and put it into practice. First, read on and do not expect too much too soon.

2 Aims

It is important to approach each event with a sensible aim. As a beginner you will be sadly disappointed when you do not win first time out. New 'ace' drivers do appear from time to time (though they still have a thing or two to learn) but the advent of the 'ace' navigator on his first rally is a non-existent happening. No matter how much theoretical knowledge you may have, there are so many small practical points to pick up that progress to the top is a slow affair.

So, do your first few events with finishing being the only target as that alone can be difficult enough on some events. Above all, try to enjoy the rallies. Far too many crews lose sight of the fact that, at club level at least, rallying is a sport. Try to be friendly and far more people will be willing to help you on your way with tips to speed you on the way to the Expert class. No one likes a bolshy Expert crew but a bolshy Novice crew will find themselves in the 'Billy no mates' corner very quickly.

Once progress is made away from the beginner stage, your sights can be set higher. The next aim will be a placing in the Novice class and then to win the Novice class. It is something you should only achieve once if organisers write their ASRs correctly, but it is a great moment, the first big step up in your new sport.

The idea of setting a target for each event is one that will hold valid to the highest levels in the sport and you should get into the habit right from the start.

3 Finishing

The ASRs will lay down the rules to be classified as a finisher on an event. Always underline this when studying the ASRs before an event. Usually the rules state that you must visit two-thirds of all the controls on the route, this will not include passage controls. If there is any doubt, ask the organiser before the start. So, if there are 30 controls on a route, you must visit 20 of them within OTL as well as normally reaching the finish within OTL. If there is a danger of not making the 20 then you must cut out passage controls to achieve the requirement as no amount of passage controls will help you reach the magic 20.

4 Marshals

The SRs (Blue Book) remove from marshals any responsibility for advising competitors. No matter how inexperienced you are there will always be a greener marshal so it is no good entering a rally hoping that the marshals will be able to help you out of your difficulties. The more experienced marshals often will give advice if you are completely lost but do not rely on it. Nor can you expect them to stop their marshalling to come to help you if you have a mechanical problem, though they will probably help with a tow after the course closing car has been through.

Your attitude and approach to marshals. Bearing in mind that as you enter a control you have no idea of the standard of the marshal, the initial approach must always be the same, positive and polite. Depending on the type of timing in use, you may be asking for a particular time or asking what time the marshals have (CAR 7 – CAN WE HAVE FIFTEEN PLEASE or CAR 12 – WHAT TIME HAVE YOU GOT PLEASE). The subsequent conversation will depend on the time on the watch and the competence of the marshal, but it should always remain polite. You may have to be very firm but never rude; that will always slow the marshal and you must remember that it is your time he is wasting. The same goes for arguing over the odd minute; if it takes nearly a minute for him to concede, it has been a wasted minute. In time you will learn to judge which controls are important, where to try 'shouting-up' and where to accept almost anything and get on with the route.

5 Cheating

Whether we like it or not, a certain amount of cheating does go on. Some exponents will



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argue that whatever they can get away with is fair game. Certainly the better navigators will look to exploit a set of ASRs to their limit – if for example they see a route which is quicker than the one intended by the organiser then they will use it as long as they cannot be penalised. Most crews would consider that to be OK but to con a marshal into making a wrong entry on a time card which might well be discovered afterwards is of doubtful value. You have to be fairly skilled to cheat consistently and have a very sound knowledge of the Blue Book – so as a Novice, do not try it! The art of Rallymanship has been defined as 'bending the rules as much as possible without actually breaking them', maybe that should be your limitation.

6 Golden Rules

Follow these and you should have some enjoyable rallying, even if not that successful.

1. Always read and inwardly digest the rules and regulations for an event.
2. Highlight the vital points in the rules and ensure that the driver is in the picture as to what he may and may not do.
3. Have a sensible aim when entering any event, set your sights at a feasible level and stay in your depth.
4. Do not keep going OTL – CUT to stay well within maximum lateness. Aim to finish the event with the minimum number of fails.
5. Remember that gaining too much time (twice) may involve EXCLUSION.
6. Always be honest with the driver – if you boob, own up immediately.
7. Concentrate to the utmost degree on the competitive sections and leave the small talk and shaggy dog stories for the halts and the finish.
8. Always carry spare equipment for the essential items.
9. Be aware of local rules and conventions, especially outside your own area.
10. If you want to keep friends never protest.



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Practice Event

1 Introduction

Here is a chance to put all the theory to test with a practical example. As the guide is aimed at crews looking towards competing in the Sporting Car Club of Norfolk's 12 Car Championship events, in particular Beginners and Novices, the route cards will cover the roads on Map 133 (one of the club's 'home' maps). The route cards will cover eight sections covering the eight basic types of navigation, tulips, junction instructions, road colours, spot heights, grid lines, grid references, junction directions and a herringbone. The club's navigation rules only permit the use of the first five types on Novice events. Each route card will have the same route card navigation for that section at three levels of difficulty. Following the nine route cards will be an example of the route defined to EMAMC plot and bash rules and the route defined to Welsh pre-plot rules.

2 Time Cards

Examples of the three basic types of Time Cards that you may come across are shown below. Normally on a 12 car all the Passage Controls and Route Checks take the form of Code Boards which are recorded on the Time Card in the order they are passed on the route. On a higher status event some of these will be manned and all will need to be authenticated with a marshal's signature. It is also quite common to have a separate sheet to record the passage controls / route checks. The summer time cards have your scheduled time at each control already filled in, on the landscape version they run down the left most column (next to the controls), on the portrait version find your car number in the left hand column and they run horizontally across the card (often a good idea to draw a horizontal line above your scheduled times and below your maximum lateness times (for car 12 this would be a line below car 42). The normal time card requires you to do a bit of work, the scheduled time of car 0 at MTC1 is shown on the card and it is up to you to work out your own scheduled time for each of the controls i.e. for car 12 the scheduled time at MTC1 would be 00:12, STC2 would be 00:24 etc.).

All three time cards have been set up to reflect the Practice Event. On a 12 car the location of the code boards will not be given, on a higher status event it is usual for the approximate position of the passage controls / route checks to be included on the route cards.

All three time cards only show sections timed to the minute, time cards covering sections timed to the second an extra box will be added to each control to allow the marshal to record the seconds where required.

3 Miscellaneous

The route cards use roads regularly used on club 12 cars, but the route has not been driven, all give ways etc. have been done from a combination of memory and educated guesswork.

Each route card has been split into three, Novice, Expert and Expert plus.

After the time card section there are examples of how the route would be presented on an EMAMC Championship event and a Welsh Championship event. All the route cards should be accurate and be in sync but there's always the possibility of a little human error sneaking in.



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Finals

The event will start and finish on Brandiston Airfield.

The route will only use Coloured Roads and only Coloured Roads will be shown on the Route Cards. The exceptions to this are the roads on the Airfield at the start and the finish, which are white, and will be shown as broken lines on the first and last route cards.

Always read the Finals carefully.

The latest version of Map 133 should have Revised August 2018 on the map legend.

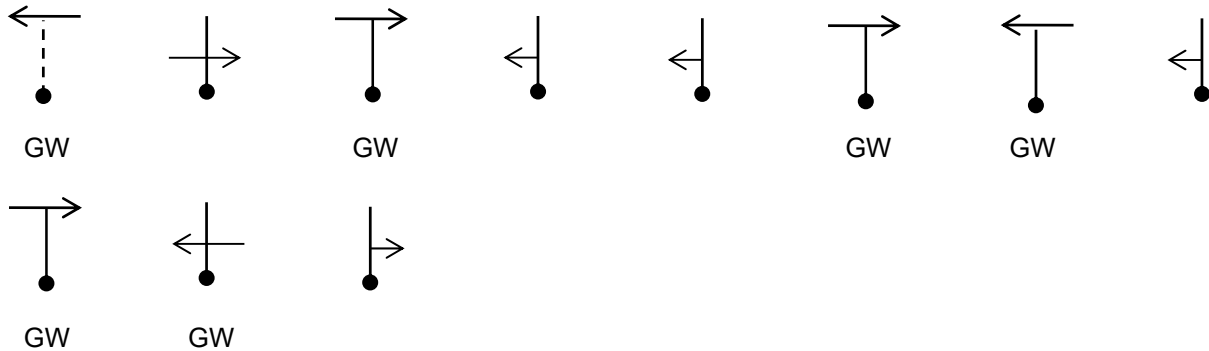


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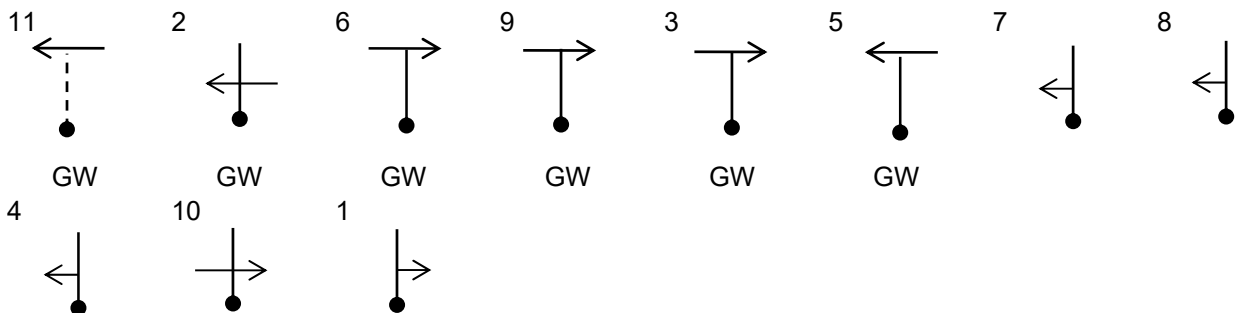
MTC1 – STC2 - Tulips:

MTC1	STC2	[CRO]
136 205½ WSW	E 140 170 W	DPH 6 miles

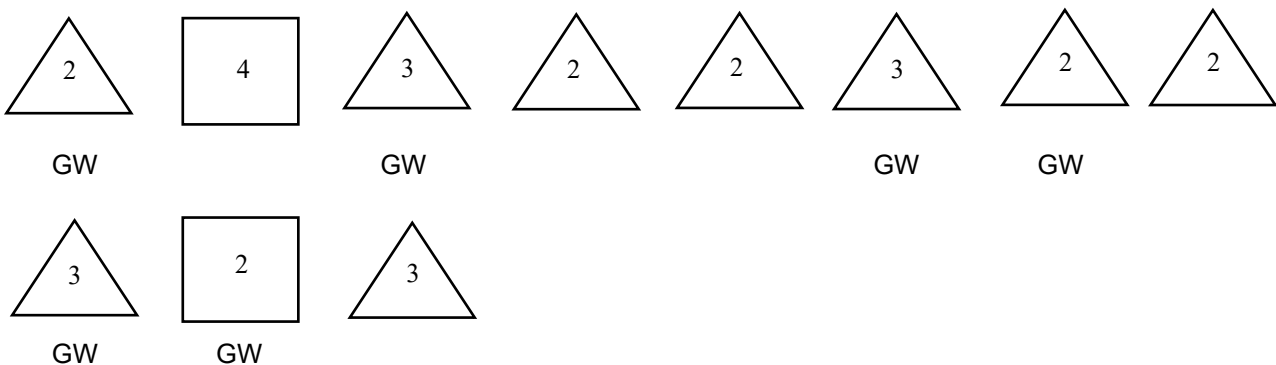
Novice - **Via the following in order tulips:**



Expert - **Via the following tulips in descending numerical sequence:**



Something to think about - **Via the following in order:**





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STC3 – STC4 – Spot Heights:

STC3	STC4	[CRO]
123½ 127 W	NNE 080¾ 142 SSW	DPH 8 miles

NOTE: for the 2020 revision 58 is shown as a Trig Point and should not be classified as a Spot Height

Novice - **Via the following:**

58 43 48 45 19 59

Expert - **Via the following:**

LVIII XLIII XLVIII XLV XIX LIX

Something to think about - **Via the following:**

+3 -15 +5 -3 -26 +40



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STC5 – STC6 - Grid Lines:

STC5	STC6	[CRO]
030 139 ENE	NNE 038 $\frac{1}{4}$ 167 $\frac{3}{4}$ NW	DPH 7 miles

Novice - Via the following:

14 15 04 16 16 15 14 05 06 14
15 06 16 05 17 04 17

Expert - Via the following:

NNENSSEENNWNWNWS

Something to think about - Via the following:

NNENNNNEENNENENEN



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STC6 – STC7 – Grid References:

STC6	STC7	[CRO]
038 ¹ / ₄ 167 ³ / ₄ NW	WNW 028 186 ESE	DPH 5 miles

Novice - Via the following:

E 025 ¹ / ₂ 172 S	NE 022 163 NW	SSE 020 ³ / ₄ 171 W GW	E 019 ³ / ₄ 171 NW GW
SE 018 ¹ / ₂ 173 WNW	ESE 016 184 WSW	ENE 012 173 WSW	ENE 009 172 ¹ / ₂ WSW
ENE 008 ¹ / ₄ 172 NE	SW 008 ³ / ₄ 173 N	SW 010 181 NNW GW	WNW 019 185 ¹ / ₂ ESE
N 019 ¹ / ₂ 185 E GW	SSW 022 ¹ / ₂ 187 ESE		

Expert - Via the following:

0255017200	0220016300	0207517100 GW	0197517100 GW
0185017300	0160018400	0120017300	0090017250
0082517200	0087517300	0100018100 GW	0190018550
0195018500 GW	0225018700		

Something to think about - Via the following:

602550317200	602200316300	602075317100 GW	601975317100 GW
601850317300	601600318400	601200317300	600900317250
600825317200	600875317300	601000318100 GW	601900318550
601950318500 GW	602250318700		



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STC7 – STC8 – Junction Directions:

STC7	STC8	[CRO]
028 186 ESE	ENE 107 197½ W	DPH 8 miles

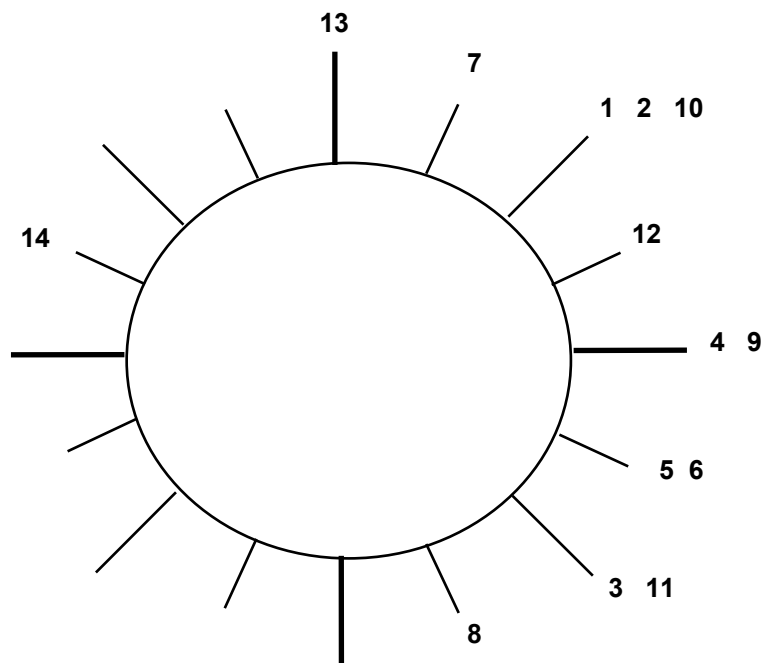
Novice - **Via the following junction depart directions:**

NE GW	NE GW	SE	E GW	ESE	ESE	NNE	SSE GW	E GW	NE
SE	ENE GW	N	WNW GW						

Expert - **Via the following:**

20:10 GW	19:10 GW	21:25	01:15 GW	22:20	22:20	21:05	19:25 GW	23:15 GW	22:10
19:20	22:10 GW	22:00	18:50 GW						

Something to think about - **Via the following:**



GW at junctions 1, 2, 4, 8, 9, 12, 14

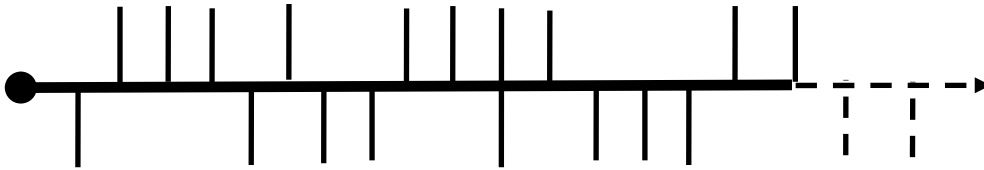


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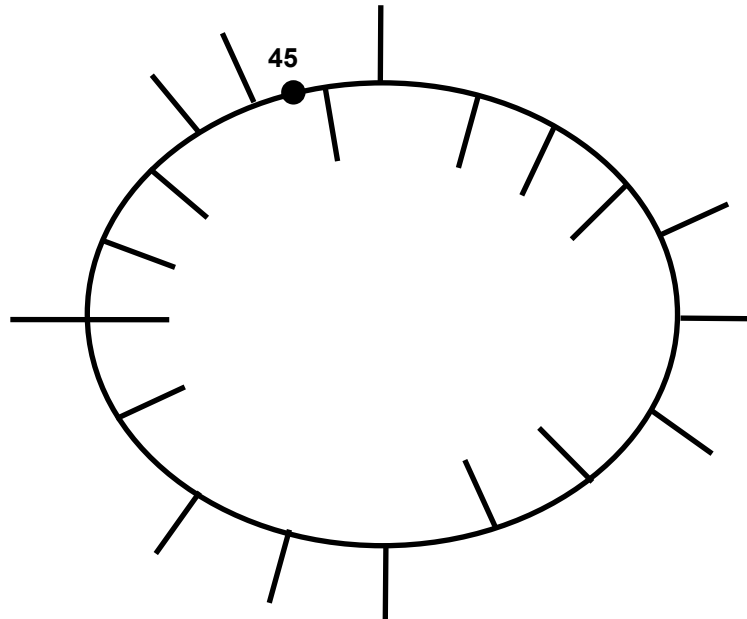
STC8 – STC9 - Herringbone:

STC8	STC9	[CRO]
107 197½ W	ENE 140 206 WSW	DPH 8 miles

Novice - **Via the following:**



Expert - **Via the following:**



Something to think about - **Via the following:**

131813111311131113181311131813181311131113111813111318131813181311131113181318



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STC9 – MTC10 - Finish:

STC9	MTC10	□
140 206 WSW	ENE136 205	DPH 0 miles

The event is over, short run to the finish, and you will see from your time card that you have 10 minutes to cover not very far.

One or two things to use this time for:

- Sign your damage declaration form – somewhere in the documentation pack that you were given at signing-on will be a sheet of paper declaring that you have / have not been involved in an accident with a third party – this **MUST** be signed and handed in at the finish.
- Make a note of your times – at the finish you will have to hand in your time card to the results team – once that has gone you have no record of your time penalties – results teams have been known to get things wrong.



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Time Card – Summer Portrait:

Car Number	Percy Pig Demo										Code Boards	Signature
Control	MTC1	STC2	STC3	STC4	STC5	STC6	STC7	STC8	STC9	MTC10		
Mins		12	12	16	20	14	10	16	16	10		
MU		3	3	4	5	3	2	4	4			
Sig												
Dir'n												
0	00	12	24	40	00	14	24	40	56	06	2A	
1	01	13	25	41	01	15	25	41	57	07	2B	
2	02	14	26	42	02	16	26	42	58	08	2C	
3	03	15	27	43	03	17	27	43	59	09	3A	
4	04	16	28	44	04	18	28	44	00	10	3B	
5	05	17	29	45	05	19	29	45	01	11	3C	
6	06	18	30	46	06	20	30	46	02	12	4A	
7	07	19	31	47	07	21	31	47	03	13	4B	
8	08	20	32	48	08	22	32	48	04	14	4C	
9	09	21	33	49	09	23	33	49	05	15	5A	
10	10	22	34	50	10	24	34	50	06	16	5B	
11	11	23	35	51	11	25	35	51	07	17	5C	
12	12	24	36	52	12	26	36	52	08	18	6A	
13	13	25	37	53	13	27	37	53	09	19	6B	
14	14	26	38	54	14	28	38	54	10	20	6C	
15	15	27	39	55	15	29	39	55	11	21	7A	
16	16	28	40	56	16	30	40	56	12	22	7B	
17	17	29	41	57	17	31	41	57	13	23	7C	
18	18	30	42	58	18	32	42	58	14	24	8A	
19	19	31	43	59	19	33	43	59	15	25	8B	
20	20	32	44	00	20	34	44	00	16	26	8C	
21	21	33	45	01	21	35	45	01	17	27	9A	
22	22	34	46	02	22	36	46	02	18	28	9B	
23	23	35	47	03	23	37	47	03	19	29	9C	
24	24	36	48	04	24	38	48	04	20	30		
25	25	37	49	05	25	39	49	05	21	31		
26	26	38	50	06	26	40	50	06	22	32		
27	27	39	51	07	27	41	51	07	23	33		
28	28	40	52	08	28	42	52	08	24	34		
29	29	41	53	09	29	43	53	09	25	35		
30	30	42	54	10	30	44	54	10	26	36		
31	31	43	55	11	31	45	55	11	27	37		
32	32	44	56	12	32	46	56	12	28	38		
33	33	45	57	13	33	47	57	13	29	39		
34	34	46	58	14	34	48	58	14	30	40		
35	35	47	59	15	35	49	59	15	31	41		
36	36	48	00	16	36	50	00	16	32	42		
37	37	49	01	17	37	51	01	17	33	43		
38	38	50	02	18	38	52	02	18	34	44		
39	39	51	03	19	39	53	03	19	35	45		
40	40	52	04	20	40	54	04	20	36	46		
41	41	53	05	21	41	55	05	21	37	47		
42	42	54	06	22	42	56	06	22	38	48		
43	43	55	07	23	43	57	07	23	39	49		
44	44	56	08	24	44	58	08	24	40	50		
Fails												
Mins												



Percy's Guide to 12 Car Navigation

Time Card - Normal:

Percy Pig Demo

Car Number

	Time	MU		Hr	Min
MTC1			Car 0 0:00		
STC2	12	3			
STC3	12	3			
STC4	16	4			
STC5	20	5			
STC6	14	3			
STC7	10	2			
STC8	16	4			
STC9	16	4			
MTC10	10				

Dir'n	Sig

2A	
2B	
2C	
3A	
3B	
3C	
4A	
4B	

4C	
5A	
5B	
5C	
6A	
6B	
6C	
7A	

7B	
7C	
8A	
8B	
8C	
9A	
9B	
9C	



Percy's Guide to 12 Car Navigation

Time Card – Summer Landscape:

CAR No	Results	Use	Mins	TC No	Mins	MU	Dir'n	Sig
0				MTC 1				
0				STC 2	12	3		
0				STC 3	12	3		
0				STC 4	16	4		
0				STC 5	20	5		
0				STC 6	14	3		
0				STC 7	10	2		
0				STC 8	16	4		
0				STC 9	16	4		
0				MTC 10	10			

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

2A	4C	7B
2B	5A	7C
2C	5B	8A
3A	5C	8B
3B	6A	8C
3C	6B	9A
4A	6C	9B
4B	7A	9C

Driver _____

Navigator _____

Percy Pig Demo

Car No **0**



Percy's Guide to 12 Car Navigation

EMAMC Championship Plot and Bash

This is how you would expect the route to be presented on an EMAMC Championship event, all on one handout, perhaps 15 minutes before your scheduled time at MTC1, although on a real event there would probably be at least a 15 minute run out from MTC1.

MTC1 – STC2 – CRO in ascending order:

1 SGW	2 To PC2A	3 SGW	4 To PC2B	
10 SGW	9 SGW	8 To PC2C	7 SGW	6 SGW
11 To STC2				



Percy's Guide to 12 Car Navigation

STC2 – STC4 – CRO:

Cross the following grid lines in order.

17	13	SGW	13	PC3A	SGW	13	17	17	12
16	12	PC3B	15	13	14	PC3C	SGW	13	12
12	STC3	13	SGW	13	12	14	PC4A	11	11
SGW	15	PC4B	SGW	11	10	SGW	16	17	10
10	SGW	09	PC4C	17	SGW	16	SGW	09?	09?
15	STC4								



Percy's Guide to 12 Car Navigation

STC4 – STC5 – CRO in ascending order:

1 STC4	2 	3 	4 	5
14 	15 	16 	17 	6
13 	20 STC5	19 	18 	7
12 	11 	10 	9 	8
		To PC5C	SGW - CARE	To PC5B



Percy's Guide to 12 Car Navigation

STC5 – STC8 – CRO:

Cross the following grid lines, spot heights and grid references in order.

STC5	43	41	15	PC6A	04	26	16	16	15
PC6B	14	SGW	05	48	06	14	52	15	44
06	16	05	PC6C	SGW	41	41	17	04	17
STC6	17	03	17	PC7A	17	SGW	02	Q	SGW
01	Q	ENE 008¼ 172½ NE			PC7B	49	18	45	01
PC7C	SGW	02	STC7	03	04	34	SGW	05	19
06	SGW	PC8A	NNE 067 195 E / SGW			07	47	08	PC8B
SGW	SGW	19	09	19	PC8C	10	19	SGW	11
19	SGW / 43		11	STC8					



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STC8 – STC9 – CRO in descending order:

1 STC9	2 	3 	4 	5
16 45	17 SGW	18 SGW	19 PC9A	6
15 	24 STC8		20 	7 SGW
14 PC9B	23 	22 	21 	8 PC9C
13 	12 SGW	11 	10 	9



Percy's Guide to 12 Car Navigation

Welsh Championship Pre-Plot

This is how you would expect the route to be presented on a Welsh Championship event – perhaps handed out 2 hours before your Scheduled Time at MTC1.

Control	Grid Reference		App	Dep	Comments
MTC1	136	205½		WSW	Standard section to STC2
GW	134¼	205½	ENE	SSE	Care leaving airfield
PC2A	127	197	SE	NW	
GW	120¾	199¼	E	N	
PC2B	120	194½	NW	E	
GW	122½	194½	W	SSE	
GW	125½	187	NNW	SE	
PC2C+GW	131¾	182¾	WSW	SSW	
GW	131¼	181½	N	SSE	
CARE	146	171	NW	W	Care turning right - traffic island followed by a narrow bridge
STC2	140	170	E	W	Standard section to STC3
GW+QUIET	129¾	168¾	NNE	E	Quiet 300m radius
PC3A+GW	132¼	166	NNE	NW	Care joining A road
PC3B	123¾	152	WNW	ESE	
PC3C	135½	135	NW	SE	
GW	137	132¾	NNW	S	
STC3	130	124	SE	NW	Standard section to STC4
GW	123½	127	ESE	WNW	
PC4A	110¼	140¼	SE	NW	
PC4B	113½	150	S	N	
GW	110½	153	ESE	NW	
GW	095½	156	ENE	NNW	
GW	098¾	172	ESE	WNW	
QUIET	093	174			Quiet 300m radius
PC4C	090	171	E	W	
GW	081	166½	NNE	SE	
GW	087	156	N	SSE	
STC4	085¾	149	NE	SW	Standard section to STC5
GW+QUIET	085	130¼	NE	ESE	Quiet 300m radius
PC5A+GW	080½	128½	WNW	W	Care joining A road
PC5B	070	133	E	W	
GW	067½	133	E	WSW	Care crossing A road
PC5C	060	132	E	W	
CARE	054	136½	SSW	W	Care joining A road
CARE	009	130	NE	E	Care leaving A road



Percy's Guide to 12 Car Navigation

Control	Grid Reference		App	Dep	Comments
STC5	033	140¹/₄	WSW	ENE	Standard section to STC6
PC6A	037¹/₂	157	SW	NE	
GW	042	160	W	SE	
PC6B	046	141	N	S	
GW	045³/₄	139³/₄	NNE	SE	
PC6C	047	160¹/₂	ENE	WNW	
GW	042³/₄	161¹/₄	ESE	NNE	
STC6	038	168	NNE	NW	Standard section to STC7
PC7A	021	170	SSE	NNW	
GW	021	171	SSE	WNW	
GW+QUIET	019¹/₂	171	ESE	NW	Quiet 300m radius
PC7B	008¹/₄	172¹/₄	ENE	NE	
GW	010	180¹/₂	SW	N	
PC7C	014³/₄	185	SSW	NE	
GW	019³/₄	185	N	E	
STC7	029	186	WNW	ESE	Standard section to STC8
GW	049	183¹/₂	WSW	ENE	
GW	063	196¹/₄	SW	NE	Care crossing A road
PC8A+GW	066³/₄	195	NNE	E	Care joining A road
PC8B	080	195	SSW	NNE	
GW	082	199	SSW	SSE	
GW	083	191¹/₂	NNW	E	Care joining A road
PC8C	098¹/₂	190¹/₂	SW	NE	
GW	107	189	WNW	ENE	
GW	111¹/₂	197¹/₂	S	WNW	
STC8	107	198	ENE	W	Standard section to STC9
PC9A	100	211¹/₂	NW	SE	
GW	103	210	NW	NNE	
GW	110¹/₂	225	SW	SSE	
PC9B	120	214³/₄	W	E	
GW	126	224	SSW	ESE	
PC9C	136³/₄	222	NE	SW	
GW	136	222	NE	SSW	
VIA	141³/₄	213¹/₂	W	SW	Care turning onto airfield
STC9	142	206	E	W	Neutral section to MTC10
MTC10	136	205¹/₂	ESE		