

Navigation in Classic Rallies
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The following are some notes on what I hope may be useful information for someone starting in Classic Rallying, in NSW in particular. It goes a bit past what is really necessary for someone competing in the Novice category, but much of what is included will be the stuff of earnest discussions over a beer or two at the end of the day, and so it may be useful to have at least heard of the concepts. Similarly it will provide some information for the move to experienced status (usually a very quick and jolting occurrence). Two warnings, however. This is not a complete review of what you may encounter (I cannot remember, or find the time to record, everything) and secondly, always ask questions about what you cannot understand – different events will use different terms and the same terms in different ways. Keeping some of the rules secret has been known to add to an event's notoriety.

Overall, it is also important to remember you are there to have fun. Sometimes it is necessary to constantly remind yourself of this. Teamwork between driver and navigator is essential in all events, and this is never helped if the inevitable tension that arises during difficult sections or in difficult situations escalates. Find a way of bringing it all into perspective. And finally, remember rallying is one of the branches of motorsport where the fastest vehicle is not necessarily the winner - as some director's keep on saying, it is intended to be the best combination of car, driver and navigator that wins the event. Luck plays its part too!

Rallying Terms

Average speed section:	A Navigation section where competing cars are also required to travel part of the route between points A and B at an average speed advised in the route instructions. Point "B" will not be specified in the instructions, but it will be a manned control on the correct route (usually at least 5 km from point "A").
Banned area:	Closely settled or other areas in which competitive sections of C.A.M.S. controlled rallies cannot be held. This is generally something the Director has to worry about, not the competitor. The competitor does, however, need to note any areas designated in the route instructions or event supplementary regulations as Out of Bounds.
Blackwell calculator:	An English calculating device comprising two circular tables which can be used to work out average speeds, distances or times provided two of the three factors (time, distance, average speed) are known. Essentially a circular slide rule. Nowadays an electronic calculator can generally be used also.
Check point:	A location on a rally route at which an official ensures competing cars pass through correctly.
Clean sheet:	To travel from one point to another within a rally without loss of points.
Clerk of Course:	Usually an "assistant director", but essentially the organiser responsible for setting the route.
Competitor's briefing:	A meeting of some officials and competitors usually about 30 minutes before the first car is due to depart on the first Division of the rally where the Director and Clerk of the Course give any final instructions and display examples of Sight boards, Control boards etc.
Control:	A rally is broken into a number of sections. At the start and finish of each section are major (also called main) controls. Times of departures from and arrival at these controls are recorded on a competitor's road card. The time taken between two major control points determines the "time" points lost, if any, in that section.
Control board:	Generally a standard size and format board marking the boundaries (start and finish) of a Section ("main") control area. Special rules apply to travel etc within the area of controls, these are generally described in the Supplementary regulations. For Passage controls there will be a single board marking the location. Often combined with a Sight board in these cases.
Control officials:	The generally unsung heroes and heroines of rallying. These are the volunteers who stand in the sun or rain (rarely anything between) and stamp your cards at controls, issue you with last minute instructions and so on. It is easy to get upset if they give you a "wrong direction" or if you have just found the previous section the most obscure you have ever encountered with more questionable instructions than there were kilometers in the entire section, but remember that is <u>your</u> problem, not their fault. Be very kind to them and appreciate what they put up with, we cannot do without them.

Correct route:	The route the Director intends you to follow. The instructions are written in such a way to direct you along this intended route. The first hour of most post event discussions are solely made up of argument about why the Director & Clerk of Course were wrong or why his/her instructions were ambiguous etc. Mostly resolved by the Director, in favour of the Director. It generally only rankles for two weeks (or until you win the event, whichever is the earlier).
Director:	Person in charge of the event.
Division:	A number of consecutive sections in an event, usually between rest or refuel breaks
“Enter on sight” control:	Once such a control is in sight the competitor may not stop or change and travel at an abnormally slow speed. Normally only specified for controls (and passage controls) in Average Speed Sections and for manned passage controls when times are not recorded so there is no reason to delay entry.
Halda:	Swedish made distance recording instrument.
Late time limit:	Competitors start each day with zero late time, but their late time builds up as the cumulative time by which they are late at each section during that day. The late time limit is set by the Director (it is usually advised in the Supplementary Regulations) as the maximum cumulative time allowed to be lost by a competitor in a Division before they are considered to be “no longer competing”. This allows the controls to close and the control officials to move on after a reasonable time. Generally the late time limit is 60 minutes per Division (but only 90 minutes for a full day). If a day is two Divisions, a competitor who has lost 55 minutes in the first Division can only lose 35 minutes in the second Division before they are considered to be no longer competing. Day two is a new day and you start again.
Mapped features (roads etc):	Unless otherwise advised in route instructions, it is assumed whatever is on the official map exists as is shown on that map, whether or not it is so in reality. The route is described and set accordingly. In these circumstances the competitor must learn to ignore (or recognise) new road alignments or entirely new roads, features such as windmills that no longer exist, roads marked as being unsealed that are now sealed etc.
Navigation section:	A section that is timed and for which instructions for its correct completion are give. See also Average Speed Section and Transport Section.
Observational question:	A means of checking the correct route has been followed. Clues are given in the route instructions for questions to answer (based, typically, on signposts, notices etc) and written in the appropriate place on a competitor’s route card. Mostly a distance from the start of the section or division is given for the signpost, notice etc.
Out of Bounds (OOB):	A point, road, location, area etc given in the route instructions that you cannot enter, cross or traverse (and still be on the correct route) unless specifically told otherwise.
Passage control (or Route check):	A control that is not at the start or finish of a Section. Unmanned passage controls are generally Sight boards, Observational questions or Post boxes. At a manned passage control the official will mark your road card (and their running sheet) with a

signature or stamp (and the direction of entry if it is incorrect). Generally only the fact that you have travelled through the point is recorded so you do not need to sign the official's running sheet. Other than in Average Speed sections, times are not recorded at Passage controls.

- Points:** A competitor's performance throughout a rally is determined on a negative scale of point losses. Each car starts an event with no points lost. During the event points are deducted for arriving early or late at a time control or for failing to follow the route instructions (e.g., entering a control from a direction other than that specified or missing a check point). At the end of an event, points are totalled and the winner is the car with the least loss of points. Where time is concerned, points are usually deducted on the basis of one point per minute late or two points per minute early. The actual penalties to be applied in a particular rally should be listed in the Supplementary Regulations for that event.
- Post Box** Sometimes tokens (that have your car number on it) are issued with the route instructions and one must be placed in receptacles at some an unmanned passage controls. It is generally obvious from the look of the Control board when you have to deposit a token.
- Road card:** A card issued to each competitor (generally at the start of each Division and at the same time as the route instructions) on which the competitor records (in the correct order) answers to Observational questions and letters etc from Sight boards. Officials also record the competitors time into controls, notes about direction of entry to controls etc and must sign or stamp the card each time they do so, so you need to give it to control officials as necessary, but make sure you get it back. It is the competitor's responsibility to ensure the information recorded by the control official is correct and to hand in the completed road card when requested (usually the final control in a Division). If you lose your road card you may as well take the shortest route to the finish and get an early start on the beer. Most navigators develop the habit of automatically storing their route card in the one spot in the car. If they cannot find it there they tend to get very agitated and are not much use for anything until they find it again.
- Romer:** Flat rectangular piece of material (3 x 5 ins. Approx.) with various map scales and map grid reference plotters around the four sides. Also called a Rally Romer.
- Route chart:** Part of route instructions comprising series of distances, usually starting from 0.0 kilometers/miles against which are written abbreviated instructions to be followed by competing cars. For example, 0.0 S.O., 0.5 T.R., 1.2 T.L. means straight on at the start, turn right after half a kilometer/mile, turn left after one and two-tenths of a kilometer/mile. In classic rallies distances will be usually be given in both kilometers and miles. It is rare that they are given in only one.
- Route check:** See Passage control.
- Route instructions:** Instructions handed to competitors, generally 5 minutes before their due start time in a Division, that contain instructions for

each Section in that Division. Also included are maps used, and for each Section, allowed times for section, type of section (generally Navigation, Average Speed or Transport) total distance for each section. Observational questions to be answered along the route are also included but often these are attached at the end of the Route instructions. Make sure you look for them as soon as you receive the instructions – most competitors have forgotten about them at some stage, to their cost in terms of unanswered questions and therefore points lost.

Section:	The rally route between two time controls.
Sight Board:	A board with a letter, number or series or combination of these that act as an unmanned passage control. Displayed on the left hand side of the road on the correct route. It is now becoming common for some to be also placed on the incorrect route so points are lost if these are recorded. Competitors must record the letters etc on their route card in the appropriate place. Examples of Sight Boards etc are usually displayed at the Competitors Briefing.
Supplementary regulations (“Supp Regs”):	The regulations covering a particular rally. They are “supplementary” to the CAMS rally code, but in classic rallying are often effectively “stand alone” documents. Read them carefully, and carry them with you in the event.
Transport section:	Section which is (generally) easily completed usually through a town, also termed a non-competitive section. Even if a time is set, no points are lost for late arrival at the end control (though sometimes points are lost for early arrival).
Tulips:	Part of route instructions comprising series of diagrams with realistic representations of road junctions or other features as well as indicating the correct route to follow at those points. Normally they represent junctions, features etc as actually encountered on the road. Occasionally (but not generally in novice events), you may be advised they show “mapped features”. In this case you will have to plot the tulips on the official map (using features as shown on the map), and then navigate along that route. Sometimes the distance from the start of the section (“overall”) or from the previous diagram (“intermediate”) will be given against each tulip.
Unmanned Passage Control (or Control):	Passage control (or occasionally Control) that relies on the competitor correctly recording their passage on their road card by answering a question or recording the letter on the sight board or by some other means the Director advises in the route instructions.
Unmapped features (roads etc):	Where the director advises the competitor to use roads or recognise features as they actually exist, but may not exist or are different to those shown on the official maps.
W.D:	Common abbreviation for "wrong direction" of entry into a control.

Typical Abbreviations

These are usually included in Supplementary Regulations, so always look for unusual ones.

N:	North	VR	veer right
S:	South	SP:	Signpost
E:	East	SO:	straight on
W:	West	FMR:	follow main road
TR:	turn right	FMT:	follow main track
TL:	turn left	XR:	cross road
BR:	bear right	TJ:	`tee' junction
BL:	bear left	RJ:	road junction
KR:	keep right	RD:	Road
KL:	keep left	GR:	grid reference
THR:	turn hard right	MPMS:	maximum permitted maintained speed
THL:	turn hard left	UM:	Unmapped
TVHR:	turn very hard right	KM/H:	kilometre per hour
TVHL:	turn very hard left	KM:	Kilometre
RA:	Roundabout	M:	Mile
VL	veer left	MGBGTV8:	a very fast car (perhaps)

Essential Equipment

- Map(s) – usually supplied at scrutineering, but don't forget to bring them with you for the rally!
- Romer – A small piece of (usually) plastic that is invaluable for plotting grid references. A basic (but adequate) one is usually supplied. Others are available at some map shops etc. Wait until you see what works for you before buying anything elaborate.
- Pencils – 2B is about ideal - too soft will smudge, too hard doesn't make a bold enough line, and digs into the map.
- Rubber (as in eraser) – Don't use ones that are too hard. Plastic ones are very good.
- Digital (perhaps – not essential, but probably easiest to use) Watch/Stopwatch (set to rally time). One that displays seconds is recommended. Needed to ensure you book in to controls at correct time. Rally time will be available at the start, so you can set your watch.
- Pencil Sharpener – Just in case – well actually if you are using a 2B pencil it probably needs regular sharpening.

Other Useful Bits of Equipment (latter items probably not necessary when competing in the Novice category)

- Notepad – to note down any important info, such as may be given at the driver's briefing.
- Map Board – A square of cardboard or similar crushable material to rest the map on. Laminated foamboard is good. (Do not use hardboard – remember it is between your stomach and the dashboard)
- Analogue Watch with second hand – handy if you still think in terms of where the little hand is or if your digital clock does not display seconds.

- Travel-sickness tablets or patches – depends on how well you travel!
- Elastic Bands and bulldog type clips – fasten spare pencils, questions etc etc to sun-visor
- Pieces of string – put your romer on a piece of string around your neck, saves losing it or searching around under the seat, also useful for measuring distances on maps and so on.
- Ruler – for nasty navigations
- Protractor – for nasty navigations
- Dividers – for nasty navigations
- Average speed calculator or tables - for really nasty navigations
- Calculator – for really nasty navigations
- Tracing Paper (or overhead transparency film) – for really nasty navigations
- Magnifying glass (with or without an in-built light) - for really nasty navigations, really nasty maps or moderately old eyes.
- Halda or some other form of resetable odometer.
- Clipboard – Some find it helps to keep all the pieces of paper together
- Highlighter pens – some mark the route on the map with these. I find I inevitably change my mind half way through a section so I only use a pencil.
- Hand held magnetic compass – sometimes useful when you are really confused about which road you are on. Ones that attach to the windscreen etc are rarely necessary. Difficult to calibrate and only rarely used (hopefully) it is not worth the space.
- Map Light – occasionally Classic Rallies have night sections – for this you will need some form of map light that does not reflect badly onto the windscreen. In this case a torch is also very useful – dropped pencils etc can be very hard to find without one. The Supp Regs will (should) tell you if there are to be any night navigation sections. Worry about it then!

On the Road

Some of the following information will not be relevant to navigating in Novice events, but it does contain some of the basic techniques that you should get used to for subsequent events.

Timekeeping

Getting the timing right is perhaps the most difficult part of doing a rally of any type. Following a real route while staying on the correct time schedule, rather than just going for raw speed within the confines of a racing circuit, is the central feature which distinguishes rallying from other forms of motorsport.

When competing on a rally, you should always be aware of your time situation, so you know exactly what time to book into each time control. If possible, the driver should mentally keep track of Due Time and Late Time (see below) and be able to confirm the navigator's calculations.

If you see that you are going to arrive at a time control (other than an “enter on sight control”) significantly before the time you want, then have the driver pull in to the side of the road just before the control board (without obscuring the Control board for cars following you) and wait. Just before the time you want to book in at, drive up to the control official. Roll down the window and ask for the time you want, e.g. “ten thirty six”. If you are just going to make it, or miss by a few seconds, tell the driver to "go straight in" as you approach the control, and ask for the time you want - but don't always expect to get it! If you're going to be late, say something like "Earliest time please" in as doleful a manner as possible and rely on the control official's sympathy. The Control Official will take your Road Card, mark the time and any other necessary comments on it and sign it. They will write the same time on their running sheet and have you sign it. It is up to you to make sure all details (such as your car number on their running sheet, the time on both cards, that they give you the correct road card etc) are correct.

In Classic Rallying generally no time is allowed between Sections. Your time into a control at the end of one Section is your start time for the following Section. You need to leave the control area without delay as there are often cars following, and apart from a few pleasantries Control officials rarely have time for extended conversations to explain why they are on that intersection in particular, what was meant by the previous instruction etc. Truth be known they were probably just placed there by the Clerk of Course who said “cars coming from this direction are correct, those coming from any other are not”. Save your questions about the route for the end of the Division and ask the Clerk of Course, Director or their minions.

If you have not worked out where to go for the next Section by the time you reach the Control at the end of a Section you will need to leave the control area and pull up somewhere down the road to work out where to go next (probably amongst a lot of other people trying to do the same thing). Make sure you do not block the road.

In principle, all the control officials' watches (and yours) should be synchronised to the second with "rally time", but sometimes they're not. If you don't get the time you want when you do deserve it, it is rarely worth complaining, just accept it as fate. In most events, the results at both Novice and Experienced level are rarely affected by the odd time penalty due to a badly set clock.

Terminology

The following sections describe timekeeping for what is known as "Current Minute Timing"; the idea is that the organisers lay down a schedule for each car at the start, and you have to try to stick to it. This is the form of timing that is almost always used on road rallies. The basic idea of road rally timekeeping can be summarised like this:

- All timing is done in whole minutes, and times are usually rounded down, ignoring the "seconds" displayed on the watch, i.e. both 12:45:01 and 12:45:58 are considered as 12:45. Some rallies allow you to book in between 12:44.00 and 12:45:59 and still be considered as booking in at 12:45 (“forward minute timing”) but this is becoming uncommon in NSW Classic Rallies.
- Cars start one minute apart, according to car number, often with the more experienced competitors having lower numbers and going off first.

- You try to book into the controls in order, usually following a pre-defined schedule based on the allowed times for each Section.
- If you end up running late, you aim to stay running the same amount late, rather than racing to catch up. The organisers will try to make things interesting enough so that catching up is not an option!

There is a broad range of terminology for timekeeping; but as a classic rally competitor, there are only likely to be a few concepts to be aware of

- **Rally Time** - rallies are not timed with stopwatches, they run on normal time often in the 24 hour clock. To allow precise timing, all Control officials and competitors synchronise watches to an agreed time. When you arrive at the start (or at the Competitors briefing at the latest), there will be a watch with rally time on display -set yours to match it, exactly to the second.
- **Scheduled Time** - your Scheduled Time at a given time control is the time you would book in there if you were not running late. Scheduled Time is predetermined by the organisers but you will have to keep track of it as you go, calculating it from the time you started the Division and the number of minutes allowed for each section. Since cars start one minute apart, this is different for each competitor. The Scheduled Time is mostly of relevance to you Late time (and to the points loss for late arrival at Controls).
- **Due Time** - your Due Time at the next time control is the time you should try to book into it, in order to avoid being penalised. This includes any previous Late time you may have accumulated, i.e. if you were running 7 minutes late when you booked into Control 4 (and you had not been late into Controls before that), and your original Scheduled Time at Control 5 was 12:38, your Due Time at Control 5 is 12:45. The Route instructions will give a set time for each Section – your lateness into previous controls does not affect the time you have in which to complete subsequent Sections (unless you are running close to your Late time limit).
- **Nominated Time** – normally if you arrive at a major control early on Transport Sections (and sometimes on the final section of a Division) the Director may allow you to check in without waiting outside the control until your Due time. In this case you will be asked to nominate the time you want – for example if the Section had an allowed time of 42 minutes and your time out from the previous major control was 15:25, you would tell the Control official as you enter the control you want 16:07. You will either be told at the start of the Division you can nominate time on particular Sections, or you will be beckoned in by the Control officials if you wait outside their control and they have been told by the Director to allow competitors to nominate.
- **Late time** - your Late time is how far behind Scheduled Time you are running, expressed as a number of minutes, e.g. "We were 7 minutes Late when we booked into Control 4 and lost another 12 minutes into Control 5". Total late time is just the difference between Due Time and Scheduled Time at whatever point in the route you happen to be. If you arrive later than you intended at a time control, and hence book into it after your Due Time, your Late time increases. In terms of general discussion on the event it is normally just “how much time did

you lose” or “what are you down” (which generally includes all points lost – time as well as missed passage controls etc).

- **Late time limit** - There is a limit to how much Late time you are allowed to accumulate; after all, the organisers want to finish the rally, publish the results and get to the bar! This limit is usually 60 minutes per Division (it will be notified in the Supplementary Regulations for each event). If you have more than 60 minutes of Late time, you are “Out of Late Time”. If you book into a time control so late that you're Out of Late Time it, and all subsequent controls and observations in that Division do not count, just as if you never visited them at all. Even though you can start again in the next Division you will be very much down on total points. You should take the measures described below as necessary to avoid being out of late time.

How to Avoid Becoming “Out of Late Time”

If you are on a difficult rally, and your late time in a Division has built up to over about 45 minutes, you need to consider taking one or more of the measures below to reduce it. This is a matter of judgement, since all of them cost you penalties and affect your score. They are listed in order of how drastic they are, with what may be the mildest first, but you should familiarise yourself with the scoring system so you can estimate number of penalties each one is likely to incur.

- **Making Up Time** - with a bit of practice, you may manage to do some rally sections in less than the specified amount of time. If you need to reduce your late time, in some rallies you can book into a time control ahead of your Due Time, instead of waiting outside. This is known as "Making Up" but is in fact a quite uncommon means of avoiding your late time limit (and you will usually lose the double point penalty applied to early arrival in controls). It is usually the case that if the rally is so difficult you have lost that much time it you cannot be sure you will reach subsequent controls early enough to claw back much time.
- **Cutting Some Route** - if you are running late and you're not able to make up time by arriving early at subsequent controls while maintaining the correct route, you might consider missing out a bit of the route. If there are two time controls which are only physically a couple of miles apart by road, but the rally route between them is quite contorted and much longer, you should be able to make up quite a lot of time by going straight to the next time control. You risk missing all the passage controls and observations, as well as possibly arriving at the next control in the wrong direction. If you have to do this, it is much better if you can at least partly plot the correct route first; this will allow you to work out what way to approach the next control, and decide where the passage controls might be, and how many you will miss. Usually, the organisers use the minimum number of code boards required to satisfy the condition that someone who makes a navigational mistake misses at least one, but they are at liberty to place them anywhere.
- **Cutting Controls (“cut and run”)** - if you are really desperate, it is possible to skip one or more time controls and still have a chance of finishing the rally. It is always best to finish the rally if at all possible, no matter how huge your penalties are, as you don't know how badly everyone else might have done. By going straight to a later control you can potentially pull back a large amount of time and

make a fresh start, but this is often a method of last resort, as you will be penalised not only for the time controls you missed but all the passage controls and observations too. In this case be sure to work out what time you need to book in at the control you have cut to, as you don't want to be early (i.e. ahead of Scheduled Time).

Plotting the Route

Maps, and some important points to keep in mind.

The official maps most commonly used are the AUSLIG (or whatever the current name of the Australian Government Map people is) 1:250,000 scale survey sheets. For weekend events in NSW the official maps will typically be two or three adjoining maps. Official maps are usually supplied by the organisers (the Supp Regs will tell you if they are) and they are generally issued at scrutineering.

These maps are well prepared and contain a lot of information, but it is worth bearing in mind that they are not intended for motor sport use, and so represent a bit of a compromise. The scale is a bit smaller than an ideal size for road reading, and the cartography is rather variable - the representation of the roads varies from very precise to rather vague wandering lines drawn freehand. You are able to provide yourself with supplementary maps if you wish. These may be larger scale maps, tourist maps, local street directories and so on. Sometimes they are helpful, sometimes they are a hindrance.

There will be an extensive key or legend along one side of the map that defines all the map features. It is worth learning what these are so you can acquire the skill of looking at a piece of the map and visualising what the area it represents should look like.

North is typically taken to be indicated by the grip lines that run vertically up the map. In reality magnetic north may be some degrees either side of this, but the basic convention in NSW rallies is to assume when the route instructions say "north", the Director means mapped north and not magnetic north.

Different people have different means of map preparation. Some just fold them into convenient sizes, others carefully use a highlighter pen to make grid lines (see below) stand out and others probably annotate them with all sorts of comments. You need to work out whatever is helpful to you.

Mapped and Unmapped Features

It is important to remember that in the majority of Sections, the instructions will refer to "mapped route", "mapped roads" and so on (or there may be an instruction in the Supp Regs or at the start of a Division "unless otherwise advised use only mapped roads". In a Classic Rally the map is taken as being not just a representation of what is on the ground, but what you have to assume is on the ground as you work out the route. The when you navigate your way around the route you need to be conscious of where the real roads differ from the actual ones – these are favourite points for Directors to place passage controls. Having said that, there are in fact too many instances these days of roads being slightly re-aligned or intersections reformed. As a result the Director will often ignore these changes

– one of the navigator’s headaches is to try to guess which is a significant change that needs to be checked out and which to just ignore and assume the Director did too. Experience and luck are two factors here, but the first section or two of an event are always a worry as you try to gauge what the Director is doing on this rally. Often they will give clues by saying “use an unmapped road between X and Y” – if you are travelling along the Hume Highway you can guess this will mean use the new road between those two points (but you better be careful each side of those points otherwise why would the Director confine his advice to between X and Y).

Further the instructions may (and often do) talk about using only “mapped sealed roads”. You will need to look closely at the Legend of the map to see how “sealed” and “unsealed” roads are drawn on that map. Typically the difference to the navigator’s eye, when bouncing along in the car and trying to interpret instructions, look for answers to observational questions and remember to tell the driver to keep left half a kilometre down the road is about zilch. Nothing of this is to do with the age of the typical Classic Rally navigator’s eyes, however. Most people at times have to use a magnifying glass to tell the difference in colours, and most navigators have picked an incorrect route on the basis of not being able to differentiate roads in the heat of the moment.

Having said all that, remember these are “mapped sealed roads” (or mapped unsealed roads for the others). The “mapped” here is critical, it may be 20 years since the map was drawn and what was sealed then may now be dirt and (more commonly) what was unsealed then may now be sealed. If you are told to use some mapped unsealed road and you do not travel on a dirt road you may well be on the correct route. Don’t automatically assume the map is accurate (or up to date), and remember most Classic Rallies typically do not involve the negotiation of much unsealed road. Generally you will be told at the start how much unsealed road will be encountered during the event (on the correct route), but remember this discussion will always be referring to “actual” unsealed road present on the correct route rather than “mapped” unsealed road. Don’t get confused.

Tulips

Tulips are route instructions that are comprised of a series of diagrams with realistic representations of road junctions or other features as well as indicating the correct route to follow at those points. Normally they represent junctions, features etc as actually encountered on the road.

Figure 1 shows typical Tulip instructions. Note they may or may not be numbered, they may have distances indicated as well. The general rule is, however, they represent the road at that point and they indicate the direction you are coming from (you are travelling from the circle or dot at the end of one of the lines) and you travel away from the junction or feature along the road shown by the arrow. If no distances are given you must travel until you see the first feature that looks like the one in the Tulip, then follow the directions given in the Tulip.

Figure 1 added about here.

In the diagrams in Figure 1, the Tulips represent:

1. Straight on at junction (where a road veers to the right – note it may be that the main road veers to the right and you need to take a minor road straight ahead).
2. Turn right at “T” junction.
3. Turn left at crossroad.
4. Veer right at junction. Again it may be the main road that you continue to follow or it may be a minor road that you take to the right at the intersection.
5. Turn hard left at a 5 way junction.

Multiple Use of Roads

The CAMS Rally Code has regulations covering multiple use of roads. The basic rule is that at no time in any one Division should two cars on the correct route in competitive sections ever be travelling in opposite directions on the one piece of road. Essentially a hangover from dirt road and night-time rallies, but overall a sensible rule given the narrow country roads often in use and the joy of having a fang on those roads. Remember always however the roads we use are public roads and the locals (or other tourists) will be on them doing all sorts of things you cannot even imagine. Other competitors are also likely to be doing all sorts of things you can imagine – going back to look for that question they missed, checking whether they really should have taken the other fork in the road and so on. In practice most of us see competitors going the other way, but mostly one of you will know they are going against the traffic and will be taking care and in fact expecting to have someone with a red glaze over their eyes to come rather smartly around the next corner.

Note also that “opposite directions” is fairly broad – it also means “crossing over” or crossing the path.

The diagrams in Figure 2 give some examples of what can and cannot be done.

Figure 2 goes about here.

In the first two diagrams the route goes through the one intersection, but at no time would cars have to cross another competitors tracks while travelling in another direction.

The third shows the acceptable use of one piece of road twice. Starting from the top, the car proceeds past “A” and turns right to pass through “B” before rejoining the original road and leaving through “C”. On the road through “A” all cars will be travelling in the same direction and, strictly speaking, when entering the intersection above “A”, no cars cross paths of others. This sort of loop is in regular use in NSW ClassicRallies.

The fourth is not allowed in rallies as at the intersection “A” two cars on the correct route would have to travel in different directions – in this case cross paths.

The fifth shows a straightforward (and illegal) use of the same piece of road twice. Here a car travelling from the top passes through “A”, “B” and “C” as in the first diagram above, but then goes back up through “A” again before turning right to “D”. In the area of “A” the cars will be travelling in opposite directions on the same piece of road (even though it has two or more lanes). It is easy to see from the first diagram how the route travelled could be easily altered to avoid this.

As can be seen from the above, you can go through an intersection twice as long as you do not cross your own path (based on diamond turns being the go) and you can travel on the same piece of road twice provided it is in the same direction, but apart from that, you generally only see the same bit of countryside once in a Division. Note a few tricks are used here – tunnels and overpasses can be used without “crossing the path” and if a dual carriage way is marked as two roads on the map they will be considered as separate roads (though I cannot recall this having been done - yet).

Occasionally the instructions do tell you in a Transport Section at the start or finish of a Division to take care as other competitors may be going in the opposite direction. This is typically the case if you have to go into town to refuel or have a meal break.

Also, very occasionally inexperienced Directors have ignored the cardinal rule of not using the same piece of road twice in different directions, but this is rare and hopefully you will never encounter it. If it does happen it is usually good for about a twenty minute time loss as you frantically search for an alternative route.

Shortest Mapped Route

Route instructions usually talk about the shortest mapped route, however the Supp Regs often define this more closely. Firstly, remember whatever the instruction may be, it is the “shortest mapped route”. From wherever you are at the start of the section, you cannot go the pretty way, or the way you know to be the shortest because of that short cut you saw last time. You need to look only at the map and decide what is the shortest way, then take the driver along that route.

There are two main sub-divisions of “shortest mapped route” – shortest mapped route point to point and shortest mapped route overall. The difference is very important and the source of much confusion. Take the map shown in the first diagram in Figure 3 (thank goodness there are rarely this many roads on NSW 1:250,000 maps, except perhaps around Thirlmere!). You are at a control at “A” facing NW and the final control for the section is at “F”. The instructions say to travel through B, C D and E.

Figure 3 goes about here.

If the instructions are to use the shortest route point to point, then you have to find the shortest sections of road to go from A to B, then the shortest sections of road to go from B to C, then the shortest from C to D and so on. You have to do this without using the same road twice in different directions or crossing your route. The correct route in this case is marked in the second diagram in Figure 3. Note that “B” is not at an intersection so you have to keep going in the same direction as you pass through it. Point “C” is at an intersection so you have the choice of two exit directions once you reach it. The shortest actual distance between “B” and “C” is not the road employed, but it is the shortest possible route between the two points once you get to “B” via the shortest distance between “A” and “B”. In practice, the shortest distance point to point is the easiest to work out – the choice is limited.

If the director decrees the section is to be the shortest mapped route overall, you are now looking for the shortest route between “A” and “F” that passes (in any order) through “B”,

“C”, “D” and “E”. The options multiply and you have to check lots of combinations and permutations. The third diagram in Figure 3 shows the route in this case – note it no longer uses the shortest distance between “A” and “B”, for example, but overall it is a shorter route between “A” and “F” than the previous example.

The Supp Regs usually tell you what the “default” use of the term “shortest mapped route” will be in that rally – it is usually shortest mapped route point to point. That then leaves the Director free to just use the term “shortest mapped route” at the start of the route instructions for most sections. He/she then is free to drop in an occasional “shortest mapped route overall” at the start of the route instructions for a particular section. Easy to overlook, and correspondingly easy to sail into a passage control from the wrong direction. Look out for it.

Measuring Distances.

Why go to the trouble of measuring distances in a rally? In general there are four uses of distance measurement in classic rallies:

- The director usually shows the location of observation points, questions, controls and points of danger as kilometers (and miles) from the start of a Division. (A Division is usually half a day of rallying – Divisions are normally broken into separately timed Sections, typically 30 – 100km long).
- In some cases (such as when “tulips” are used for instructions) the director will provide distances for each instruction from the start of a Section or from the previous instruction (or both).
- If an “average speed” section is encountered, both distance and time must be measured if you are serious and want to calculate your actual average speed. Some people ignore these instructions, but they are often critical in separating places in experienced categories.
- If you are reading a map to follow your progress (not necessarily critical in novice sections, but advisable – you will not get everything right the first time – or the second or, depressingly, any time) it is normal to measure distances between features on the map and check them with what is actually happening on the road. If a mapped bridge across a river does not appear within a reasonable distance from the measured distance after the last road junction, then you should start to ask questions like “am I where I think I am”. If you are not measuring such distances you can go for a long time before you discover the control is not on the road you are on!

The reason a device with two odometers able to be adjusted independently are popular is that you can leave one register on total distance while you use the other for whichever of the latter three uses interests you at the time.

The Halda

In the rallyist’s lexicon, a Halda is the mechanical odometer (distance measuring instrument) that became a piece of standard equipment in probably every rally car of the 60’s and early 70’s. Halda was (is ??) a Swedish manufacturer that probably obtained its bread and butter from manufacturing mechanical Taxi Meters (for fares), but made these

wonderful odometers as a sideline. By about the mid 70's electronic odometers were becoming common in rally cars, but these are frowned upon in most classic rallies.

Three commonly seen Halda models are:

- Tripmaster: Mechanical odometer with one register. The register can be set on / off / forwards / backwards as well as instantly reset to zero and hand wound forwards or backwards. Distances measured to 2 decimal places – ie when in kilometers, in tenths and hundredths of a kilometer (100 meters and 10 meters, respectively) distances.
- Twinmaster: Mechanical odometer with two registers. The most common unit for rally competitors. Each register can be independently controlled (well, mostly independently) with the same functions as the Tripmaster.
- Speedipilot: A truly amazing piece of mechanical gadgetry, with a small format Tripmaster and a mechanical clock plus an additional hand for indicating the average speed of the car. Basically of limited use, though it always sounded great as most rallies require at least one or two sections to be travelled over at a set average speed. Most commonly accompanied these days by the cry “does anyone know how to work one of these?” Such cries seem to be irrespective of whether or not the user has an instruction sheet.

Halda's are traditionally driven by the car's speedo cable. The speedo cable is usually unscrewed from the back of the speedo and a “T” piece is screwed in in its place. The speedo cable then goes into the other end of the T piece, and the Halda drive cable (a short speedo cable) comes off the “T”. They can put a large strain on the car's speedo drive, speedo cable and speedo itself. Attention to detail regarding cable fit at junctions, lubrication and avoiding short radius bends of the cables are important.

Haldas have interchangeable driving gears so that they can be adjusted to read correct distances no matter what diff ratios, tyre sizes or speedo drive gears are used. Adjustment is in steps (depending on the number of teeth of the two adjustment gears employed) and is usually a case of “set and forget”. Adjustments can get the error down to about about the nearest 20 meters or so, from memory. It is reported an obsessive character recently asked one of the suppliers of gears (as with all Haldas and Halda parts, these are scarce and so there are limited suppliers, and supplies) for a 39½ tooth gear to make his Halda read perfectly. You can get by without this!

Example of the use of a Halda for Intermediate Distances.

The example shown in Figure 3 gives an opportunity for a review of one method of using a Halda for calling corners etc. The following assumes the use of a Twinmaster so one counter can remain set to the overall distance for the Division (or Section, if the Director happens to reset distances to zero each Section). The exact expressions used are a matter of choice between navigator and driver, but consistency is important. Nothing like a car in the dirt as a result of a misunderstood call to charge the atmosphere with a bit of tension.

Take the case of the point to point route (second diagram in Figure 3) . The counter being used for the intermediate distances is the one being zeroed and read. It is also usual if the navigator is not still working on new parts of the route instructions for distances to be called about 200 meters from corners, here I have just taken it to be the distance from the

previous corner (to save my typing). It is also common if the navigator has time to call bends as they appear on the map. In practice, make sure you tell the driver if you are going to stop calling all corners, bends etc. It can be confusing if you have called four gentle bends in a row, then leave him to discover on his own that he is in the middle of a nasty 150 degree bend at the end of a 700 m straight because you suddenly wondered if you had plotted the final part of this section correctly and stopped reading the road off the map for him.

Starting at "A". Zero intermediate counter.

2km, road on the right for reference (if you were really on the map you would probably call the sharp bend at 1.2km, but I am only recording junctions here)

Zero Halda at this junction.

1.5km, turn right at "T" (passing through B)

Zero Halda at this junction.

1.5km, keep left, road from right for reference.

Zero Halda at this junction.

1.5km, keep left, leave road to right.

Zero Halda at this junction.

2.3km, turn right off this road.

Zero Halda at this junction.

400m, turn left at "T" (passing through "C").

Zero Halda at this junction.

1.9km, turn right at "T" (passing through "D").

Zero Halda at this junction.

1km, turn right off this road.

Zero Halda at this junction.

5km, road to the left for reference.

Zero Halda at this junction.

1.2km, left at crossroads.

Zero Halda at this junction.

1km, road to the left for reference.

Zero Halda at this junction.

1.1km, turn left at crossroads (Passing through "E").

Zero Halda at this junction.

1.2km. Straight on into control.

Zeroing the Halda at each junction reduces the error from slight variations in distance etc that tend to accumulate and be confusing as the Section continues. Conversely, if you suddenly discover you are not where you thought you were having zeroed the Halda at what is now a "questionable" point leaves you a bit up in the air until you find another point you can identify with confidence. All in the experience!

It takes time to get to use a Halda "automatically" (well, mostly automatically, "shit, I forgot to set it to "forward" again" is one of the most anguished cries to be heard from the navigator's side of the car) but once it becomes familiar and the navigator and driver build up their teamwork then it becomes a very useful tool. Having said that, and having been stranded without one at times, I know that once the initial shock has passed it is only occasionally felt to be a major handicap to run without one. At times it would have been mightily handy and saved a few wrong turnings, but not a major impediment to some respectable performances.

Why a Halda?

It is quite possible in most rallies to get by without the use of a Halda. A car's odometer is usually adequate, especially when entering as a novice. Some of the difficulties with using it are, however:

- While you can work out how much it is in error (through a test km or 5 km section), though you cannot (normally) adjust it – you just need to keep on making allowances.
- Unless you are in an especially desirable car (say a 250 GTO), it is likely to be in front of the driver instead of where it is actually of use, in front of the navigator.
- If you do not have a tripmeter on the car you will not be able to reset it for a new Division. You will need to write down the distance at the start and keep on doing the subtractions.
- You cannot “wind on” the odometer if you find a known distance comes up a little early or late.
- It may not wind backwards when the car is reversing.
- It cannot be switched to run backwards if you go too far down a road or need to turn back for some reason. None of us always get the right road the first time, or sees the answer to the question when we expect it, so there is always some turning around and going back. It always riles the driver when you say “turn around now” and he has just spend 5 minutes getting past that semi which is now sitting on your back bumper bar. As a navigator you are blissfully ignorant of vehicles around you and even after many years I can never understand why the driver always gets shitty at that exact moment.

Having said all that, if you are not familiar with the use of the Halda it can just sit there as a hunk of extra weight on the dashboard. My general advice would be don't get up-tight in the first one or two rallies if you do not have one (or do not hire one), but if you decide this is a sport for you get one whenever you can and put it in as soon as you have it. Using one is really the only way to learn, but you are probably taking in so much in your first rally or two you can well live without its distraction if you have to.

Map References

Modern 1:250,000 sheets are composed entirely in metric units, and use the map reference grid based on 10km squares. A national grid map reference gives a precise location on the map in terms of the grid lines printed on the map. These grid lines are generally printed in fine blue line and numbered along the edges (with an occasional blue number on the map itself to help). There are other lines printed also, such as the black latitude / longitude lines. Be very careful as when they are close to grid lines they can be very confusing – it is amazing how you can ignore the colour when plotting.

A map reference is given as an even number of digits - the first half of it refers to the "eastings" which are numbered across the map from the bottom left, the second half to the "northings" which are numbered upwards from the bottom left. This can be confusing as

the “eastings” are actually drawn as lines running north – south and “northings” as lines running east – west. The names can be thought of as “eastings” are when you step across the map towards the east, northings as you step up the map towards the north. Various mnemonics have been developed to help here, usually some variation of “across then up”. About the worst I have heard is “CAMS” – cross and mount stairs. That is so bad you will probably remember it forever!

In reality, a map reference does not refer to a point, but a square area whose size depends on the accuracy to which the reference is quoted. On road rallies this only applies to four figure references, which refer to whole grid squares; six and eight figure ones can be considered as points within the accuracy achievable. While six figure references are discussed here they are rarely used. Eight are the most common, with four in occasional use.

The examples that follow refer to the Goulburn 1:250,000 map, Edition 1.

The blue numbers marked across the bottom (and top) of the map run from 64^{0000} to 77 (with a 23 on the far right at the bottom only). Ignore the “ 0000 ,” where it occurs, it is not relevant to plotting. The numbers here are the eastings 64 to 77. The far right one, 23, indicates that the map to the right (Wollongong, as it turns out) has a different numbering system and so the overlap is confusing. Maps to be used in Sections are specified at the start of the Route instructions for that Section, so you generally understand what is going on very quickly when this occurs in a rally.

The Goulburn map has numbers 613^{000} to 624 marked from the bottom left up to the top of the map. The numbers relevant for plotting northings in rallies are 13 to 24. You will also see 613 to 623 marked on the right hand side, not as visible as they are printed onto the map itself and not off the edge. You will see from these numbers (and the eastings) that the grid lines are not exactly square on the sheet. This is nothing that should affect your navigation.

- Four Figure - these refer to an entire 10km grid square; the square is the one to the right of the vertical grid line (easting) and above the horizontal one (northing), e.g. 6714 is the grid square containing the town of Yass Junction (and Yass also). This is shown below. See first diagram in Figure 4.
- Six Figure - these refer to a point to an accuracy of 1km (about 4mm on the map) e.g. Yass Junction is at 675146. When a driver is reading map references aloud from a clue and a navigator is plotting them, it is conventional to read the grid square first, e.g. 675146 is "six-seven, one-four; five, six", with suitable breaks between the first and second pairs to allow the navigator to find his or her place on the map. This is helpful because you need to locate the grid square first when plotting the reference. A crew should decide on whether to use this convention, or to read map references linearly. Note that six figure map references are not commonly used in NSW Classic Rallies.

To plot this with a romer, first find the grid square, then position the "5" mark on the top edge of the romer on vertical grid line 67, and the "6" mark on the right edge of the romer on horizontal grid line 14. See second diagram in Figure 4 for this example, but as I cannot draw finely enough the figures on the romer do not show up! Try it with a romer and you will follow it.

- Eight Figure - these are used to give exact references, and are normally employed in NSW Classic Rallies. On 1:250,000 map they are accurate to about 100m – usually OK, but occasionally still requiring judgement calls on closely mapped intersections. The "extra" digits, as compared to a six figure reference, i.e. the 4th and 8th ones, mean you have to interpolate from the figures given on the romer – normally these subdivisions are not marked, so again some judgement may be necessary. In our example, the intersection of the Hume Highway and the road towards Derringullen is at 67381452; this is read " six-seven, one-four; three-eight, five-two". Again the example is shown in the third diagram in Figure 4.

Figure 4 goes about here.

The following map references all plot at road junctions - try them and see:

- 65451462 – Burrinjuck Dam turnoff from Hume Highway
- 65781880 – main road junction within built-up area of Boorowa
- 75911892 – junction, Oberon – Goulburn Road and road to Bannaby at Taralga (be careful you do not measure from the 149-45 degree longitude line in black.
- 77291526 –Marulan South turnoff from Hume Highway
- 72281339 - crossroads east of Collector
- 63962028 – crossroads at Murringo (this sort is many a Director's favourite)

References.

Some of the information included above was copied or adapted from various sources. These include:

Various Supplementary Regulations and section instructions for Classic Rallies in NSW
 Castrol Rally Manual (ed. P. Browning), Patrick Stephens, London, 1971
 Rallying & Rallycross (ed, Roger Bonhomme), Olympic Tyres, 1971
 How to go Road Rallying, David Croke, 1997 (Edinburgh University Motor Sport Club)
<http://www.dcs.ed.ac.uk/home/dcc/RRIntro/> Note this has a lot of information specific to Scottish Rallies, but much is similar to NSW events. The navigation does, however, seem to be even more devious than that required in our events.
 Steve's Brief Guide to Road Rally Navigation, Steve Brumpton, 1998, Cambridge University Automobile Club <http://www.cam.ac.uk/CambUniv/Societies/cuac/rrguide/>

The navigation schools run by the Classic Rally Club (and the tabletop rallies they sometimes have) are great ways of learning the terminology and finding out the tricks of navigation (and the deviousness of Directors). Some Directors (and I think Jeff West is one) provide the instructions for the Experienced category to Novice competitors as well. Cross checking from one to the other after the event is an excellent way to learn. Otherwise just competing and asking questions will help fill you in.

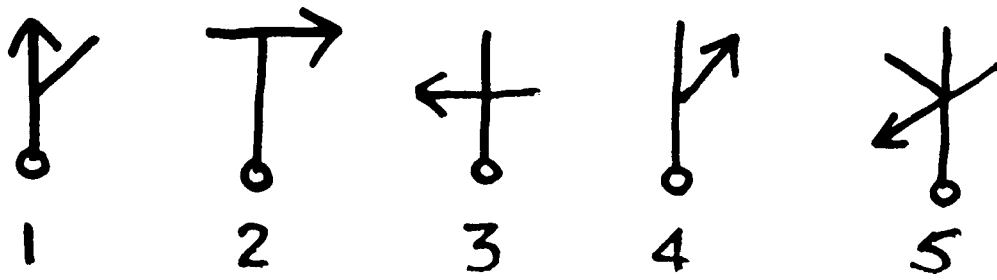
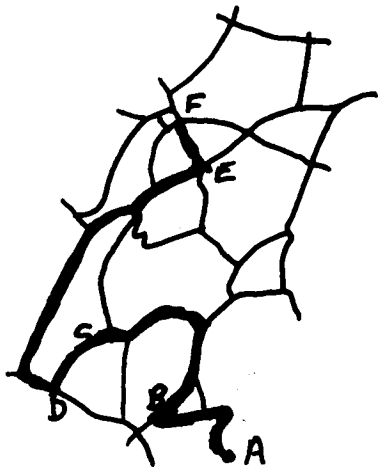
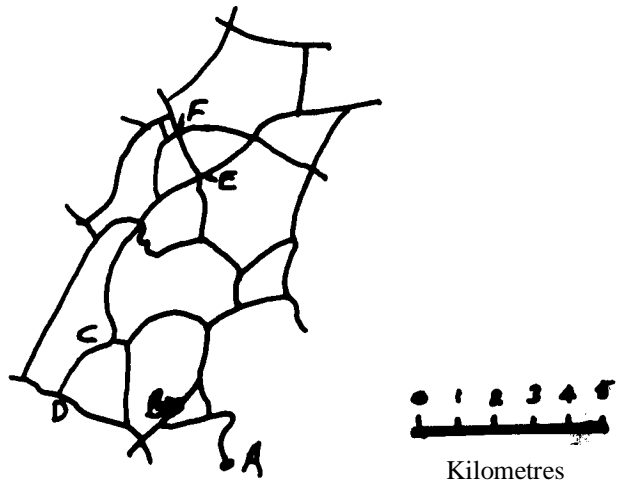
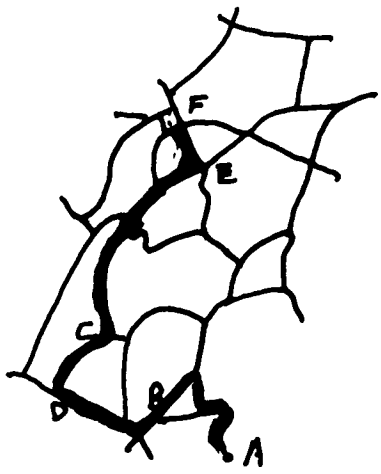


Figure 1. Sample Tulips.

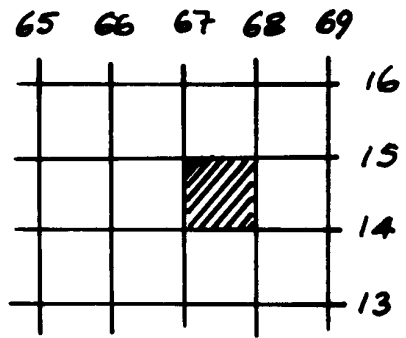


Shortest Mapped Route
Point to Point

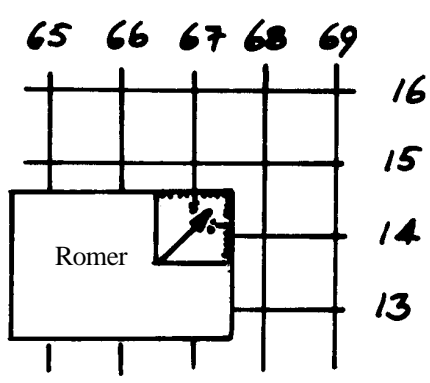


Shortest Mapped Route
Overall

Figure 3. Examples of Route Selection.



Four figure map reference, 6714



Six figure map reference, 675146

Eight figure map reference, 67381452

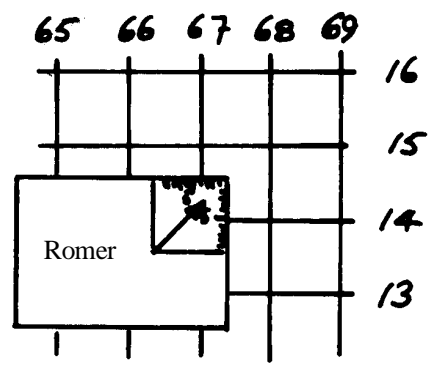


Figure 4. Map References