This file contains the first seven parts of a series of articles written by Julian Smith of Ride Drive for the TVR Car Club Magazine. When the series is complete this file will be updated to include all the articles.

If you want to know more about Ride Drive check out;

http://www.ridedrive.co.uk/

Registered Office

21 Ramworth Way
Aylesbury
Buckinghamshire
HP21 7EX

Company Director : Julian SMITH
Telephone : 01296 427889

Booking enquiries via
motoring@ridedrive.co.uk or on 01296 427889.

Registered Company Number : 3408030.

VAT registration number : 851-7203-40

Ride Drive Limited

01296 427889

motoring@ridedrive.co.uk

Introduction from Clive Westmacott TVR Sprint Sub-editor

Hurrah for the open road!

Had you asked me a few weeks ago how I rated myself as a driver I suspect that I would have modestly replied that I was above average. What I would have meant was that I actually reckon that I am a good driver, priding myself on several aspects of the skills and techniques, gleaned from 41 years of driving, chatting to professional drivers and reading relevant literature. Oh yes, and I am more than capable of handling (and getting the most from) a 25-year old TVR on the public roads, or am I?

So it was with some distance that I reviewed the Ride Drive web site last year, I was really quite impressed by some of it and when I revisited it later I was even more impressed, in fact, I started to examine it far more carefully. It began to dawn on me that these guys seemed to really know their stuff and were obviously very passionate about their cause. I read a range of testimonials written by some of those who had driven with Ride Drive that were enthusiastically thanking the organisation for their work, but could it really be that good? I decided that I would find out and called Julian Smith at the Ride Drive office, who upon request, enthusiastically agreed to take part in producing a series of driving articles that would cover the essential ingredients of one of their advanced TVR driving sessions. To get a real feel for what Ride Drive could offer I too would have a Ride Drive Advanced TVR Driving Experience - to sample the goods so to speak.

After leaving my contact details I received a call from Andy, a Class 1 police driving instructor from Dorset. We chatted about my 3000S and general motoring matters, after which an appointment was made to meet up with him for my drive. I was doing a full-day on-road session and on the day, Andy arrived at ten sharp at the rendezvous point. After initial pleasantries he spent a little time outlining the purpose of the day and details of his objectives, oh yes, and calming me down. For some reason I was a gibbering wreck, - very nervous and very apprehensive.

Initially, and whilst settling down, I drove the first part of the route whilst Andy took a brief look at what I was doing. It was a baking hot day but we soon found the welcome shade of a large chestnut tree where we stopped and talked about my driving style and some techniques that Andy wanted me to try out. A pattern emerged whereby I would drive a section of the route, focussing on a particular skill, whilst trying hard to remember and to employ the ones I had learnt earlier, after which we would build into it another component.

Throughout the day there were opportunities to stop for a rest, a chat and a stretch, and by lunchtime I was feeling a considerable growth in confidence. On reflection I realised that I was beginning to drive far more smoothly than ever before, I was more relaxed and much more self-assured. I was beginning to really like this! Okay, I was having to concentrate hard, but the buzz!

Effective and rewarding progress relies heavily on three things: the skills and personality of your mentor, your willingness to experiment with new ideas and the environment where it takes place. So firstly, the environment could not have been better. I was, after all, driving a convertible TVR through some of the most glorious Dorset and Wiltshire countryside on one of the hottest days of the year. Secondly, I have always enjoyed driving and was very keen to explore ways of getting more from the TVR and myself. Thirdly, Andy is a natural and highly experienced instructor with a very impressive CV and a very relaxed way about him. I had planned to describe the activities of my day in some detail, but the Ride Drive literature does that anyway. What is more to the point is the fact that each session, although following a general pattern, is tailored to the needs of

the individual and is positive and fun. At no time did I feel criticised or at all uncomfortable. Andy assessed my driving style and integrated the good aspects with the new to build my new driving style. I took it all on board, exploring what to me were new ideas and had an absolute ball as a result.
I guarantee that you will learn invaluable skills and techniques from the forthcoming articles but having had the ‘day’ myself, I cannot emphasise strongly enough the value of signing up for a Ride Drive session to start you down the road to getting the maximum pleasure from your TVR and achieving your own full potential as an advanced driver.
Oh, and before I hand over to Julian, just two more things, i) it is patently clear that Toad did not have a Ride Drive session. ii) I shall most definitely be going back for more - it’s just so addictive.

Clive Westmacott

Introduction from Julian Smith from Ride Drive

If during a conversation about motoring matters someone mentions the words ‘Advanced Driving,’ what thoughts come to mind? White haired men in cloth caps, string backed driving gloves, holier-than-thou preaching, wittering and condescending sentiment with ‘don’t do this’ and ‘don’t do that’ by the bucketful, perhaps? Who wants that? After all, you had your driving lessons when you were younger and passed your test. You’ve ‘been around the block’ a few times and gathered a reasonable share of experience. You haven’t been involved in any road accidents, so what’s the point of getting involved in anything purporting to develop your driving skills? There are far better things that money can buy for your car, aren’t there?

This reaction to the suggestion of advanced driver training is quite common. It’s one of those things that is often seen as being sissy or an indicator that you are lacking in some way if you admit that you want to do a course. A bit like admitting to your peers that you take Viagra. This attitude isn’t just confined to the male driver either. The ladies often shy way from the idea on the grounds they are going to be made to feel inadequate in some way or make a fool of themselves doing something daft.

So what do you know about driving? We’re talking about road driving here - the environment in which even the most enthusiastic track-day goer will spend 99% of their time at the wheel. Everyone has much the same start in their motoring career. It begins with the lessons from an approved driving instructor delivered in the approved manner, a little practice in mum or dad’s car in between, passing the test and then perhaps buying your first car. Having now got to the stage of obviously knowing all there is to know, you smugly drive everywhere you can whilst pouring scorn and derision upon others that you think to be less worthy than yourself whilst picking up pointers and tips from ‘more experienced’ drivers. You learn too by watching what others do on the road, but is the person that you are listening to down the pub or following along the A361 any better than you? He or she could be telling or showing you a right load of old twaddle, yet you may look upon it as a good idea and adopt it as part of your driving style, and because you manage to get away with using it unscathed you continue to think it is a great way to do things.

Actually, advanced driver training, if delivered in the right way and by the right people, can be tremendous fun and will give you far more pleasure from using your car on the road, especially if that car is a TVR. We all know that a TVR is steeped in myth and legend. There doesn’t seem to be anyone on this planet that doesn’t know of someone who knew someone else who once put one up a tree backwards when going around a bend and barely escaped with his or her life. After all it happens every day, doesn’t it?

Yes the attrition rate is high with TVRs, especially among new owners to the marque, but not one a day, far from it. Actually a TVR is a pussycat. Oh yes, the Tuscan S, the Cerbera 4.5, and even the Sagaris. You can chuck them about through bends, drive them quickly in the wet and generally have great fun without any harm being done at all, but you have to know the technique. You have to learn to tune in to the car, listen to it talking to you, understand the language it speaks and work in harmony with it. However, the only way in which you are going to do that is to ask someone to help you to communicate with the beast, to open your eyes and to show you the light.

My company, called Ride Drive, has been working with TVR owners for a long time and many who are reading this will be familiar with the name. Indeed we have hundreds of very happy

customers and our order sheets are always bristling with new and repeat customers who just want to get more out of their period of TVR ownership.

Our business is helping people all over Britain get the most out of the ownership experience of their car, to use it more effectively in a road-going environment, to drive it accurately, smoothly and quickly without ever getting into difficulty or getting themselves in any trouble. I have a team of over 120 dedicated people spread all around the country ready and waiting to meet their local TVR owners to show them how they can still have fun on the road, despite all the arguments about speed cameras and other traffic restrictions, and without breaking any rules.

All of our advanced driving programmes take place predominantly on the public roads because this is the only place to do it, and because it is the place where you use your car on a daily basis. Some of the options do take you onto a disused runway of an airfield for a short period, but the activities we conduct there are all related back to the use of the car on the public road. It's just that on the airfield we have more space for you to make the mistakes that help you to understand and to bond with your particular model of TVR so that when you drive back out onto the road you have more of an idea of what you can expect from it.

To drive these cars well is an art form and the money you spend on extending your driving skills will have a far greater effect upon enhancing the performance of your TVR than any bolt-on accessory you buy over the counter. One of our customers, Mr. Bryan Lister from Halifax, captured the essence of what we are striving to achieve with the use of a few very simple words written upon his customer feedback questionnaire form following his visit with his TVR Tuscan.

He wrote, "The best performance enhancement you can get for your TVR may not be de-catting your exhaust or re-chipping the ECU, but ironically it will probably be fine tuning the nut that holds the steering wheel! I'd like to thank Julian for making the arrangements for the session and Stuart for his infectious enthusiasm, which he maintained throughout the day."

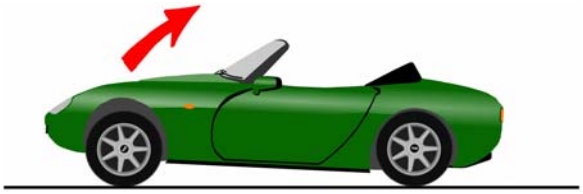
Over the coming months I am going to take you through a Ride Drive Advanced TVR Driving Experience step by step just as though one of us was sitting in your car with you, starting with the description of the car and what influences its behaviour when you drive it, so that you can form an in-depth understanding of why it behaves in the way that it does in response to the input that you give to it by the way that you use the controls. You will also be given information on how to deal with various road-going scenarios to help you stay clear of conflict with other road users. Yes, the methods are based upon Roadcraft, but the application is different. It has to be, because as you know already, a TVR is no ordinary car. There will be no patronising, no ridicule, no preaching and definitely no cloth caps! This is going to be just like it is out there, as if one of us were with you in your car on the road. Informative, useful and rollicking good fun.

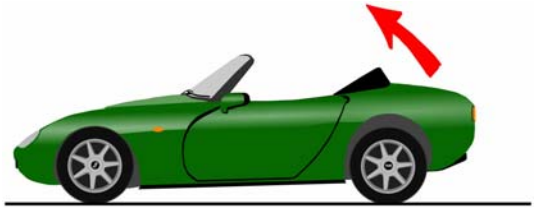
Part 1: Balance and Stability

In this month's edition we are going to look at the balance of the car and how you, as a driver, will affect that level of balance by your use of the driving controls. The basics of this would be explained to you as part of the introduction briefing that takes place at the beginning of your session.

When the car is parked and unattended it is as stable as it can be. You can watch it for weeks and it will not do anything untoward. It is only when you put a driver in it and that driver sets the car into motion is its balance altered. When you drive a car along a road its balance is affected in different ways in response to the input that you give to it through your use of the driving controls.

When we accelerate the rear of the car dips on the suspension and when we brake it is the front that is similarly affected. Many think the reason for this is that the car behaves as if full of water that surges rearward upon acceleration and forward under braking, but that is not so. Think of it this way. Many people once rode a bicycle, and if they were unfortunate enough they will have gone over the handlebars through applying the front brake too harshly. The reason this happens is that when the brake blocks clamp onto the cycle wheel-rim the rim tries to take the brake blocks with it, but as they are attached to the frame the rim takes the whole bike with it lifting the rear wheel off the ground. It is caused by torque at the front brake area.





Conversely, if anyone has performed a wheelie on a bike, they will know that it is necessary to select a low gear and push hard on the pedals to get the front wheel off the ground. What is actually going on here is that the rider is exerting so much force through the chain that the power is being delivered more quickly than the bike is able to accelerate. The result is that part of the energy is dispersed by the bike pulling itself around its own drive sprocket. Taking this principle to the car, we have all seen drag strip racing on the television and know that some of the cars actually lift their front wheels off the road due to the immense amount of power that is being delivered to the rear wheels. Again, this is caused by torque at the rear wheels and will affect your TVR, hopefully to a lesser extent, because it is a rear wheel drive car. This transfer in loading even occurs when you just lift your foot off the power. In short, under acceleration the car tries to lift the front off the road and so increases the load on the rear wheels and under braking or deceleration it is trying to lift the rear off the road and thereby increasing the load on the front wheels.

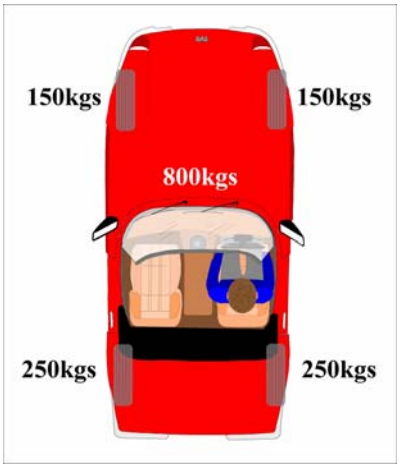
You can see that already we have affected the weight distribution within the car just by increasing and decreasing its speed. When in motion the car is most stable when it is travelling in a straight line with the engine pulling, but not accelerating. However, we can't drive around like that all day as there comes a point where we have to change direction.

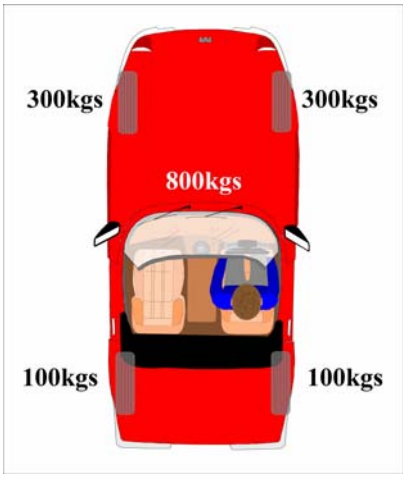
Steering is another factor that causes a change in balance within the car. When we turn the steering wheel we experience an extra loading on one side of the car. The reason this happens will be dealt with in a later edition that will cover cornering forces but for now it is good enough to know that steering causes a loading on one side of the car.

If we look at the red TVR in the next illustration you will see we have labelled it up as weighing 800 kilogram's, just as a nice round example figure to work with. Again, using easy figures, imagine that the car, when stationary, has a weight distribution of 200kgs per wheel. As already covered, the loading on the rear wheels increases as the driver accelerates, but as the car is travelling straight the loading is equal across the axle. When braking in a straight line, although the load is greater on the front wheels, it is again evenly spread between them. Whilst the extra load on one pair of wheels remains equally divided and the unloading of those at the opposite end pair is also equal between them so the car is at its most stable attitude at that time when completing that task.

If the car is required to travel around a corner the wheels on the outside of the curve will become more heavily loaded whereas the wheels on the inside have some of their burden removed. The only way in which we are going to keep the car at the maximum level of stability is to balance the loading upon pairs of wheels, which in the case of a cornering vehicle, will be a balance between the front and rear wheels on the same side. When cornering there is a small amount of added resistance acting upon the car, which if not countered, will cause it to decelerate. To achieve the best balance point it is necessary to apply just enough power so as to keep the car moving at a constant speed and to try and achieve the weight distribution as illustrated in diagram 4. We call it driving on a neutral throttle. When driving through the bend in this way the car will be as stable and as far away as possible from that dividing line between being in control or being out of control. To achieve this it means that we cannot brake, we cannot accelerate and we cannot even lift off the power, because to do so would upset the balance. If that is the case, how do we change gear and brake?

Keep thinking about that last question and we will cover the answer in the next edition.



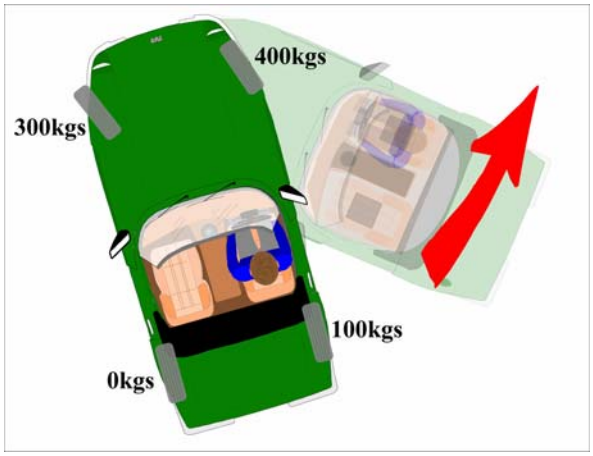


Part Two: Staying in Control

In Part One we discovered that a car is most stable when the weight is evenly distributed between matching pair of wheels, these being two sharing the same axle or two sharing the same side of the car. To illustrate why this is so important we shall look at a motorway scenario where the common driver response makes matters worse.

You are driving along lane-3 of the motorway when for reasons best left alone you are caught out by an obstruction ahead of you. As you have noticed it late you have insufficient room between you and the rear of the vehicle ahead to be able to stop. What should you do?

Most will get a big foot full of brake pedal and simultaneously grab a big handful of steering wheel. This is probably the most effective way of disturbing the balance of a car that you can implement and can quite easily cause it to flip over. What happens as the brakes are applied is that the front tyres rapidly become heavily loaded whilst the load on the rear tyres becomes almost instantly lighter, which means the amount of grip they offer you is seriously reduced. If that isn't bad enough, with the introduction of steering the loading across the front pair of tyres becomes unevenly distributed as it does at the rear. In fact, no two tyres will be loaded by the same amount and will inevitably, at the very least, lead to the tail swinging out to the side.

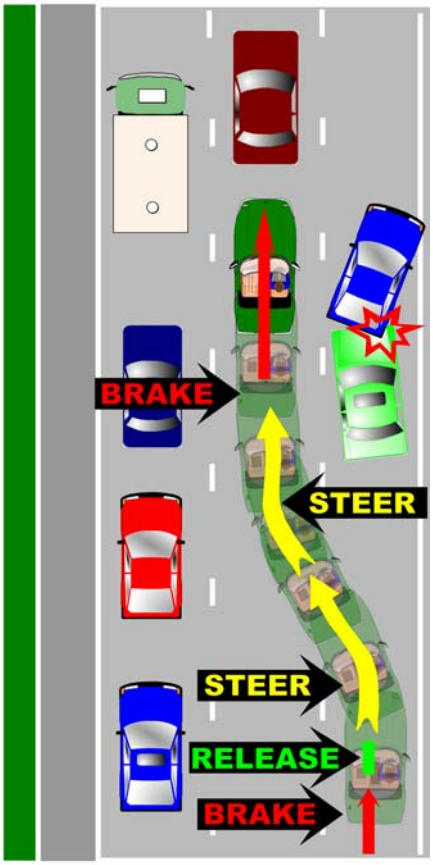


Although the wheel and tyre loadings in the diagram are not to scale, the illustration demonstrates what one might experience in this emergency lane change situation if it is not completed with a bit of thought.

To maintain the best degree of balance in a vehicle it is necessary to evenly distribute the loading over pairs of wheels and tyres, such as the two front, or the two rear or even two along the sides, but in the diagram no two values are the same. The tyre with the most amount of hold on the road is the front offside and the one with the least is the one diagonally opposite. As the car 'wants' to continue in a straight-ahead route it will be around the offside front tyre that the car will initially pivot as it spins out of control.

To deal with this manoeuvre effectively you need to maintain the balance of the car as best as possible and to do this it is necessary to separate out the activities carried out within the cockpit to singular actions. Firstly, upon recognising the need to stop, apply the brakes progressively, but quickly. Brake for as long as possible before losing the space to change lane before meeting with the obstruction. Now release the brakes and then apply the steering as smoothly as possible. Having steered left and then right re-apply the brakes again as hard as possible without locking the tyres. What you are doing here is separating out the braking and steering and if you are really clever you can set a neutral throttle whilst steering as well.

That is one example of how the System of Car Control works well, but it doesn't have to take an emergency to use it. Separating out the operation of the controls represents best practice for all road-driving situations. Dealing with a hazard, for example, or negotiating a bend.



Part Three: The System of Car Control

At this stage of the driving session you will have completed the initial briefing, that will have lasted on average a little over 5-minutes, and now it is time to fire up the engine and to get going. The first thing that you are to be introduced to is *The System of Car Control*, which will form the backbone of everything that you do with us in your car.

The System of Car Control is "…a system or drill, each feature of which is considered in sequence by the driver on the approach to a hazard." If you feel like switching off at this point, don't because if you can get this sorted out you will reach a stage of realisation that will capture your imagination and help you get the most from driving your TVR.

What the *System* does is to give us a simple and repetitive method of carrying out all those necessary operations that take place within the cockpit, those which are required so as to drive the car effectively whilst acting in response to what we have to deal with on the road, whilst cutting out the unnecessary ones. Take a hazard, for example. A hazard, in this context, is anything that contains an element of actual or potential danger and requires some form of action or extra consideration to be made by the driver, other than travelling at a constant speed in a straight line. The parked car, mud on the road, a bend, the actions of another driver, a junction, a pedestrian crossing – the list is almost endless, but by using the *System* we can deal with every single one of them and more, in exactly the same way each and every time.

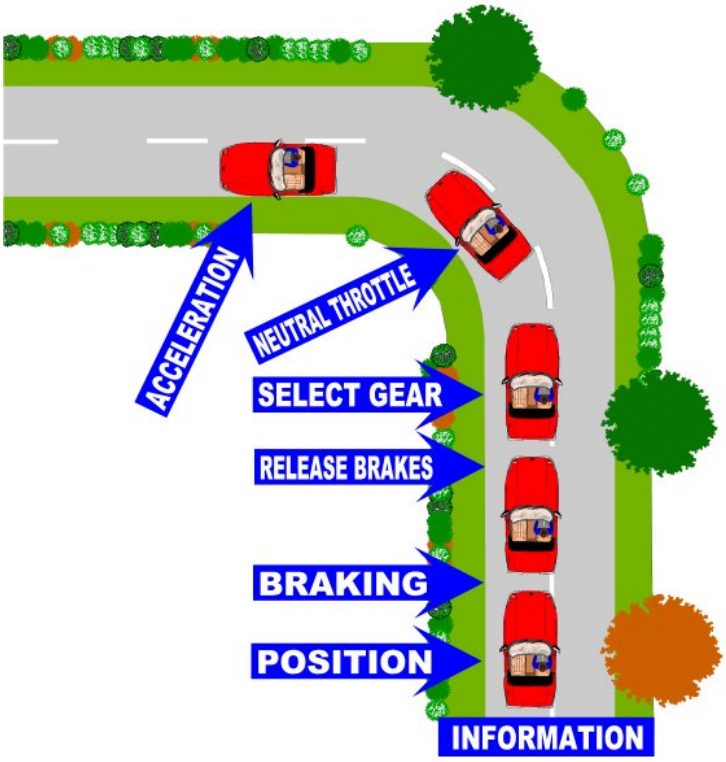
The System of Car Control consists of 5 features, these being Information, Position, Speed, Gear and Acceleration. As the definition says, each feature is *considered* by the driver, which doesn't say that they all will be completed, but as long as we have considered them all, and in sequence, we should never have a problem.

It's all very well talking about what it is, but it is far more interesting to describe the practical application in relation to an every-day example, like negotiating a bend. To drive from a straight into a bend will normally comprise three different actions: a reduction in speed, achieved either through braking or natural deceleration, the selection of a lower gear and steering. Those three actions are not surprising in themselves, it is when you do these things that may be different from what you are used to. If we use the *System* we need to get as many tasks as possible completed before we get into the bend itself so that we are that much better prepared for it.

Imagine you are driving along a fairly straight road at 60mph in 5^{th} gear whilst approaching a 20mph bend. You identify the location of the bend and may change your position on the road. As you draw near to the bend either i) apply the foot brake smoothly and progressively or ii) by the use of acceleration sense (a subject to be covered later) lift off the power so that the car arrives at the bend at the required speed naturally and without any braking.

Having got he car travelling at the desired speed – still in 5^{th} gear, release the brakes and select the most appropriate gear for that road-speed. This gear will be the one that gives you the desired degree of response from the engine to drive you through and out of the curve. In this case the car is a TVR S3 and second gear is our choice, selecting 2^{nd} directly from 5^{th} without going through intermediate gears that are actually not used.

When you have set your speed, and changed gear, take up the hand position on the wheel in readiness for the turn and just before you enter the bend apply a neutral throttle setting. All you do now is steer the car smoothly and drive the car through the bend at a constant speed. A neutral throttle setting is when the engine is driving the car along, but not causing an increase in speed, which keeps it nicely balanced.



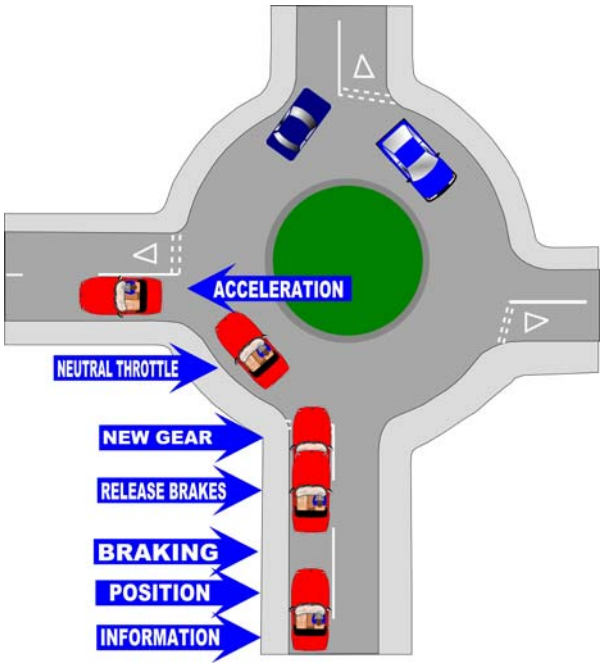
What you have done here is to set your speed, gear, hand position on the wheel and throttle setting before you have started to steer so that all that is left to do when you reach the start of the curve is to drive through it under complete control with the car totally balanced and responding sweetly. Once the bend starts to open out we can gently squeeze in the power, applying full power only when the car has straightened up.
It is important to note that bend assessment, positioning for bends and cornering forces, as part of the System, will be covered in later articles.

The same procedure is applied to negotiating roundabouts. Knowing that you are approaching a roundabout and having identified where it is, as soon as possible you look for clues as to whether you are going to have to stop and give way or if you are going to be able to flow through the junction. The *System* is applied in exactly the same way by checking the rear view mirrors, considering giving a direction signal, adjusting road position according to the intended direction of exit and a reduction in speed either by deceleration or by braking, or both, but without making any gear changes – yet.

In the early 1930s car brakes did not work too well and it was good practice to use the engine to aid deceleration by changing down through the gears sequentially, to arrive at the desired final ratio. Technology has moved on and the technique is no longer appropriate as brakes are now extremely good. It could also be argued that since brake pads are easier and cheaper than clutches and gearboxes to replace, it makes sense to wear out the brakes first!

If you are approaching a roundabout in fourth gear and end up driving onto it in first because you have had to stop to give way to other traffic, what did you use third and second gears for?

We will encourage you to only take a gear at the point of commitment to a given situation, so in the case of our roundabout we are saying that you select your gear, as in the diagram, when you know that you can commit to that roundabout. If you are going to have to stop then stop in your original approach gear and then pick up a first gear to move off. Similarly, for the bend, when you know you have slowed to the speed at which you are going to enter and drive through that bend, that is the time to go directly to the gear with which you will drive through the bend.



If you think about it logically, all this makes sense and once you get used to it you will see that it is simplicity itself. By employing the *System* you are maintaining the level of stability and control to the maximum degree. All your braking, gear changing etc. is done before you get to deal with the hazard itself, so that when you do deal with it you are doing so with both you and the car set up and fully prepared.

Part Four: Cornering Force

The summer has passed and now we are faced with a whole different motoring environment. Damp and wet weather is more likely to be encountered with leaves on the carriageway, which means that the roads will become more slippery. These are the conditions in which many TVR owners become afraid – very afraid. However, fear not as help is at hand to help you to understand the car a little better so you can make your TVR do as it is told.

We use a lot of analogies at Ride Drive, as we find they are very useful in putting the point across, and here is a good example. Take one freshly hatched conker, drill a neat hole through its centre and thread it onto a piece of string of about 2-feet in length. Knot the string at one end and allow the conker to slide to the knot whilst holding the other end in one hand. If you now whirl the conker around over the top of your head like a helicopter rotor the string will remain taught, and the faster you whirl the more stressed the string becomes. The question is, does the conker pull on the string or does the string pull on the conker?

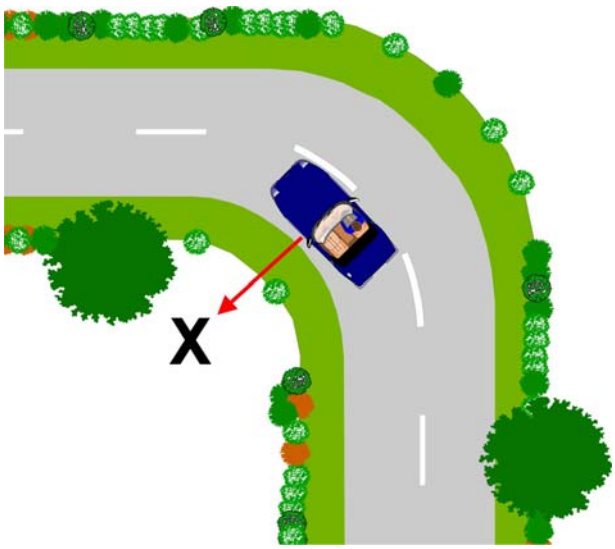
If you have paused to wonder where this is all leading please read on, as the relevance of it all will become apparent very soon. To get to the answer to the riddle ask yourself what would happen to the conker if the string snapped or if you let it go. The conker would no longer orbit the top of your head, but would fly off on a straight-line course, so it must be the string that makes it steer to a circular path.

Every inanimate object on earth will, when subjected to acceleration, travel in a straight line unless it is subjected to an interfering force that acts upon that object and in a different direction. In the case of our conker it will fly off in a direction that is at a tangent to the circular path it came from, but it will travel in a curved path towards the ground as it becomes subject to the force of gravity – the interfering force.

How does this have any relevance to your TVR? Let us accept that objects, including cars, will always be happiest when travelling in a straight line, as this is the direction of travel that nature intended for them. When you ask a car to go around a bend you are asking it to perform an unnatural act, which takes an amount of effort that is stronger than its desire to keep going straight ahead. When you drive a bend your tyres are the conker string and the car the conker, so that if you try and negotiate that bend too quickly your conker string may snap, or slip from your grasp, releasing it from the force that is making it steer away from a naturally straight course. This means that we have to corner only at a rate that is within the breaking strain or our grip on the string if we are to remain on our intended course.

Still not convinced? Then think of this: if you put a tennis ball in the centre of your passenger foot well, and it remains there whilst driving along at a constant speed in a straight line, when you steer into a left-hand bend, which way does the ball roll? The answer is at the bottom of the page, but don’t look yet as there is more to cover first.

It is easy to think that there are many different forces pulling and pushing on a car during cornering, but really there is only one cornering force – the one that forces it away from its natural line of travel of straight ahead and is indicated by the red arrow in the illustration. The arrow is pointing towards the axis of the circular path through which the car is travelling and whilst driven around that point. This is known as centripetal force, not centrifugal force, which is a completely different thing and should never be confused or associated with cornering motorcars.



Whilst it is not possible to change the forces of physics it is possible, by understanding them better, to work more closely with them and not to fight them. This is one of the reasons why the *System of Car Control* works so well, as through this driving method the driver will set the car up to its maximum level of stability before any change in direction takes place, so that when that does take place it is achieved with the car at its most stable attitude throughout, with the cornering force applied evenly over the whole car.

We all know that when we steer a car into a bend the car will heel over towards the side that is on the outside of the curve, but think of it more this way: the mass of the vehicle is intent on going straight ahead on the original course and the tyres, through their grip of the road surface, are hauling it away to follow the road. All the time that the tyres are winning the battle the car will be forced to obey, a bit like pulling a cat away from a mouse by the tail, and because the connection between the chassis and the wheels is allowed to move (suspension) some of that movement is taken up before the change in direction of the chassis. Think of a second conker attached to the first by a piece of elastic.

If you balance the car up nicely prior to entering the bend and you are really silky-smooth with the steering during the process, you will get the best performance out of the car in terms of its cornering potential. If you are rough with the controls, or shift the balance of the car after you have begun cornering, then you will diminish the ability of the car to deal with what you are asking it to achieve. Every component part of that car is being forced to go around the bend against its will and therefore any part that manages to break free from that grip, such as the car's back end, will automatically resume a straight line of travel taking with it whatever it is attached to.

We shall talk more about retaining control of the car through the way in which we operate the controls in later articles, but now the answer to the riddle of the tennis ball in the foot well. As the car steers to the left the ball appears to roll towards the right, but has actually rolled forwards, or to be more precise, has continued on the original straight course of the car. Remember, the ball can roll freely and whilst the car is travelling on the straight road the ball is travelling at the same speed and in the same direction. When the car turns the ball continues to carry on ahead on its original course and will only turn with the car when it rolls up against the transmission tunnel, which then collects up the ball and steers it around the bend. It only appears to roll to the right because the car has gyrated about its axis with the driver’s door moving to occupy the position where the bonnet had just been. The ball is just trying to do what is natural – to continue straight ahead.

Part five: Clutch Bite Over-steer

When you talk to the companies that insure TVR drivers on the road, and ask about claim statistics, they will tell you that around 80% of all TVR blameworthy claims occur within the first twelve months of ownership and do not involve a third party. This means that those new to TVR, or new to a TVR model over a previous one, are very much at risk of being involved in a collision resulting in a claim being made against their own policy, and when they do have their crash it nearly always only involves their own car. Having absorbed that information one has to then wonder how many other collisions there are where the owner will pay out for their own repairs and how many squeaky moments have there been where the driver got away with it, and with the car unscathed. Add that all together and the numbers, if they could be calculated, would probably be absolutely mind blowing.

Please don't get the idea that this is a prelude to the use of scaremonger tactics to inspire readers to post off their applications for a Ride Drive Advanced TVR Driving Experience, because that is not the case at all. What this is about is that the bare facts are being laid down to help you to realise that the statistics are pretty grim and that we are going to offer some advice as to how you can avoid being a casualty yourself; all for free, thanks to TVR Sprint. In the same way as we would deliver our driving techniques whilst with you in your car on the road, this article is going to tell you about one of the least talked about reasons for loss of car control, and probably one of the least understood.

If you look into insurance claim statistics even further you will find that nearly all these situations where control has been lost have occurred either on a bend, on a roundabout or during some other circumstance where the TVR was being driven other then in a straight line. It is often assumed that this is because the driver has simply accelerated too hard within a bend, but very often by increasing power in a bend the result will be under-steer and not the dreaded over-steer that TVR owners fear so much. Whilst it is agreed that excessive power being applied to the driven wheels whilst negotiating a bend may cause loss of control through over-steer, especially in the wet, there is another cause of over-steer that is extremely common and one that is much less obvious.

To explain this phenomenon we need to examine what over-steer and under-steer actually are (and this is done with all due respect to those who do already know the difference). Under-steer is where you are trying to turn a corner and you are steering more than the car is turning. When this happens the front tyres are scrubbing sideways and not managing to bite sufficiently well enough to provide full grip. Over-steer is where the car turns a lot more than you are steering it. This usually means that you have lost the back end and it is coming around to overtake you.

As discussed in Part Four of this series, when a car is driving through a bend it becomes subject to centripetal force in just the same way as a conker on a string being whirled about like a helicopter rotor. If your tyres let go, or your conker string breaks, the result is the same, as both will resume their natural course of a straight line, and particularly in the case of the car, it will affect all or part of it, as in front axle, rear axle or both axles.

We all know that when you drive your TVR along the road under power the engine is driving the rear wheels via the transmission, but when you lift your foot off the accelerator, does the car

immediately stop? Of course not, because it is subject to momentum that will keep it moving. As the car continues to travel down the road, have you given any thought to what is happening now? Under deceleration, or over-run as it is called, the driven wheels are now driving the engine, keeping it running at road-speed. We know this because if we choose to dip the clutch at this point, and coast the car along, the engine revs would die to idle and we would need to get the revs back up to road speed in order to drive and regain full control of the car. This month's article centres on this crucial aspect and how control is maintained.

Imagine the following scenario. Tom has just sold his VW Golf GTi and bought his first ever TVR. Being around 30 years of age and never owned a rear wheel drive car before, he has no experience of them and certainly none of TVR's. Also, because he has had no other driver training than his standard DSA driving lessons twelve years ago, he drives a car in the same way as about 95% of the rest of the motoring population in terms of how and when he operates the controls. Tom approaches a bend in the road and, since he is enjoying his TVR, he is driving it in a spirited manner. When he sees the bend Tom begins to change down through the gears, one at a time, sequentially from fifth all the way through to second. By the time he is changing from third to second he is steering around the first part of the curve, with one hand on the wheel and one hand on the gear lever, when he suddenly loses the back end of the car – why?

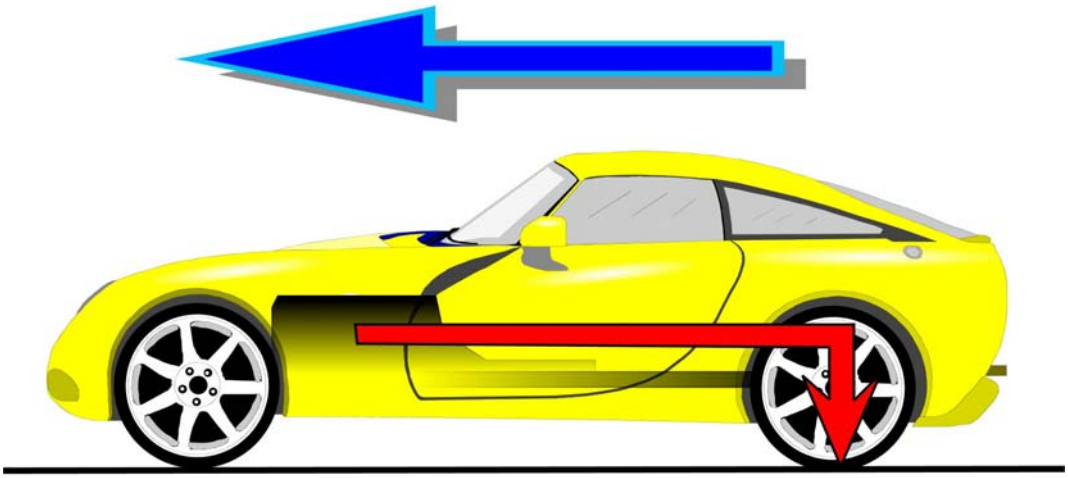
The reason is this: as Tom dipped the clutch to make that gear change the engine revs died to idle. After selecting second gear he started to bring the engine back up to road speed, not by using the accelerator, because his right foot is on the brake, but by dragging it there on the clutch, slipping it as he increases the bite. This creates a powerful resistance at the rear wheels, the wheels that are normally driven and which are now being asked to accelerate the engine back up to road speed, causing a loss of adhesion between rear tyres and road surface. Also, because the car is on a curved path and the tyres have lost their grip, the rear end now assumes its natural course – a straight line. Tom would have achieved this loss of control just as effectively by pulling on the hand brake and if the road surface is anything other than bone dry with a surface in good condition the amount of provocation required to get the TVR spinning will be significantly reduced.

Many TVR owners will have read of engine braking and how it is alleged to cause loss of control. It is not engine braking that is the problem here, it is clutch drag. The effect of just lifting off power, which is what engine braking is, will not be anywhere near as dramatic or as serious as the circumstances outlined above and we will let you experience this on an aerodrome runway during the Advanced Handling Skills and Road Driving Experience programme. Nearly everybody has their tail wagging, or will have a spin or two, on these sessions when pushed hard and put under pressure. Certainly by sorting it out in that controlled environment your chances of losing control on a public road become significantly reduced.

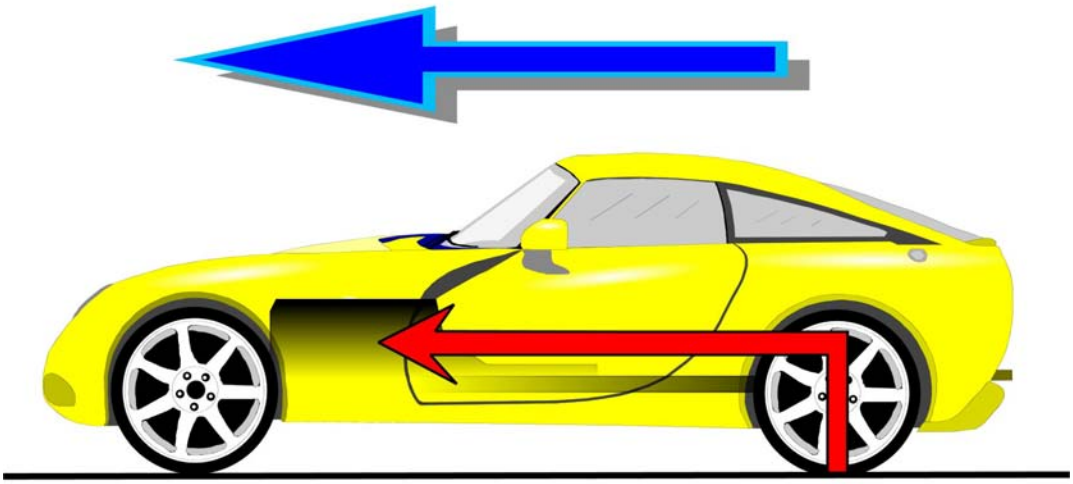
Having understood the above scenario, go back to the November issue of Sprint and consider whether Tom would have lost his TVR had he used *The System of Car Control*. Hopefully you will see why that method works so well, as by separating out all those routines that are necessary to drive the car, completing them in a sensible chronological order and doing so on the straight before the bend, the car is always kept at its most stable attitude. Also, because when using that system we are not braking and gear changing at the same time (at Ride Drive we call this brake-gear overlap) we can match engine speed with road speed by synchronising the action of the accelerator and clutch to eliminate clutch drag completely.

There are six main (and sometimes overlapping) areas where drivers lose control on a bend: 1) misreading the bend and thus trying to drive it at too high a speed, 2) entering and/or negotiating a bend on the wrong line, 3) acceleration or deceleration in the bend, 4) applying additional steering (winding more on) in a bend, 5) braking (as opposed to clutch drag) in a bend and 6) changing gear in a bend.

If you always drive to *The System*, and complete every bend or corner with the engine pulling, but not accelerating the car, smoothly and consistently you will never get caught out.
Staying with bends, in next month's edition we are going to look at how to read a bend to find out how severe it is even before we get there.



A - Under power the engine is transmitting drive to the driving wheels



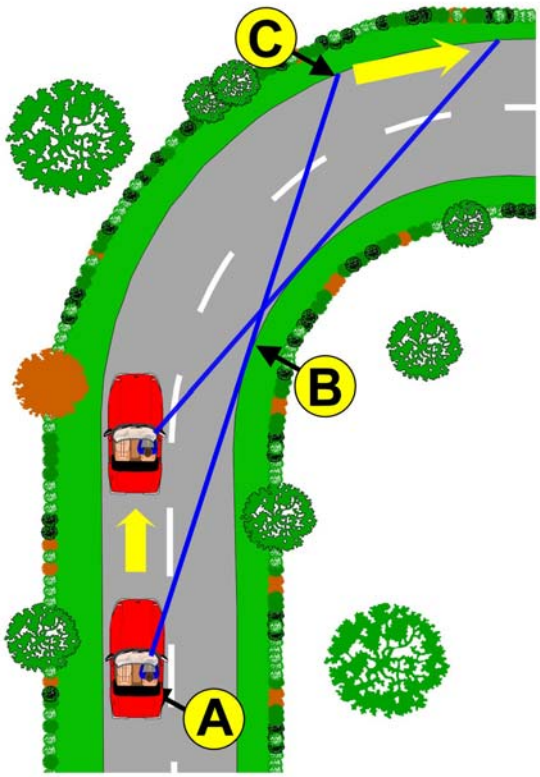
B - During over-run the driving wheels are transmitting drive to the engine

Part six: Bend Assessment

Cornering is one of the areas of driving where many cars end up falling off the road. Effective cornering is not something that we really get to know about, unless we have taken part in some form of advanced driving input. The way that people drive around bends is completed in a manner very much based on their own personal experience, experience they build up through their own individual experimentation and through observing the behaviour of other drivers. This is very much a trial and error method of doing things and, on occasions, is perhaps more than a little haphazard.

The art of successful cornering is not merely a case of just turning the steering wheel, but one that involves a whole range of other factors. How do you take a bend properly, effectively and safely? We have talked on these pages about the force acting on a car and the effects we have upon it when we do certain things with the controls, and the subject of the poise and balance of the car becomes even more important here.

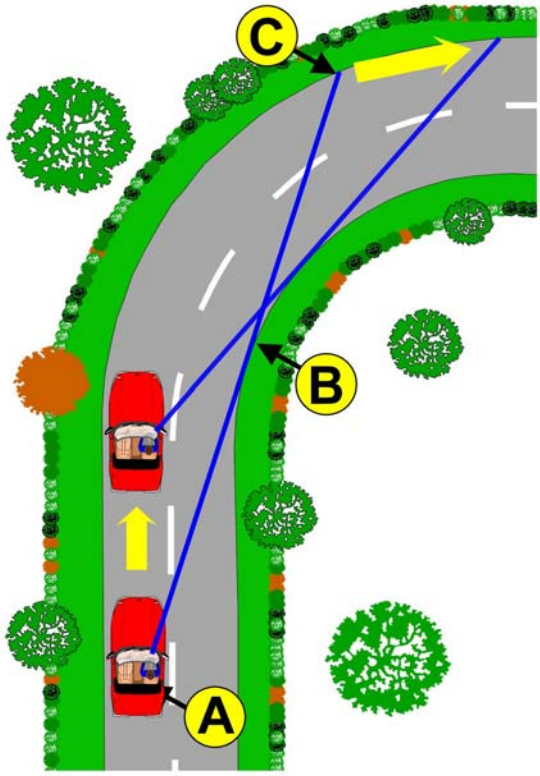
So as not to brake in a bend we have first to get the car travelling at a speed at which it is going to safely negotiate that bend, even before we begin to apply any steering. This means we have to be able to accurately assess the severity before we get into it. So how do we know at what speed to be travelling for any given bend before we are actually going through the process of driving around it? It has a lot to do with something called the Limit Point Analysis, which in simple terms can be referred to as the use of the ‘Vanishing Point’ or ‘Convergence Point’. The vanishing point, or convergence point, is that last and most distant little bit of the road surface that you can see before it disappears out of your range of view and it works like this.



Take your TVR out on the road, preferably to a rural environment, and find a right-hand bend. Drive towards it and stop the car on the nearside of the carriageway at a distance of about 50 metres before the start of the bend. Now study the view ahead and you will see the nearside verge running away forward on the left and then curve to the right as it follows the line of the bend. Now cast your eye along the offside verge and you will see that there will come a point where it will appear to meet the nearside verge forming an arrowhead or 'V' of tarmac. This arrowhead is often referred to as the Vanishing Point or Convergence Point, and is that last little bit of the road surface that you can see in the distance. Referring now to the diagram, the tip of the arrowhead of tarmac is point C.

Point A is your eye looking forward from the driving seat, and because your perspective of that view ahead is somewhat two-dimensional, point B and point C will appear to be one of the same. Having plotted those positions, now drive towards the bend whilst paying particular attention to the tip of the tarmac arrowhead. What you will find is that the arrowhead, when you are close enough, will begin to change shape appearing to move to the right. The opening view that you see is like standing in the hallway of your house and pushing a solid door slowly open, a door that swings away from you. As the latch-edge of the door swings into the room it reveals more and more of what is in that room in the same way that you will see more and more of the left-hand verge on your right-hand bend as you drive towards it.

Having completed the experiment, go back and drive the bend again. This time, begin your observation from much further back.



During your approach from a distance, point C will initially appear to be stationary, but as you draw near it will move. The way in which you use this phenomenon is to ‘chase’ the edge of the door, or the point of the arrowhead, but never catch up with it. If you are catching up with it you are travelling too fast and if you are losing ground to it you are travelling more slowly than you need to. When the rate of your approach equals the rate of the movement of point C then you are travelling at exactly the right speed. You can now finish with your brakes, change to the most responsive gear, balance the car with just enough power to keep it driving, but not accelerating, and drive the bend under full control. Once the road begins to straighten out, point C will zoom off into the distance and you can then accelerate to an appropriate speed for the straighter road. This method of bend assessment works just as effectively for left hand bends as it does for those going to the right, it’s just that for right-handers it is easier for the unaccustomed eye to see and is therefore a good place to start.

Imagine there is a piece of string tied to your accelerator pedal with the other end tied to the vanishing point, point C or the arrowhead. As you get closer the string will go slack releasing the pull on the accelerator pedal, which of course slows you down. If the distance remains constant the string will keep your accelerator pedal in the same position, and when the vanishing point runs away from you the string is pulled tight so the accelerator pedal pulled towards the floor causing an increase in speed.

As your bend finishes and you accelerate away, look into the distance for the next bend and the next vanishing point and start planning for that one. This takes practice until you become visually tuned to seeing it, but when you do it is brilliant. Once Limit Point Analysis has been mastered it is possible to drive any road at the optimum speed regardless as to how many or what type of bends are encountered. Even if you have never been down that road before you will be able to overlap your planning phases and deal with one bend after another, after another, perfectly.

Two words of warning here; 1) once the vanishing point has told you that your speed is appropriate for the corner, don't take it for granted. You have to keep watching, as you will have to be wary of the bend that has a double apex, or dogleg! 2) Make sure you use the road-edge and not the hedge, which may be set back from the road, or may not follow the arc of the bend and so give a false reading.

PART 7: BEND LINES

Negotiating bends is one of the areas where many drivers have difficulty, not just through how they manage the car, or how they read the bend, but on what course they drive through it. This month we are going to look at bend lines, but before we do there is a message to all track day drivers to say that the road is not a competitive environment and the lines you may take on a track will be different, not because we are saying they are wrong, just that on the public road they are not appropriate due to the multitude of additional factors that have to be taken into consideration.

Every bend has its own critical speed limit and that will differ depending upon the severity of the curve, and the coefficient of friction (the grip properties) between the road surface and the car tyres. This means that the bend will have its own physical speed limit up to which a car will be able to travel around it and stay on the road.

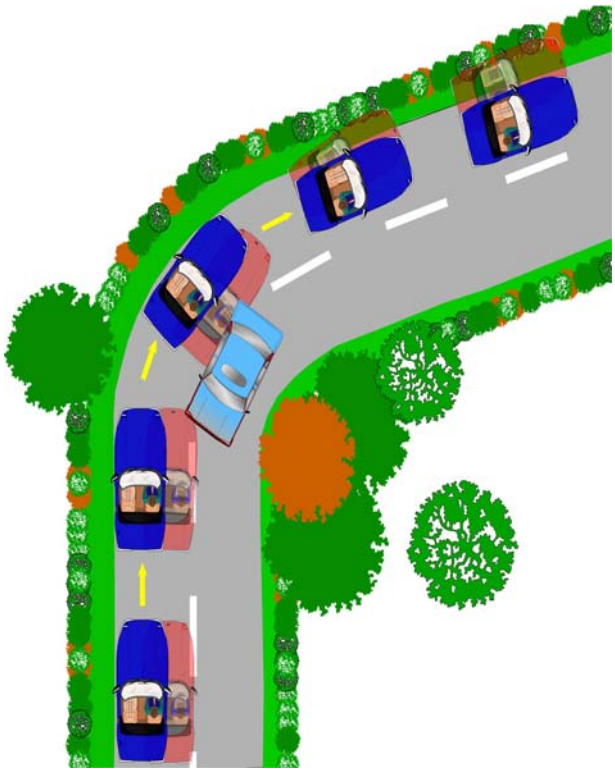
The maximum physical speed at which a vehicle can negotiate a bend will become reduced if the method is not smooth, balanced or on a perfect arc. Our cornering performance is heavily dependant upon from what position we commence our approach and in what position we place the car whilst driving through the bend itself.

Just to make matters appear more complicated, there are bends within bends as, depending upon the entry position, the course taken though the curve may vary. The carriageway edge on one side strikes a different arc from the opposite one, and between both you could make almost as many others as you like. To corner in the most effective manner the widest arc will be regarded as the best line. This is because the wider the arc the less the lateral forces involved and the greater the ability of the car to deal with it. However, we are dealing with the public road here and to take the widest arc may not be the safest option and so we therefore may have to sacrifice our position for safety.

Right Hand Bends

Dealing initially with a right-hand bend you will see from the illustration that we have a blue TVR making the approach with its near side wheels close to the near side edge of the carriageway. This of course is done with all due regard to any potholes, broken or subsiding edges, mud or gravel that may be present.

This next bit is where the skill factor comes in, because the idea is to hold a course that follows a smooth arc all the way through the curve keeping to the left of your lane until the view opens out on the exit side, at which point the road position may be changed in preparation for the next task. Trying to hold this position as you travel around the bend without submitting to the temptation to pull the car off-line towards the centre white line is very difficult, but with determination and practice it is possible and is well worth it. Getting into position early is important and the best way to approach the bend.



Superimposed on the diagram is a second TVR, the red one, and here the driver is negotiating the bend on what is termed as a shallow line. By using this line the severity of the curve becomes greater the further you get into the bend, and if the speed is high you could find that you are running out of road making it necessary to wind on more steering to stay on the carriageway. This situation is a very common cause of single-vehicle crashes on right hand bends.

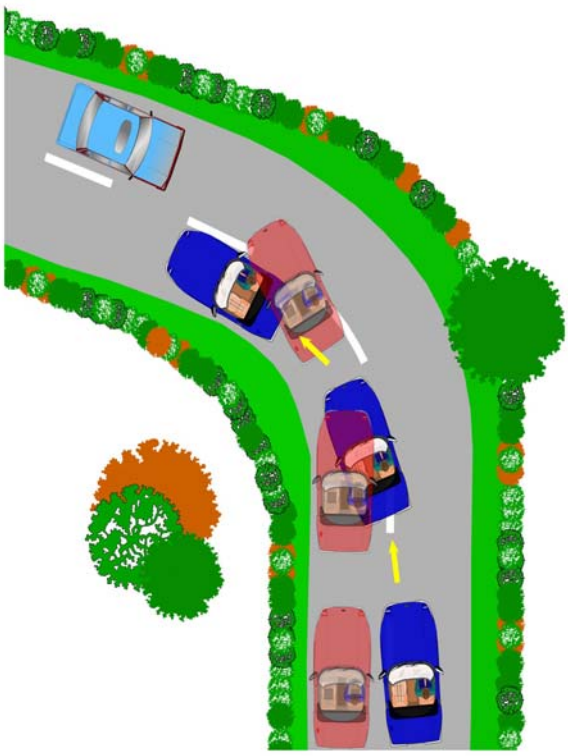
By using the line of the blue TVR, you are taking the widest line and so keeping the car further within its cornering limits, extending your view into the bend as far as is physically possible, allowing a driver approaching from the opposite direction to see you earlier and putting as much distance as you can between you and potential conflict with oncoming traffic. Ask yourself this, whereabouts on the carriageway will a vehicle coming the other way drift to if the driver has entered your bend travelling too fast? Is that where you want to be at that point, or where the artic driver is putting his cab unit to keep his rear end off the verge?

It is prudent to remember that the corner you are entering may continue for longer than you think and if you come off-line too early you may eventually end up facing the near side kerb/verge at such an angle that you have nowhere left to go but through the hedge – or worse. As previously stated, holding the wide line takes a great deal of practice to perfect and it is best to initially attempt it at lower speeds until the skill is mastered.
If the land to the right is flat and flush to the road surface, and indeed remains so for sufficient distance beyond the bend, it may, depending upon the layout of the road markings etc. to ‘apex’ the corner. However, be extremely careful. Once you start to aim onto that line you are committing yourself to it. Don’t start what you may not be able to finish.

Left Hand Bends

The most effective approach position from which to negotiate a left hand bend is to place the car as far across to the offside as possible. The problem with that is the right-hand side of the road tends to be used by traffic travelling from the opposite direction, which some may regard as a health risk.

If the layout of the land is such that you are able to get a good cross-view (this is a view across the inside of a bend over a field etc.) or if the bend was open enough so that use of the opposing lane will not put you into conflict with opposing traffic, you could, road markings permitting, move the car out beyond the road centre on the approach side. However, if the bend is blind, this may not be appropriate, but even so you can still use the full extremity of your side of the carriageway and it is amazing how shifting the car a few inches to the right on the approach will extend the view into the bend by yards.



The advantages here are similar to those of the right handed bend in that it allows you to assess the severity earlier, so giving you more time to set yourself up. It allows you the maximum view into the bend so you can see further ahead, a driver approaching from the opposite direction can see you earlier and you are taking the widest line, keeping the car further within its limits.

The potential effect of driving into a left hand bend on a shallow line is not as worrying as it may be for a right-hand bend, but only if there is nothing coming the other way! From a shallow line there is a higher risk of running wide on the exit, and depending upon how much room you have to spare, it will have an affect on whether you are going to stay on tarmac, go ploughing, find a ditch or even hit something that is going to hurt. Again we have superimposed the red TVR onto the diagram to demonstrate this. Both the blue TVR and the red one have applied the same degree of steering, but because the approach position has been different so has the outcome.

A view into a bend can vary from one bend to another, and maybe from one day to the next, so use the diagrams only as a guide. Also, the condition and frictional properties of the road surface will vary considerably from one bend to the next and therefore directly affect the ability of your car to negotiate it safely. Take into account the effect overhanging trees or bushes may have in shedding material onto the road or shielding it from sunlight after a frost when all around has thawed. The hazards that can be encountered are many and diverse. Each bend has to be judged upon its own merits as to where you place your car during the approach. You could have a situation where there is a junction to the right and on the approach to a left hand bend, which would be an area of potential conflict, and so use of the offside of the carriageway would have to be avoided. If another road user is approaching from the opposite direction you will have to remain within your own side of the carriageway and reduce your speed so as to be able to keep your car under control whilst driving to the tighter line.

Whether you are dealing with a right or a left-handed bend you have to set the car up on the optimum line well before you reach it. Should you find that you have gone in a bit too quickly and things are looking a little awkward, don't look at where you fear you will end up or that is where you will crash. Keep looking around the corner to where you actually want to go. It is amazing how this will produce at least 5% more tyre grip!

The overriding factor in all of these techniques is that you never sacrifice safety for position and you MUST always be able to stop within the amount of tarmac you can see in front of you at any given time. Don't get territorial. Always be prepared to give ground to someone else, as winning possession of a piece of tarmac is not worth risking injury or a damaged car.