Review

In this chapter we have looked at:

- the system of car control
- applying the system to some common hazards.

Check your understanding

What is a hazard?

How does the system of car control increase the safety of your driving?

What are the elements of the system of car control?

Which is the central part of the system and why?

What are the main ways in which you can give information to other road users?

When should you consider giving a signal?

How should you decide which gear to select?

Why is it vital to use the system flexibly?

If you have difficulty in answering any of these questions, look back over the relevant part of this chapter to refresh your memory.

Chapter 4
Acceleration, using gears, braking and steering

Use this chapter to find out about:

- tyre grip
- vehicle balance
- accelerating
- using the gears
- braking
- steering.

Developing your skill at controlling your vehicle

The aim of this chapter is to give you complete control over moving, stopping and changing the direction of your vehicle at all times. To achieve this level of skill, you need to understand in detail how the accelerator, gears, brakes and steering controls work and how to make best use of them.

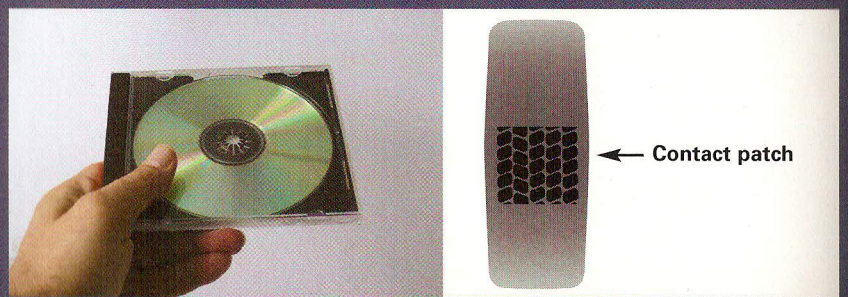
A moving vehicle is most stable when its weight is evenly distributed, its engine is just pulling without increasing road speed, and it is travelling in a straight line.

Control of your vehicle and your own and others' safety depends on the grip between your tyres and the road.

The tyre grip trade-off

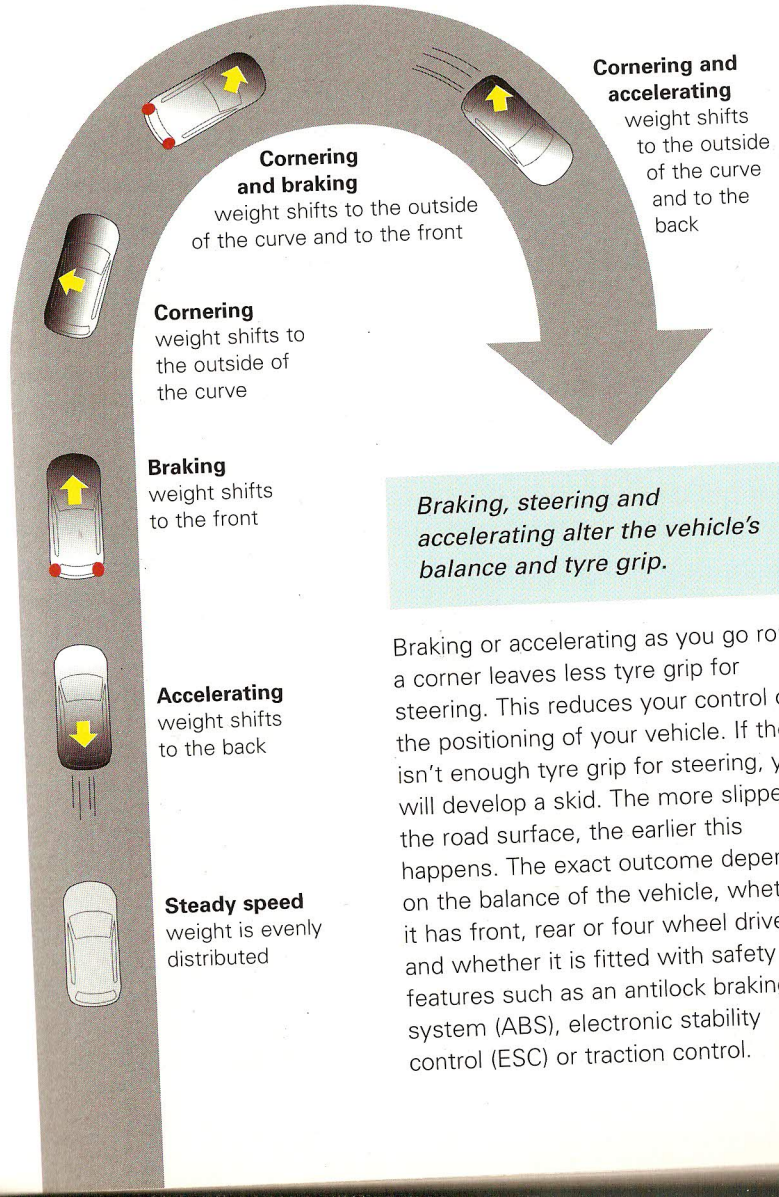
There is a limited amount of tyre grip available. The patch of tyre in contact with the road is about the same area as a CD cover. This is shared between accelerating, braking and steering forces. If more tyre grip is used for braking or accelerating, there is less available for steering, and vice versa.

Your control of the vehicle is totally dependent on the grip between the tyres and the road surface. The patch of tyre in contact with the road is about the same area as a CD cover.



Vehicle balance and tyre grip

Tyre grip is not necessarily the same on each wheel. It varies with the load on the wheel and this affects how the vehicle handles. Braking, steering and accelerating alter the distribution of the load between the wheels and so affect the vehicle's balance.



Braking, steering and accelerating alter the vehicle's balance and tyre grip.

Braking or accelerating as you go round a corner leaves less tyre grip for steering. This reduces your control over the positioning of your vehicle. If there isn't enough tyre grip for steering, you will develop a skid. The more slippery the road surface, the earlier this happens. The exact outcome depends on the balance of the vehicle, whether it has front, rear or four wheel drive, and whether it is fitted with safety features such as an antilock braking system (ABS), electronic stability control (ESC) or traction control.

Technology to help keep control of the vehicle

Many vehicles are now fitted with electronic safety features to help the driver keep control of the vehicle when harsh steering, braking or acceleration might result in a skid. These include ABS, traction control and electronic stability control systems. The specific technology and how it works varies from one manufacturer to another. This technology is also developing fast, with increasing sophistication. We look in the next chapter at some of the systems that can help drivers to avoid skidding.

See Chapter 5, *Maintaining vehicle stability*, page 89.

Develop your awareness of tyre grip

Analyse what is happening to your tyre grip as you steer round a corner or bend.

Be aware of the trade-off between accelerating or braking on the one hand and steering on the other.

- Do you finish braking before you go into a bend?
- Do you avoid accelerating harshly while driving round bends?

Using the accelerator

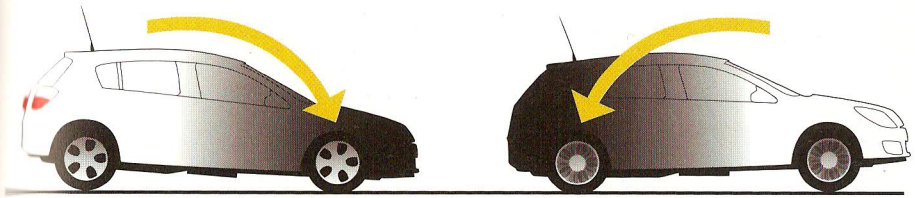
If you are in the correct gear for your speed, depressing the accelerator will give you a responsive increase in engine speed. If you are in too high a gear, the engine will not respond because the load from the wheels is too great. Changing to a lower gear reduces the load and allows the engine to speed up and move the vehicle faster.

If you release the accelerator pedal you get the opposite effect – deceleration. The engine speed slows down and cylinder compression slows the vehicle down. The lower the gear the greater the slowing effect of the engine. So, in the correct gear, the accelerator pedal has three effects:

- depress the pedal to increase speed
- release the pedal to decrease speed
- gradually ease off pressure on the pedal to gently decrease speed.

Acceleration and vehicle balance

Acceleration alters the distribution of weight between the wheels of the car. When a vehicle accelerates, the weight is lifted from the front and pushed down on the back wheels. During deceleration the opposite happens. This alters the relative grip of the front and rear tyres.



During deceleration
the rear tyres lose grip
the front tyres gain grip

During acceleration
the rear tyres gain grip
the front tyres lose grip

How acceleration affects different vehicles

Acceleration affects rear wheel drive and most four wheel drive vehicles differently from front wheel drive vehicles.

- **Front wheel drive vehicles** lose grip or traction on their driving wheels because acceleration transfers weight, and therefore grip, from front to back wheels. This reduces their ability to accelerate. Accelerating too sharply causes wheel spin. Harsh acceleration or a slippery road surface increases the risk of wheel spin, which can be particularly dangerous when pulling out at a junction. Avoid accelerating sharply and in slippery conditions depress the accelerator very gently.
- **Rear wheel drive vehicles** gain extra grip on their driving wheels, which helps acceleration (but harsh acceleration will cause the driving wheels to lose traction). At the same time the front is lightened.
- **Four wheel drive vehicles** vary in how the power is divided between the front and back wheels, and in the type of central differential they have. This means the effects of acceleration vary according to the model but generally four wheel drive vehicles have good grip when accelerating. For precise details consult your vehicle manufacturer.

Develop your skill at using the accelerator

Jerky acceleration is uncomfortable for the passengers, puts unnecessary strains on the vehicle, and adversely affects tyre grip. Use accurate and smooth movements to depress or release the accelerator – squeeze and ease it.

Acceleration capability varies widely between vehicles and depends on the size of the engine, its efficiency, the power-to-weight ratio and its load. Take time to get to know the acceleration capability of any vehicle you drive: the safety of many manoeuvres, particularly overtaking, depends on judging it well.

How you use the accelerator affects your own and other road users' safety. Sudden sharp movements of the accelerator reduce tyre grip and jeopardise steering control. The faster you go the further you will travel before you can react to a hazard. It will take you longer to stop and, if you collide, the results of the impact will be worse.

Acceleration sense

Acceleration sense is the ability to vary vehicle speed in response to changing road and traffic conditions by the accurate use of the accelerator.

You need this in every driving situation: moving off, overtaking, complying with speed limits, following other vehicles and negotiating hazards. Acceleration sense requires careful observation, full anticipation, sound judgement of speed and distance, driving experience and an awareness of a particular vehicle's capabilities.

Acceleration sense helps you avoid unnecessary braking. Common mistakes are accelerating hard away from a junction and then having to brake sharply to slow to the speed of the vehicles in front or accelerating to move up behind a slower moving vehicle and then having to brake before overtaking.

When you come up behind another vehicle, how often do you need to brake to match the speed of the driver in front?

If your answer is 'always' or 'nearly always' work at developing your acceleration sense.

Drive along a regular route using acceleration sense rather than braking. Notice how it improves your anticipation and increases the smoothness of the drive.

Accelerating on bends

A moving vehicle is most stable when its weight is evenly distributed, its engine is just pulling without increasing road speed, and it is travelling in a straight line.

As soon as a vehicle turns into a bend it starts to slow down and lose stability, due to cornering forces. If you maintain the same accelerator setting as you go into and round a bend, you will lose road speed.

Maintain a constant speed round a bend to keep your weight evenly distributed front and rear, to ensure maximum tyre grip.

If you accelerate to increase road speed and you alter direction at the same time you may demand too much from the available tyre grip and risk losing steering control. To retain maximum steering control and stability, aim to keep your road speed constant round the bend.

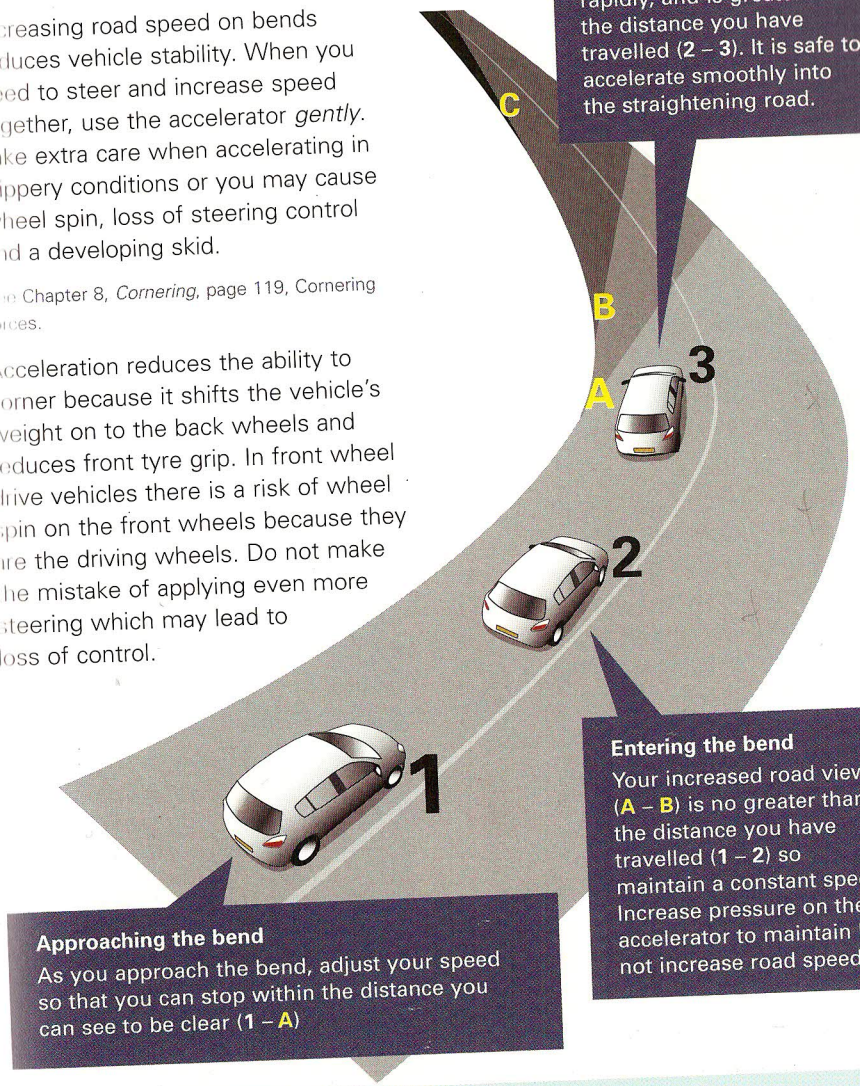
To maintain constant speed, increase power by depressing the accelerator.

Your aim is not increase your road speed but to keep it steady. How much to depress the accelerator is a matter of judgement and practice.

Increasing road speed on bends reduces vehicle stability. When you need to steer and increase speed together, use the accelerator *gently*. Take extra care when accelerating in slippery conditions or you may cause wheel spin, loss of steering control and a developing skid.

See Chapter 8, *Cornering*, page 119, Cornering forces.

Acceleration reduces the ability to corner because it shifts the vehicle's weight on to the back wheels and reduces front tyre grip. In front wheel drive vehicles there is a risk of wheel spin on the front wheels because they are the driving wheels. Do not make the mistake of applying even more steering which may lead to loss of control.



Follow the guiding safety principle – you must always be able to stop safely within the distance you can see to be clear. If that distance shortens, you must slow to match it.

Key points

- The harder your accelerate, the less tyre grip you have for steering.
- Use the accelerator smoothly – jerkiness causes wheel spin.
- Use acceleration sense to vary your road speed without unnecessary braking.

Power source affects acceleration and engine braking

Diesel, petrol and electric vehicles differ in their acceleration and engine braking characteristics. (Engine braking is discussed in more detail later in this chapter.)

The range of technology built into new vehicles to improve engine performance means that different makes and models with the same type of power source can also have markedly different acceleration or engine braking characteristics. Consult your vehicle handbook for an exact specification and make sure you are familiar with the acceleration and engine braking characteristics of any vehicle you drive.

Using the gears

Correct use of the gears depends on accurately matching the gear to the road speed, and using the clutch and accelerator precisely. Your vehicle can only increase speed if the engine can deliver the power and it can only do this if you are in the correct gear. Aim to:

- be in the correct gear for every road speed and traffic situation
- make all gear changes smoothly
- engage a chosen gear without going through an intermediate gear first
- know the approximate maximum road speed for each gear of the vehicle.

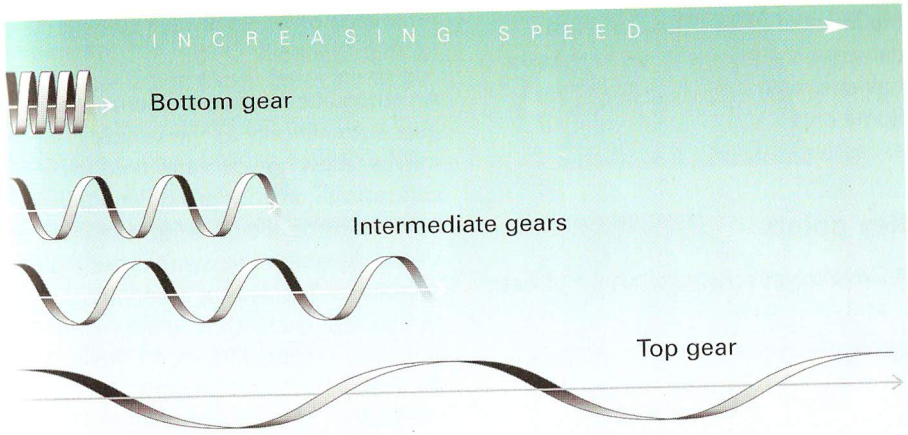
For economic progress, accelerate up to the engine's peak performance point and then change to a higher gear. Bear in mind the manufacturer's peak engine performance recommendations for your vehicle. This may differ from both the maximum torque (ability of the engine to turn the wheels) and the maximum revs obtainable from the engine.

The main effect of the gears is to transform engine revs into usable power.

- In a low gear, the engine is able to rev more freely, which allows the vehicle to accelerate rapidly and to climb steep slopes.
- In a higher gear, lower revs deliver more speed but less ability to accelerate or to climb slopes.
- Intermediate gears allow progress from one extreme to the other.
- A lower gear also restrains the vehicle's speed when descending a steep slope.

The greater turning power of low gears also affects tyre grip. The greater the turning power, the more likely that the tyres will lose grip. This is why wheel spin occurs when you accelerate hard in first gear.

This is why it is advisable to use a higher gear when moving slowly in slippery conditions such as on snow, ice or mud. When moving off from a standstill on ice, use first gear and slip the clutch without accelerating. You will gain traction and slowly pull forward.



Bottom gear
produces plenty of road wheel turning power but not much speed

Intermediate gears
produce varying combinations of wheel turning power and speed

Top gear
produces plenty of speed but not much wheel turning power

Changing to a lower gear helps when:

- travelling at low speeds
- going uphill
- going downhill, because engine compression slows the descent
- approaching a hazard
- on slippery roads, where you should ease off the accelerator to lose speed gently, so as to avoid skidding.

High gears are good for:

- cruising at speed
- certain slippery conditions where lower gears may cause wheel spin.

Moving off from stationary

From a standing start, accelerate smoothly and gather speed by steadily working up through the gears. You should only use maximum acceleration through the gears if there is a pressing need, and if the road surface and other conditions are safe. Over-accelerating in low gears or remaining in a gear beyond the limits of its best performance damages the engine, uses excessive fuel and results in slower progress. Some engines cut out or misfire if excessively revved.

Key points

- Develop good coordination of hand and foot movements.
- Recognise when to change gear by the sound of the engine.
- Choose the correct gear for the road speed.
- Use the brakes rather than engine compression to slow the vehicle (except during hill descents and when there is a risk of skidding).
- Brake in good time to slow to the right road speed as you approach a hazard, and then select the appropriate gear.
- Match engine speed to road speed before you change down.

Automatic and semi-automatic transmissions

All automatic and semi-automatic transmissions operate and behave differently from manual gearboxes and from each other, so always consult the vehicle handbook.

An automatic transmission changes gear automatically as the vehicle moves, allowing you more time to concentrate on your driving and to keep both hands on the steering wheel for longer. An automatic system has a gear selector on the floor or steering column that allows you to choose the mode you need – typically, Park (P), Reverse (R), Neutral (N), and Drive (D). The key points are:

- always ensure that the footbrake is on before engaging either D or R from stationary
- do not engage D or R with a high revving engine.

There is an increasing range of transmission technologies to automatically adjust the gear ratio between the engine and the wheels. Some types of automatic transmission allow you to choose different combinations of gear modes. For any vehicle that you drive it is vital that you:

- read the manufacturer's instructions
- know the type of gearbox fitted and how to use it.

Overlapping braking and gear changing in limited circumstances

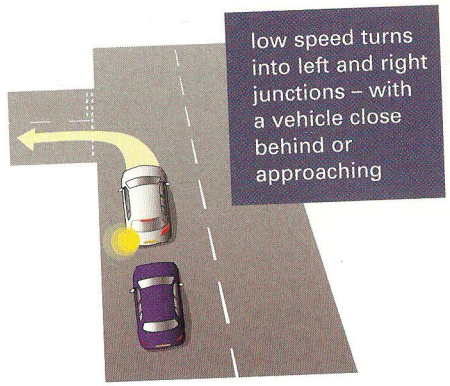
The individual phases of the system of car control are almost always applied separately: the fundamental principle is that brakes are to **slow**, gears are to **go**.

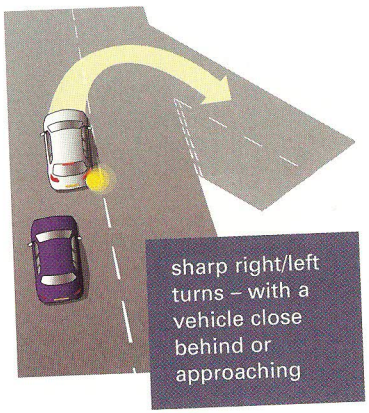
In some circumstances it may be helpful to overlap braking with the gear change by braking normally but changing the gear earlier, towards the end of braking.

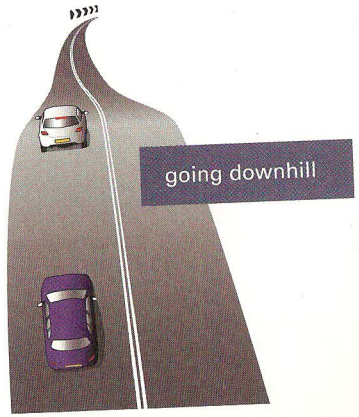
If you use this technique it must be part of a planned approach to a hazard. Begin applying the system *at the same time and in the same place* as you would normally. The system is not compressed.

When drivers first learn the system of car control, they separate braking and gear changing and try not to overlap. The problem with this approach to tight turns is that if you brake some distance before the turn to avoid an overlap you can confuse other drivers with unexpected results. Following drivers may think you are stopping and be tempted to overtake. Approaching drivers preparing to turn into the same junction may think you have slowed to leave space for them to turn ahead of you.

Situations where brake/gear overlap may be appropriate:



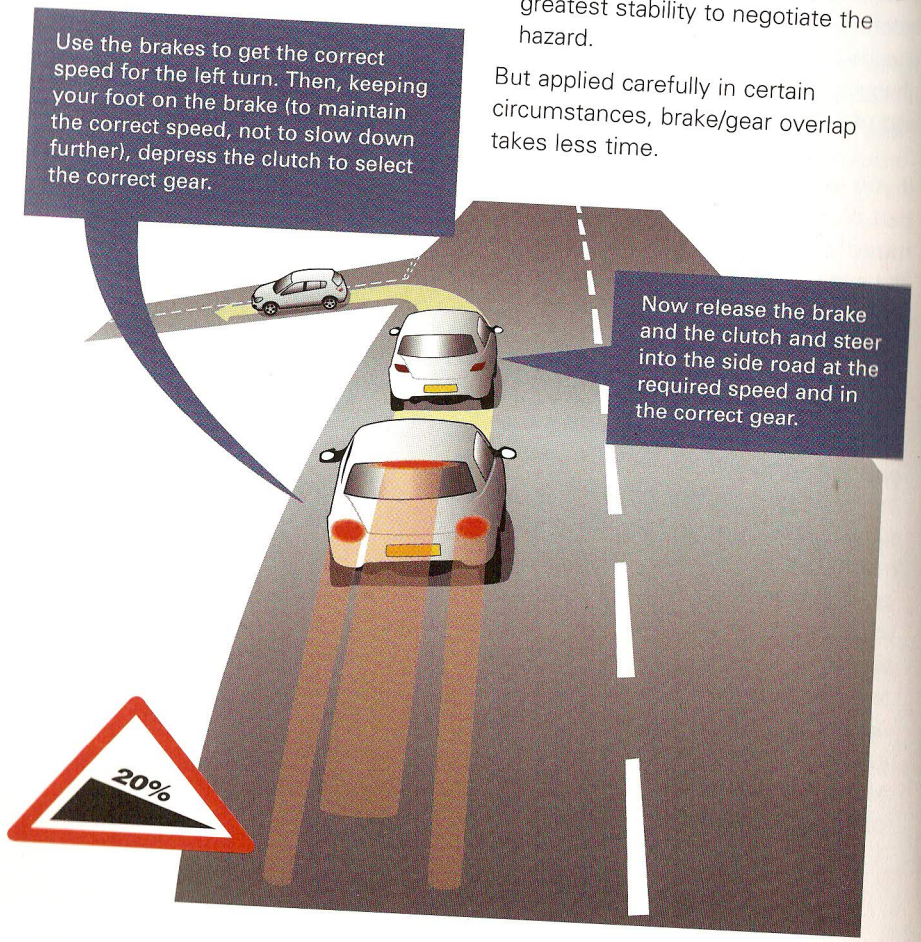




Brake/gear overlap – an example

Here is an example of using brake/gear overlap as a planned approach to a hazard, in order to maintain correct speed.

If you turn left into a side road which is part way down a hill, the vehicle will start to accelerate when you take your foot off the brake. Instead, apply the system as normal up to and including the speed phase.



Incorrect use of brake/gear overlap

Brake/gear overlap has a bad reputation because it is frequently misused by drivers who approach a hazard too quickly:

- overlap that is not properly planned results in late, excessive braking and rushed gear changes
- braking late and rushing a gear change can destabilise your vehicle at exactly the point where you need greatest stability to negotiate the hazard.

But applied carefully in certain circumstances, brake/gear overlap takes less time.

How well do you use your gears?

Ask yourself the following questions

- Are you always in the correct gear?
- Do you adjust your speed first, then select the appropriate gear?
- Do you avoid using your gears to slow down except on hills and slippery surfaces?
- Do you ever find yourself changing gear halfway round a corner?

You should avoid changing gear while cornering because it destabilises the vehicle and requires you to take one hand off the steering wheel.

Slowing down and stopping

You need to be able to slow down or stop smoothly and with your vehicle fully under control. Anticipate the need to slow down or stop early and brake progressively. Being able to accurately estimate the required braking distance at different speeds and in different conditions is central to skilful driving. There are two ways of slowing down (decelerating) or stopping:

- releasing or easing off the accelerator
- using the brakes.

Releasing the accelerator (engine braking)

When you release the accelerator the engine slows and through engine compression exerts a slowing force on the wheels. This causes the engine to act as a brake, reducing road speed smoothly and gradually with little wear to the vehicle.

The loss of road speed is greater when you ease off the accelerator in a low gear. (This applies equally to automatic gearboxes.) Engine braking allows you to lose speed in conditions where normal braking might lock the wheels – for example, on slippery roads. It is also useful on long descents in hilly country. In normal driving, though, engine braking can only be used to produce gradual variations in speed.

Using the brakes

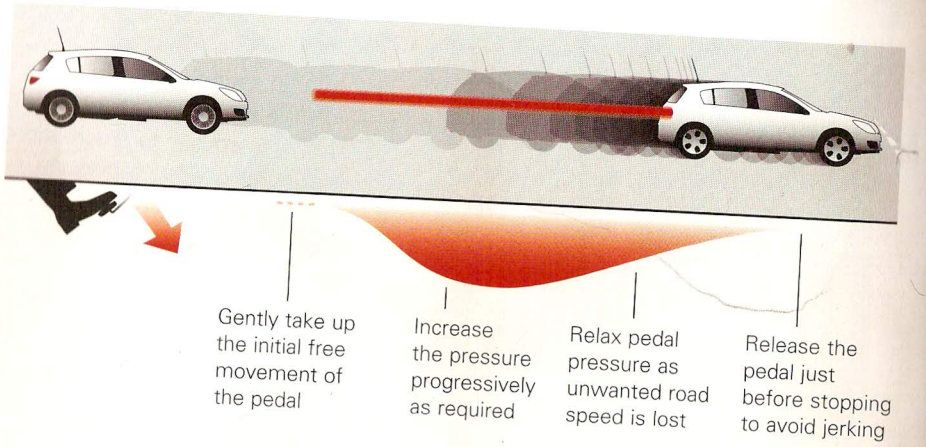
Use the brakes if you need to make more than a gradual adjustment to your road speed. For maximum control, you should keep both hands on the wheel while you brake, and plan to avoid braking on bends and corners. (But note the discussion on brake/gear overlap earlier.) You can apply pressure to the footbrake to achieve the slightest check or, at the other extreme, until just before the wheels lock up (or the ABS intervenes). Try to avoid locking the wheels completely because this will cause you to lose steering contol. Remember to make allowances for extra loads or changes in road surface.

Check the brakes every time you use your vehicle, both before you move off and when the vehicle is moving.

See Know your vehicle, page 164.

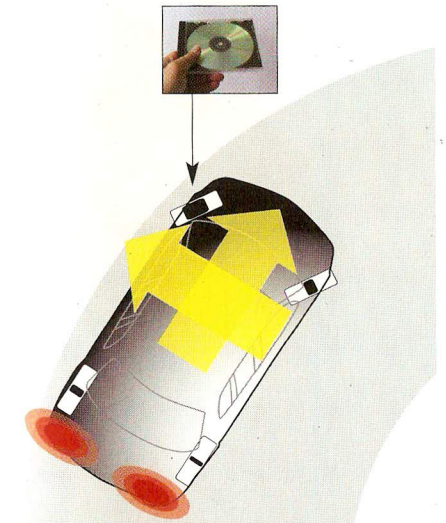
Normal braking (tapered braking)

Braking should normally be progressive and increased steadily.



Braking, tyre grip and balance

Braking moves the weight of the vehicle forward on to the front wheels. This makes the steering heavier and at the same time reduces the grip of the rear tyres. On a bend this reduces stability and can cause a skid. The harsher the braking, the greater the demand on tyre grip and the less your ability to steer. In slippery conditions harsh braking almost inevitably results in a skid.



Braking reduces the grip of the rear tyres. On a bend this unbalances the vehicle.

The safe stopping distance rule

This is one of the guiding pr... *Roadcraft*. By relating your speed... distance within which you can stop, y... can adopt a safe speed in any situation.

Never drive so fast that you cannot stop safely within the distance you can see to be clear.

The importance of observing this rule for your own and other people's safety cannot be overstated. It provides a guide to the speed at which you should corner and the distance you should keep from other vehicles in all other traffic conditions. Successfully applying this rule requires skill. You need to be aware of:

- the braking capabilities of your vehicle
- the type and condition of the road surface – in slippery or wet conditions braking distances increase greatly
- the effects of cornering, braking and vehicle balance on tyre grip.

In narrow and single track lanes, allow twice the overall stopping distance that you can see to be clear to allow room for any oncoming vehicle to brake also.

Overall safe stopping distance

To work out the overall safe stopping distance, add thinking distance to braking distance.

Thinking distance + Braking distance = Stopping distance

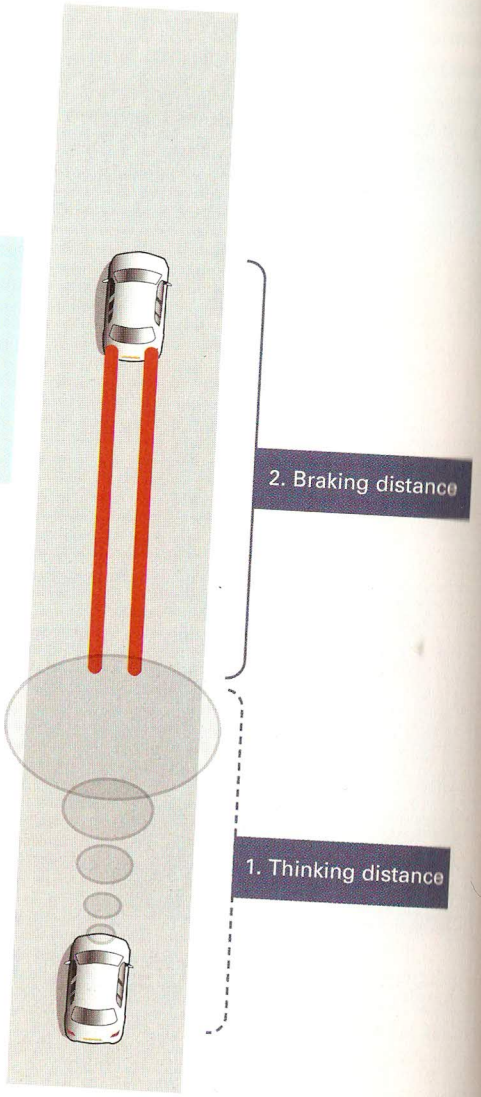
Thinking distance is the distance travelled in the time between first observing the need for action and acting. This is why attitude, observation, anticipation and information-processing abilities are vital.

Actual thinking distance varies according to the speed of the vehicle, your physical and mental condition, your attentiveness and whether or not you are expecting something to happen.

It takes much longer to react to unexpected events than to expected ones – you need less thinking time if you are anticipating events and not just reacting to them.

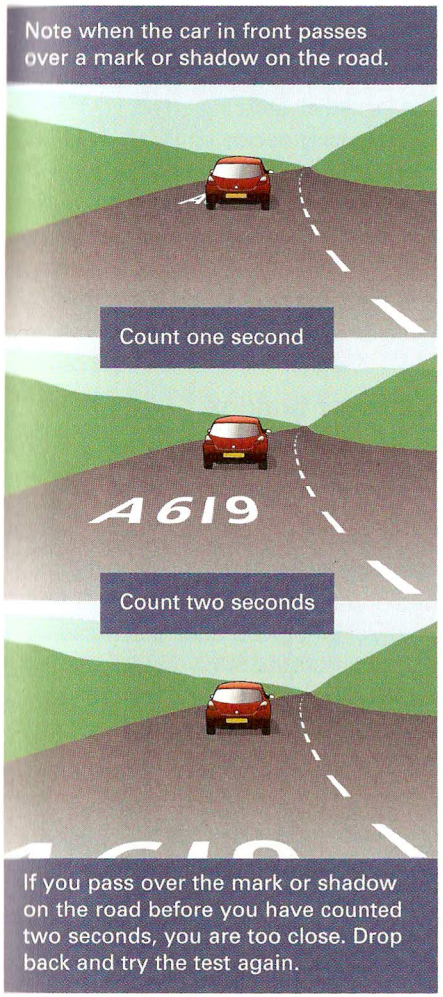
Some common medicines (e.g. some antihistamines for hay fever) can make you drowsy and slow your thinking and should be used with care.

Braking distance is the distance needed for braking. Actual braking distance depends on the vehicle's capability, the gradient of the road and the condition of the road surface – slippery surfaces greatly increase braking distances.



The two-second rule

To keep a safe distance between you and the vehicle in front on fast roads, leave a gap of at least two seconds. But remember your overall stopping distance depends on your speed and the condition of the road surface. An easy way to count two seconds is to say: *Only a fool breaks the two-second rule.*



You need to allow at least double this distance in wet weather and even more in icy conditions. If the vehicle behind you is too close, drop back further from the vehicle in front. This will allow you to brake more gently in an emergency and may prevent you being rammed from behind.

Braking for corners and bends

Braking affects the balance, stability and cornering ability of vehicles, so you need to plan braking carefully for a corner or bend:

- plan to avoid braking on corners because it increases the demand on tyre grip; if braking is necessary, apply the brakes gently and steadily
- brake in plenty of time
- adjust brake pressure to the condition or grip of the road surface
- on steep winding descents brake firmly on the straight stretches and gently on the bends; remember to use a low gear at an early stage in the descent.

Braking as you approach a hazard

To apply the system of car control, consider your road speed on the approach to a hazard and slow down if necessary. Always check your mirrors before you reduce speed or change direction. Choose the best road position and then reduce speed safely and smoothly using engine braking, braking or a combination of both.

When and how firmly you apply the brakes depends on your judgement of speed and distance. Consider:

- your initial speed
- the road surface
- weather conditions
- the specific road and traffic conditions.

Sometimes braking may need to be firm but it should never be harsh. Harsh braking usually results from poor observation, anticipation and planning. Aim to lose speed steadily from the first moment until you achieve the correct speed to negotiate the hazard. Timing is crucial: avoid braking so early that you have to re-accelerate to reach the hazard, or so late that you have to brake harshly.

See Chapter 3, *The system of car control*, page 51.

Emergency braking on a good dry road

The quickest and shortest way to stop on a dry straight road is to brake until the wheels lock up.

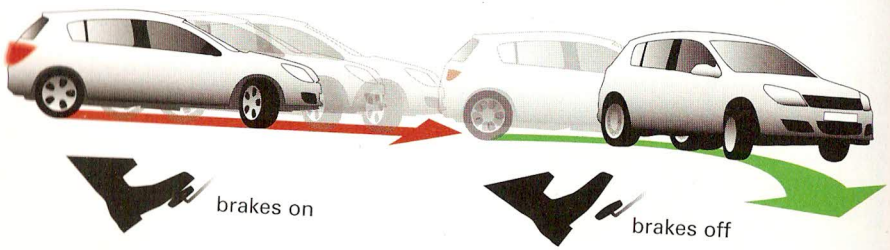
In a vehicle with an antilock braking system (ABS), the ABS repeatedly releases the brakes just before the wheels lock up and reapplies them in a pulsing action, so that they never fully lock. ABS only works if you maintain firm pressure on the brake pedal. The advantage of ABS is that it gives you some steering control during emergency braking – see Chapter 5 for a full explanation.

In an older vehicle without ABS locking the wheels achieves a high degree of braking but once the wheels are locked all steering effect is lost. You must quickly decide either to brake to a standstill on a straight course, if there is room to do so, or to relax brake pressure to steer out of trouble. In a vehicle without ABS, one option is to use the cadence braking technique described below.

Cadence braking

If your vehicle has ABS do not do this. Read the manufacturer's handbook.

In a vehicle without ABS, applying the brakes repeatedly gives you some steering control during braking. (This is in effect what ABS does electronically.) Apply the brakes firmly to lock the wheels momentarily and then release them to allow the wheels to rotate again, so that you regain steering. Repeat this sequence deliberately and rhythmically until sufficient road speed is lost. Braking occurs while the brakes are on, steering while they are off.



*ABS and cadence braking do not help **braking** – they help **steering** while braking.*

Emergency braking on a slippery road

In a vehicle without ABS, cadence braking gives you some steering control when braking on a slippery road. However, it is much better not to have to brake sharply in these conditions. Use your observation and anticipation skills to recognise where slippery conditions are likely, and adjust your speed.

See also Chapter 5, *Maintaining vehicle stability*.

Using the handbrake

Methods for applying and locking the handbrake vary, so check and follow the manufacturer's instructions.

Only use the handbrake when the vehicle is stationary. New drivers are often taught to use the handbrake every time they come to a standstill on a journey. With experience you can judge whether you need to put the handbrake on for every momentary stop.

Steering

A well-maintained vehicle travelling along a flat, straight road should hold its position with minimal steering. Camber, crossfall, or side winds can move the vehicle to one side but a small steering adjustment will keep the vehicle on a straight course. Usually you only need to make positive steering adjustments when you alter position or turn the vehicle. Steering characteristics vary between vehicles, so make sure you are familiar with the characteristics of vehicles you drive. Some vehicles respond more than average to steering (oversteer) and others less (understeer). Power assisted steering (PAS) assists steering at slow speeds and may cause you to oversteer if you're not used to it.

Steering technique

Police driving schools have developed a range of steering techniques to suit different policing situations. The most widely adopted is the pull–push method which provides safe and efficient steering in a wide range of circumstances.

Your steering method should be determined by the control, efficiency and comfort you experience throughout the full range of steering movements. This may vary according to:

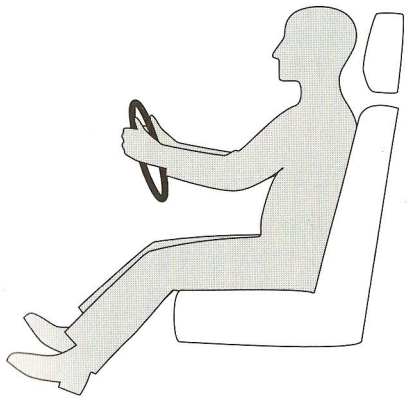
- the car you are driving (the lightness of its steering, the diameter of the steering wheel, the castor action and the number of turns from lock to lock)
- how you sit in relation to the steering wheel
- your size and shape.

Seat position

Good steering starts with getting your body in the right position in relation to the steering wheel. Adjust the position and angle of your seat so that you can reach the controls comfortably. Aim for a position which allows greatest control of the steering without being uncomfortable. An uncomfortable position will tire you and impair your driving.

You're likely to be in a good sitting position when:

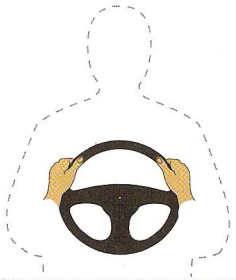
- both hands are on the steering wheel and your elbows are slightly bent



- you can depress the clutch pedal to its full extent and your knee is still slightly bent.

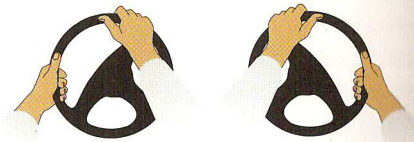
How to hold the steering wheel

- Place your hands on the wheel with your palms on the rim. Your thumbs should extend out and be placed on the rim so that your thumb nails are towards you.
- Hold the wheel lightly but be ready to tighten your grip if necessary.
- Keep both hands on the wheel while you are driving unless you need to operate a control.



This standard hold enables you to turn the wheel immediately in either direction and is a feature of most safe and efficient steering techniques.

Make changes in direction smoothly and gradually. Make small changes in direction by turning the steering wheel without altering your hand hold.



To make more positive turns, use the pull–push method described next.

Pull–push

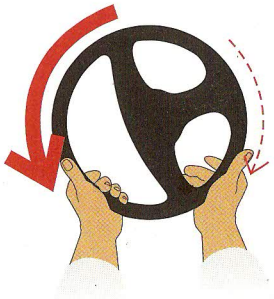
With the pull–push method neither hand passes the twelve o'clock position. Your hands remain level with each other on the steering wheel except when you move a hand up for the initial pull or when you make small alterations in position. One hand grips and makes the turn, the other slides round its side of the wheel ready to continue the turn. The advantage of pull–push is that it keeps both hands on the wheel and allows an immediate turn in either direction at any point during steering.

The explanation of the pull–push method given below is for a left-hand turn. For a right-hand turn follow the same method starting with the right hand at 12 o'clock.

Start the turn with a pull and not a push because it gives better control.

Slide the left hand up to a higher position on the wheel, but not past the twelve o'clock point. The starting point will depend on the sharpness of the bend or turn.

Pull the wheel down with the left hand.



As the left hand pulls down, slide the right hand down, allowing the rim to slide through the right hand fingers. Keep the right hand level with the left hand until it nears the bottom of the wheel.

If more turn to the left is necessary start pushing up with the right hand and at the same time slide the left hand up the wheel, keeping it level with the right.

Repeat these movements until you achieve sufficient turn.

Straighten the vehicle after the turn by feeding the wheel back through the hands with similar but opposite movements to those used for the turn. Don't let the wheel spin back on its own.

When you steer do you start with a pull rather than a push? If in the past you have tended to start with a push, practise pulling first. Notice how it contributes to the smoothness and control of your steering.

Rotational steering

In exceptional circumstances, for example during skidding or during very slow or high speed manoeuvres, this technique may be an option.

Hold the wheel using the standard hold described on page 78. The quarter-to-three position allows the greatest degree of turn without having to reposition a hand.

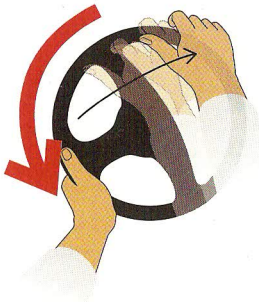
Most alterations to direction (up to about 120 degrees of steering wheel turn) can be made by turning the wheel while keeping a light but fixed hand hold.

For more acute turns (requiring more than about 120 degrees of steering wheel turn) reposition your lower hand at 12 o'clock and continue smoothly pulling down the wheel.

If you can see that a turn is going to require more than 120 degrees of steering wheel turn, place your leading hand at the top of the wheel before starting the turn.

If even more turn is required, place your other hand near the top of the wheel to continue the turning motion.

Straighten the wheel by using a similar series of movements but in the opposite direction. Although the self-centring action of the wheel assists the return, you must keep it under control.



Manoeuvring at slow speeds and in confined spaces

Manoeuvring in a confined space sometimes requires rapid movements of the steering wheel. The standard pull–push technique generally provides effective steering, but on occasions, especially when reversing, other hand holds may give better control. Avoid trying to turn the steering wheel while the vehicle is stationary. This damages the tyres and puts excessive strain on the steering linkages, particularly in vehicles with power assisted steering (PAS).

Reversing hold

Hold the wheel near the top with your right hand and low down with your left hand. If you find this position difficult, or need to improve your view to the left, put your left arm on the back of your seat. Look in your mirrors and over your shoulders to get a clear view. If the seat belt restricts your movement, release it but don't forget to put it back on.

Advice on reversing

Reversing can be difficult, especially in a confined area. The faster it is done the more difficult it is to control, so always reverse slowly. Before you reverse:

- scan the area for suitability and obstructions
- ensure you have an unobstructed view
- use your mirrors to help you whilst reversing but look all round, don't rely on mirrors alone
- wind down your door window to give you more all round awareness
- get someone to help you if possible.

While reversing:

- travel slowly and slip the clutch if necessary – in automatic vehicles you can check the speed by using the left foot on the brake
- as you steer, the front of your vehicle moves out and could strike nearby objects – remember to look forward
- check around you for hazards.

If your reversing lights fail, use your indicator lights or brakelights to light the area behind you when it is dark, but be careful not to mislead other road users.

Key points

- **Don't rest your elbows on the window frame or arm rests because this reduces steering control.**
- **Hold the wheel lightly but be ready to tighten your grip when you need maximum steering effort.**
- **Keep both hands on the wheel when cornering, braking or driving through deep surface water.**
- **On slippery roads steer as delicately as possible or you may skid.**

Accurate steering requires good observation, anticipation and planning. If the brakes are applied sharply or if the speed is too high, steering cannot be precise.

Review

In this chapter we have looked at:

- the skilled use of controls for moving, stopping and manoeuvring your vehicle
- getting maximum safety from the tyre grip available
- how acceleration and braking affect vehicle balance
- the importance of matching engine speed to road speed when you change gear
- skilled use of the gears in a range of circumstances
- using your brakes
- thinking, braking and safe stopping distances
- steering for maximum safety and control.

Check your understanding

How and why does acceleration affect your ability to steer?

How and why does braking affect your ability to steer?

Why do you need to be in the correct gear to accelerate?

What is the basic driving safety rule?

When, if at all, should you use your gears to brake?

What is the safest way to lose speed gently in slippery conditions?

What factors affect thinking distance and braking distance?

What is the simplest rule to keep a safe distance from the vehicle in front?

What are the key points to remember for effective steering?

If you have difficulty in answering any of these questions, look back over the relevant part of this chapter to refresh your memory.

Chapter 5
Maintaining vehicle stability

Use this chapter to find out:

- how to minimise the risk of skidding
- what causes a skid
- what active safety features do to help stability and what they can't do
- how to correct a skid manually in a vehicle not fitted with active safety features.