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This document will take approximately 20 mins to complete.



Junctions

- Has a car driver ever pulled out in front of you, causing you to brake sharply or crash?
- Has someone's poor lane discipline ever caused you a problem on a roundabout?
- Regardless of blame, perhaps there was something that you could have done to reduce the risk.

We will examine some of the most common junction problems, look at why drivers sometimes fail to see bikes, why riders sometimes cause problems for themselves and suggest ways to reduce the risk. It does not cover basic information on how to negotiate a junction, so if you are a provisional licence holder, speak to your CBT/DAS trainer.

The information in this download is based on established information including that contained in the police Roadcraft manual. The information is provided in good faith and Norfolk County Council accepts no responsibility for any damage or injury howsoever caused by following the advice contained herein.

“ Based on Department for Transport Data, almost 60% of (killed and seriously injured) powered two-wheeler crashes occur at, or near, some form of junction. ”

Junctions

Many riders will have experienced a vehicle unexpectedly pull out in front of them at a junction or a vehicle coming towards them turn across their path as if they had not been seen at all. These are probably the two most common junction problems, created by other road users.

This type of crash is by no means restricted to novice riders so it is worth more experienced riders also looking deeper into:

- **Why and how easily these things can happen**
- **What can be done to reduce the risks**

Understanding how easily these things can happen is intended to give riders the capability and opportunity to adopt or enhance their defensive mindset around junctions. Riders must take control as far as possible and not rely on other road users to do the right thing. It's not about blame, it's about avoidability.



Why do car drivers sometimes fail to see motorcyclists?



It is undeniably bad driving because the motorcyclist was there to be seen. A common scenario is when a driver looks in the direction of the motorcyclist, but still pulls out, apparently not having seen them at all.

Historically, learner training stressed the importance of **gaining eye contact** with the driver. Whilst it is useful to know whether the driver has even looked your way, it is unsafe to assume that they have seen you. The reasons why drivers occasionally look and then pull out in front of bikes can be complex. We will look at some of the human factors contributing to this outcome.

It may be useful to understand how easily the human brain can dismiss information that is in plain sight. This knowledge should reinforce the need for riders to adopt a **defensive mindset** and a **high level of concentration, observation and planning**. It is cold comfort from your hospital bed, knowing you were not at fault.



Why do car drivers sometimes fail to see motorcyclists?



The **Human Factors and Ergonomics Society** examined a person's failure to notice an unexpected object located in plain sight in looked-but-failed-to-see (LBFTS) crashes. Despite the lack of other hazards or distractions, drivers can look in the direction of the oncoming motorcycle but still pull out into its path.

Professor of Psychology, **Kristen Pammer** (Australian National University) noted in the study that there is a huge amount of sensory information when driving, that our brain must deal with.

“ We can't attend to everything, as that would consume enormous cognitive resources and take too much time. Our brain therefore, must decide what is most important and the frequency of LBFTS crashes suggests a connection with how the brain filters out information. ”

(Pammer 2018)

Prof Pammer observed **“ motorcycles appear to be very low on the priority list for the brain when it is filtering information. ”**

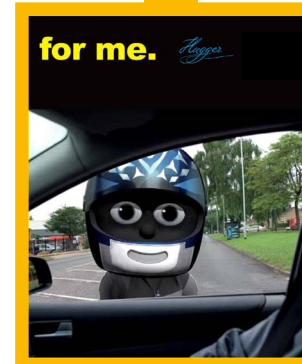
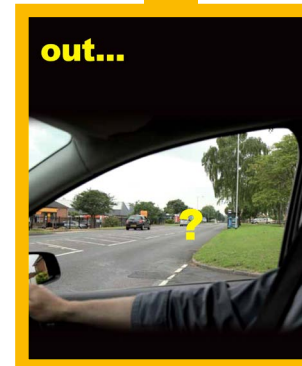
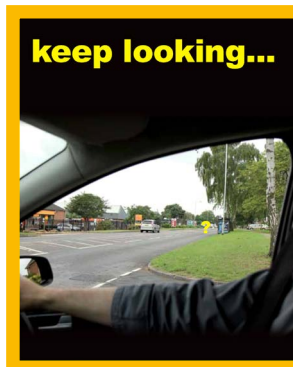
Her conclusion was that better training programmes are needed to make drivers more motorcycle-aware and put motorcyclists higher on driver's 'brain radar'.



Why do car drivers sometimes fail to see motorcyclists?

Campaigns across the world have been trying to address this deficiency for decades.

- Research conducted by Crundall et al (2010) suggested that whilst most drivers may indeed look appropriately, some may not fully realise what they are looking at and may look away before fully processing the information.
- People tend to look for things that are of interest to them. If a driver is also a motorcyclist they are more likely to be carefully looking out for bikes (Brooks & Guppy 1990, Magazzu et al 2006, Crundall et al 2008)
- Motorcyclists make up 1-2% of vehicular traffic and so, are an uncommon sight on the roads. This does not help in placing motorcyclists high on the driver's 'brain radar' as they are an unusual object on a daily journey and easier to miss if the driver is not actively looking out for them.



How we see the world

A study published in **Psychological Science**, showed that we are not always seeing what we think we are with our peripheral vision, which is partially based on a reconstruction of reality. Humans, and many animals, do not look at a scene in a fixed way. Their eyes flick around, looking at parts of the scene, building a mental map.

The eyes rest briefly on an object, before moving on, known as 'saccadic eye movements'. Only the central one to two degrees of the visual field is high definition. By rapidly moving the eye around the various parts of the image, those parts are stitched together to form a bigger picture.

The areas where our eyes stop and focus, are known as '**fixations**'. The path between 'fixation' points, are known as '**saccades**' and our brain actually closes down the visual system for a split second rendering us functionally blind for that time.



How we see the world

With this video, disregard the peripheral areas and stare only at the centre. Your central visual field sees hexagonal shapes and the brain fills in the information from the peripheral areas, joining up the image, creating the illusion that the whole image is made up of hexagons.

Our brain has partially reconstructed the reality of what is clearly there to be seen.



See the YouTube video showing a variety of different geometric shapes across the image but with an area of identical shapes in the centre. Staring at the central area, the brain reconstructs the reality of what is there to be seen, to create a screen of identical shapes to those in the central visual field.



We are not well equipped for these tasks

It has taken us over 50,000 years to evolve from the Cro-magnon species of hunter-gatherer, to our current state of physical and mental development. For most of that time, nothing much changed in the way we lived our lives, then in the last 150 years everything changed.

Do I really need to know all this?

The purpose of examining this is to illustrate just how easily other road users can overlook a motorcyclist. It shouldn't happen if people are concentrating and paying sufficient attention but occasionally it does. We are a very adaptable species but we are not well evolved for driving or riding and the way our brains see and process information is clear evidence of that.

All road users need to be mindful of these limitations and do their best to mitigate the effects. From a rider's perspective they need to ride with high levels of concentration, observation and planning and adopt a defensive mindset, anticipating hazards before they become an immediate threat.

These visual and processing limitations also need to be borne in mind by riders themselves when they are taking in information from their surroundings, particularly with objects in the peripheral visual field. **Half a glance is not enough.**



Junction problems and reducing risk

The most common reasons or contributory factors for crashes at junctions are:

- **Careless driving on the part of the car driver**
 - Drivers occasionally make mistakes and we've seen how easily that can happen. For self-preservation riders must take control of the situation, as far as possible, by **riding defensively**.
- **Motorcyclist not anticipating what may happen**
 - The rider may not be at fault, but needs to be proactive. They must scan the scene looking for potential problems **before** they become an immediate threat. This buys Time To React.
- **Excessive Speed** - If the motorcycle is travelling too fast, the driver may misjudge speed and distance, even if they have seen the bike. The rider will also have less time to react if something goes wrong.

Remember the **SAFE STOPPING DISTANCE RULE** ➤



REMEMBER

SAFE STOPPING DISTANCE RULE

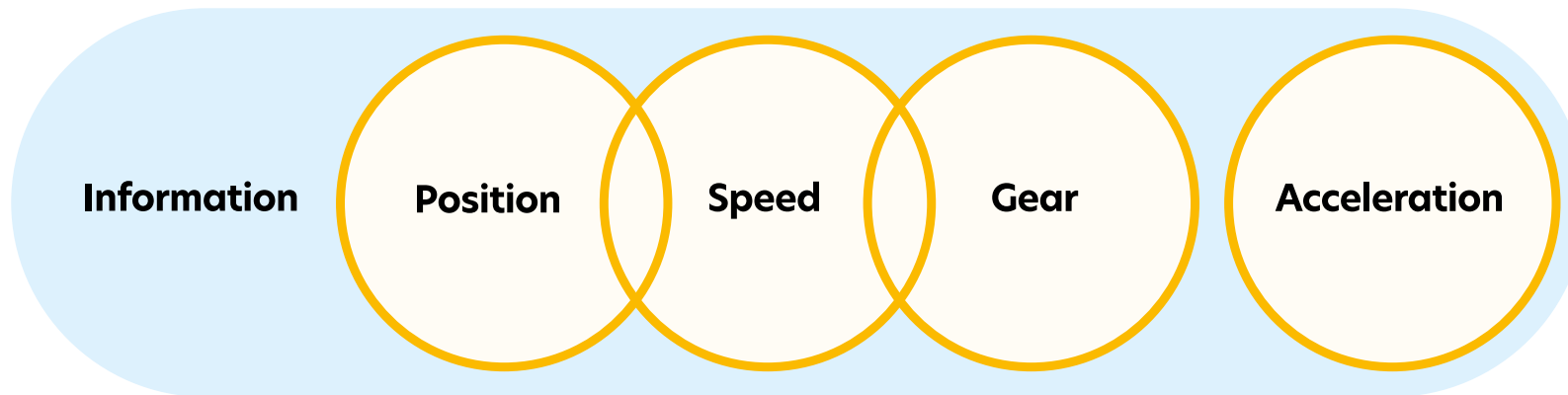
Always be able to stop on your own side of the road in the distance you can see to be clear.



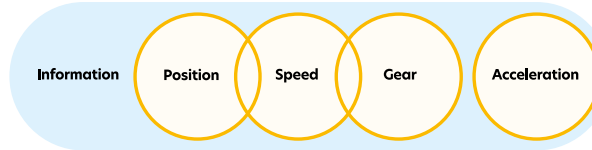
Reducing Risk

Adopt a systematic approach

The police System of Motorcycle Control is covered in a separate download but if we apply it here, to the specific issue of a vehicle emerging from a side junction, it will put the system into context.



Reducing Risk



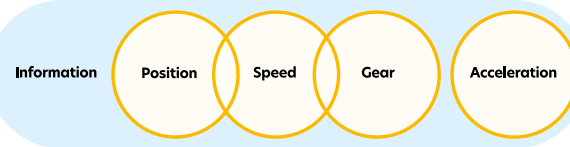
Information (observe/plan)

- **Having identified the vehicle, anticipate that it may pull out** - Acknowledge that it is a possibility.
- **Has the driver even looked your way?** - Gaining eye contact with the driver is not something you can rely on but, if the driver hasn't once looked your way, it's still useful information in terms of a warning sign.
- **Look for signs of movement** - Watch the wheels carefully to see if they start to rotate, you will spot this more easily than movement of the body of the car.

All three photos are of the same junction



Reducing Risk

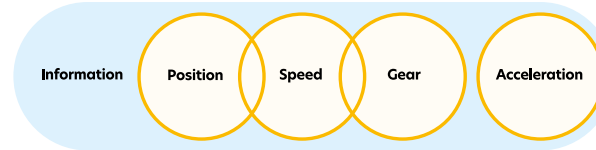


Information (observe/plan)

- **Are there any oncoming vehicles?** - If the car in the junction is intending to turn right, whilst not guaranteed, it is less likely to do so, into the path of a vehicle approaching from its left, a car being a much larger object in the visual field. The absence of any oncoming traffic may increase the potential for the car to pull out.
- **Cover the horn, consider using it** - Don't use the horn aggressively and consider an acknowledgement to the driver, that you merely used it to alert them to your presence. It eases tension. Don't forget, the driver may have loud music playing in the car and may not hear a horn warning - assume nothing!



Reducing Risk



“ Loud exhausts save lives ”

- Sadly they don't!

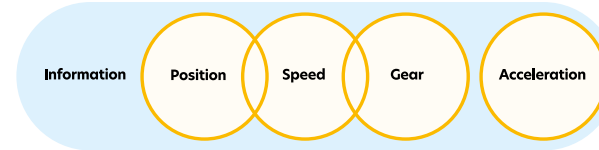
On the topic of audible warnings, you will hear some people claim that loud exhausts save lives. There are several reasons why riders may choose to have a louder, non-standard silencer. They are smaller, better looking, save a lot of weight and sound nicer than the standard item, to bikers at least.

However, it is unwise to believe drivers ahead will hear it because the sound is not projected forwards effectively, particularly at speed. The most serious crashes normally happen on faster roads, the very place a loud exhaust is least likely to be heard by drivers ahead.

The loudest place for exhaust noise is behind the bike. People still pull out in front of police bikes with sirens wailing and they have forward facing speaker cones which are far more penetrating and louder than any exhaust. If music is playing in the car, they probably won't hear your exhaust no matter how loud it is.



Reducing Risk



Position

When moving away from a hazard if your space is restricted, you may need to slow down to deal with it! Don't be determined to maintain your speed past it. Don't forget a mirror check too.

Moving away from the hazard, may make you more visible to the car driver, as you will be moving across their visual field. It is not recommended to swerve violently from side to side as soon as you see a vehicle in a side road (as some people advocate).

If the vehicle still pulls out in front of you, your bike needs to be upright so that maximum braking forces can be applied in a straight line, which is not possible whilst you are weaving around. It will also confuse everyone around you.

**If the situation is that concerning to you
...slow down!**



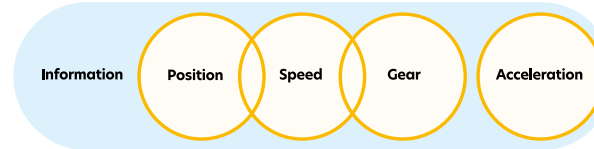
Reducing Risk

Speed

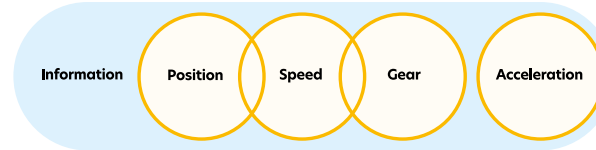
Consider a reduction in speed

Remember - Your bike almost certainly loses speed more rapidly, as you close the throttle, than the cars following you. They may be expecting to see a brake light if you are slowing down. **Consider** showing a brake light to alert them to the fact you are slowing, whether or not you actually need to use the brakes.

Cover the brake - Having identified a potential problem and decided that you may need to brake, get ready for it by covering the brake lever. It will take a split second out of the time taken before you brake and in this sort of situation, time is precious.



Reducing Risk



Gear

Consider a reduction in speed

Always be in the optimum gear - There will come a point where you are so close to the junction that it is not possible to stop if the vehicle suddenly pulls out. If it pulls out when you are almost on top of it, there may be an option to accelerate out of the way. Even with a powerful machine you will still need to be in a responsive gear to enable that instant snap of power to get out of the way. Just **be very careful** that this does not result in you accelerating into the hazard.

Acceleration

Once the danger has passed, accelerate smoothly away.



Reducing Risk

Oncoming vehicles turning right across your path

Though dramatic, the rider involved in these crash photos fortunately recovered from his injuries.

This is an extremely dangerous scenario, particularly on high speed roads.

Norfolk Constabulary put together a video '[David's Story](#)' about a fatal crash, when motorcyclist David Holmes, was travelling well in excess of the speed limit on the A47 towards Norwich.

A car travelling in the opposite direction, turned right across his path. Whilst both parties bore some responsibility for the crash, David was in view to the car driver for six seconds, on a straight section of road. For whatever reason, the driver didn't see him, prior to turning. He didn't misjudge his approach speed, he just didn't see him.

[Watch the Vimeo video of 'David's Story'](#)

Advisory note: Some people may find the content in the video distressing.



Reducing Risk

Q: Leaving any specific reference to this crash aside, how can a car driver not see a bike in these circumstances?

- In addition to everything previously discussed, the driver's **attention could be split** between what's ahead and looking to where they are about to turn.
- There may be some **conspicuity** elements, black clothing, black helmet and so forth, making you harder to spot against the background. It is a complex topic though. On some occasions, darker clothing would actually help against a lighter background. On balance, lighter coloured clothing may help, even if it's not hi-vis.
- Be mindful of low sun behind you making it more difficult for drivers emerging from junctions to spot you.

Spot the bike?



Reducing Risk

➤ **Distractions.** This could be something simple like the children misbehaving in the back of the car although mobile phone use is probably the most common problem and far more dangerous than many people realise. When did you last receive a phone call that was so urgent that it couldn't wait until you pulled over? The principal danger comes not from physically holding the phone, but holding a conversation with someone not present in the vehicle.

A driver on Bluetooth (not illegal at the time of compiling this document) presents a very different problem to talking with someone in the car. The driver will visualise the person being spoken to in addition to concentrating on the actual conversation. This will use up cognitive resources that should be focussed on driving.



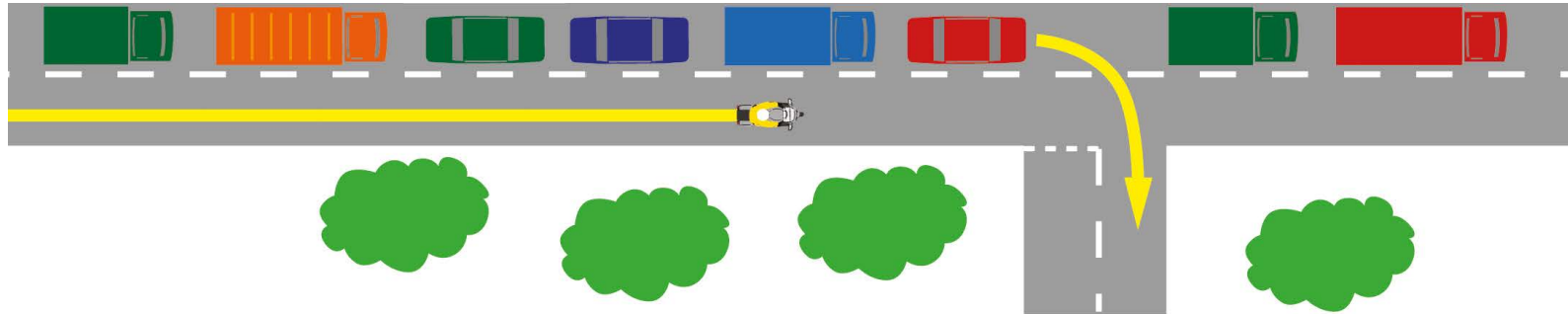
Reducing Risk

Q: What can I do about vehicles turning across me?

- See whether the vehicle is visibly **slowing** down (it may or may not be indicating)
- Observe the **movement** towards the centre line
- Consider **moving the bike** away from the hazard, to break their line of sight
- Consider a **horn** warning
- Consider **losing speed** - maybe a lot if you are really not happy with how things are starting to look
- Be **ready** with the brakes



Overtaking at or near junctions



Another serious and surprisingly common problem at junctions is bikes **overtaking** vehicles that are about to turn right. This is a lethal practice and is fully covered in our two downloads on **Overtaking and Filtering**.

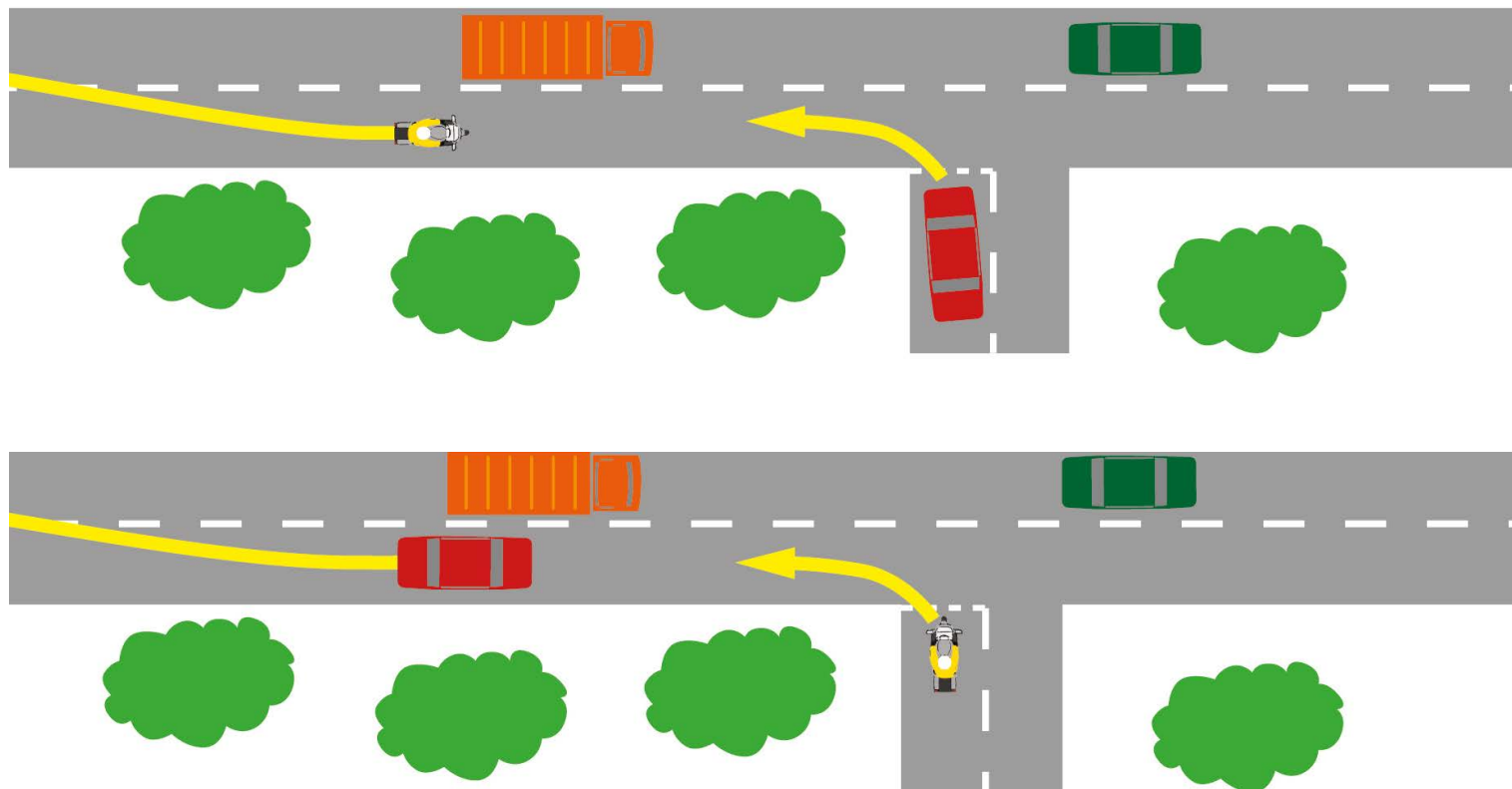
It is caused by:

- Very poor observation and planning
- Failing to register the junction and the potential of the vehicle turning
- The vehicle slowing (may or may not be indicating)
- A determination to overtake overriding the obvious risks





Another serious consequence of people overtaking near junctions can be seen from the examples below. People rarely look left before starting to pull out. Crucially, **do not** overtake anywhere near junctions in the first place but if you are the vehicle emerging, **look left** as well as right before pulling out!



Travelling too close

The DfT crash statistics for junctions include roundabouts and also tail end collisions where the motorcycle or scooter has **crashed into the back of a vehicle** that was in the process of turning, or waiting to turn into a junction.

This type of crash is all too common amongst younger and less experienced riders who do not see the benefits of staying further back, opening up their field of vision and giving themselves time to react. It also gives an early warning of something that may cause the vehicle in front to brake or alter position and allows more reaction and braking time for the vehicle behind.

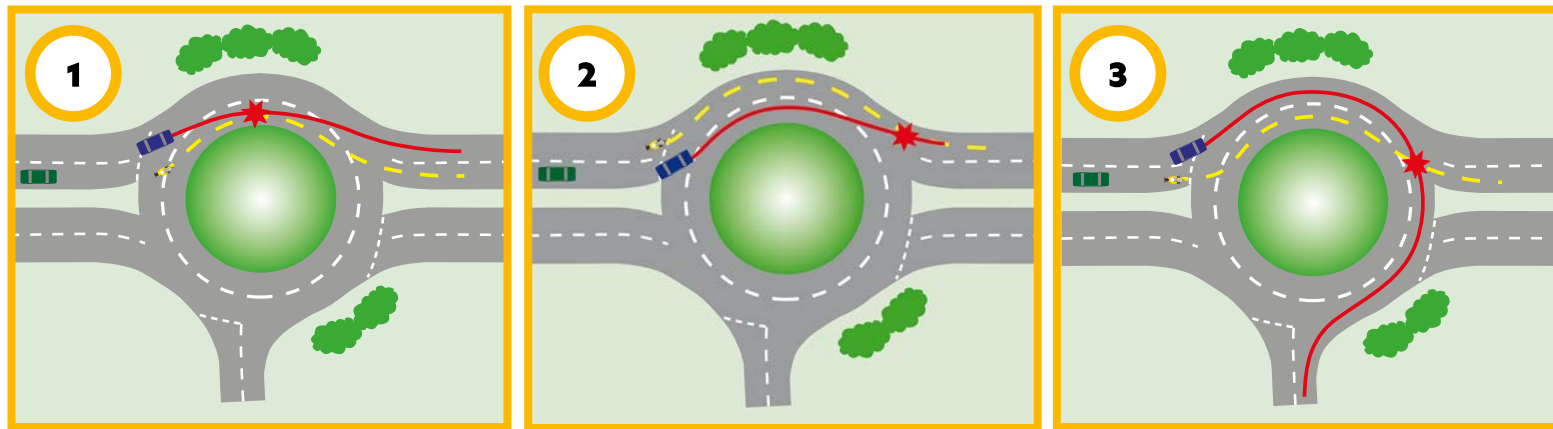


Two Lane Roundabouts

Apart from vehicles pulling out on you, two-lane roundabout junctions create several potential problems caused by poor lane discipline.

What goes wrong?

- 1** Vehicles often straight-line roundabouts taking the shortest line through. This can squeeze the motorcyclist either against the roundabout as illustrated below...
- 2** ...or against the nearside kerb on the exit as illustrated here.
- 3** The other major problem is vehicles turning right from the left hand lane. In this case, **there will be clues** that the driver is intending to turn, such as head movement. Drivers will generally look where they are heading, it is highly unlikely that they will be looking straight ahead as they turn.



Two Lane Roundabouts

Large vehicles

Large Good Vehicles (LGV) can create additional problems at roundabouts. They obviously need more space particularly on the smaller roundabouts so don't get tangled up with them, **give them the space** they need.

LGV crashes on roundabouts, can also be caused by excessive speed for the curve or load shift.

Another danger exists if the load becomes **insecure**. Consider what might happen as the vehicle exits this roundabout and you are trying to overtake it! The load is thrown to the outside of the curve whilst you are trying to overtake. This could be a load coming through the curtain or just sliding off the vehicle if it has been badly secured.

This may look like an inviting opportunity to overtake the LGV exiting the roundabout but consider what happens if the load becomes loose and comes out through the curtain as it negotiates the left hand curve with the weight thrown to the right. It has happened at this exact location in the past, with a huge roll of sheet steel!



A Simple Solution

You can only control the space in front of your bike, not to the sides. If you are alongside another vehicle on the roundabout and the driver decides to turn right from the left-hand lane or apex the roundabout, you have **no control over events**. You will also be unable to see any clues from the driver of his/her intention, such as head movement if turning right. If the rider remains on the rear corner of the vehicle slightly behind it (on which ever side is applicable) they will spot any unexpected manoeuvre developing and be able to react, most likely avoiding any contact. If the bike is alongside, the rider is at the mercy of the driver and has nowhere to go.

Is this vehicle about to turn right from the left-hand lane without indicating? If it does, you have it covered.

It may be tempting to try and get round the vehicle whilst on the roundabout, in order to make progress, but you are **trusting to luck** if something unexpected happens because you **do not control that space**.

If you arrive at the same time onto the roundabout and your momentum means you will be ahead of the other vehicle, the issue does not arise. It's more when you enter the roundabout slightly behind, but attempt to get ahead of the other vehicle as you negotiate it, that problems can develop.



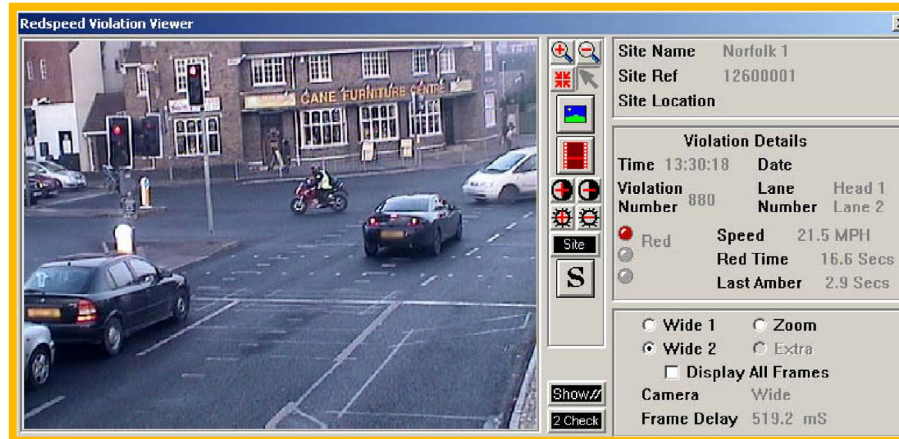
Traffic Signal issues

With traffic light infringements, you will find the 'amber gamblers' that try to beat the red light by accelerating as the lights change, but there is another group whose minds are elsewhere, completely.

The latter category is illustrated in this photograph taken from a red light camera. The display on the right-hand side shows the time that the light had been red (16.5 seconds) and the speed at which the vehicle went across the junction

There is little chance that this was deliberate, but that will be of little comfort to you.

The more common problem will be created by those that try to beat the red light so just have a **quick glance in both directions** as you prepare to move off when your light turns to green.



The screenshot shows a 'Redspeed Violation Viewer' window. On the left is a live camera feed of a street junction with a red traffic light. A motorcycle is visible in the middle of the junction. On the right is a control panel with the following information:

Site Name	Norfolk 1		
Site Ref	12600001		
Site Location			
Violation Details			
Time	13:30:18	Date	
Violation Number	880	Lane Number	Head 1 Lane 2
Red	Speed	21.5 MPH	
	Red Time	16.6 Secs	
	Last Amber	2.9 Secs	
Wide 1		Zoom	
Wide 2		Extra	
<input type="checkbox"/> Display All Frames			
Camera		Wide	
Frame Delay		519.2 mS	



In Conclusion

Junctions will always be a high-risk area for motorcyclists but with the right mindset, observation and planning, you can **significantly reduce the risks**.

We recommend people read **Roadcraft**, **the Police Rider's Handbook** published by TSO, available from all good booksellers. It contains a wealth of valuable information.

To improve your skills and get more out of your riding, why not take part in a Norfolk Constabulary Safe Rider course, or a two hour Hugger 1:1 Skills Session?

To enquire about either of these courses please contact roadsafety@norfolk.gov.uk

