Motorcycle Action Group

How Close Is Too Close?

Concerning

Car Collisions and Motorcycles

March 2006

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Introduction

The Motorcycle Action Group (MAG UK) has undertaken an investigation to identify the cause of accidents involving cars and motorcycles at T junctions in order to have a better understanding of this specific type of accident which regularly leads to the death or serious injury of motorcyclists. This paper focuses on 'Sorry Mate I Didn't See You' accidents or SMIDSYs, which are also known in the literature as Right of Way Violations (ROWV) accidents. The purpose is to provide a clearer understanding of this phenomenon and recommendations for improved car driver training as well as solutions identified as avoidance and evasion techniques for motorcycle trainers. Recommendations consider the responsibility of vehicle manufacturers as well as better training, road awareness and improved data collection.

Overview of Casualties in Great Britain in 2004

According to the DfT report[1] (table 5c and Table 29a) there were 585[2] Powered Two Wheelers[3] (PTW) riders and passengers (pillions) killed in Great Britain in 2004 (2.8% of all motorcycle related injuries) of which 25 were moped riders (0.5% of all moped related injuries). In comparison there were 1,653 car fatalities (0.9% of all car related injuries).

Table 39 of the DfT report highlights 6,063 seriously injured for all PTW riders and passengers (23.6% of all PTW related injuries), compared to 14,251 seriously injured for car driver and passengers (7.8% of all car occupant injuries). Total PTW casualties are 25,641 for PTW riders and passengers compared to 183,858[4] for car drivers and passengers[5]. However, due to the unreliability of the recording methods for seriously injured, these data should be considered with scepticism[6].

A national police strategy paper argues that motorcyclists are the most vulnerable road user group however statistical evidence suggests that this is not the case if we consider the volume of deaths and serious injuries by type of road user. Effectively by identifying the vulnerability of specific modes of transport (i.e. PTWs) this removes the focus on the fact that car occupants are far more likely to die and that pedestrians are far more likely to be victims of car collisions. In 2004, total car occupant fatalities were 1,671 while total pedestrian fatalities were 671 and total PTW fatalities were 585. 49% of these 2,927 deaths were caused by collisions with cars[7].

Table One

Vehicle involvement 2004			
Fatalities resulting from collisions with cars **presumed caused by car*		Fatalities resulting from collisions with PTWs ** presumed caused by PTW*	
car/ptw*	227	ptw/ptw*	8
car/pedestrian*	388	ptw/pedestrian*	23
car/bicycle*	61	ptw/bicycle*	1
car/car	494		
car/van	13	ptw/van	0
car/hgv-bus	4	ptw/hgv-bus	1
Total Fatalities	1,187	Total Fatalities	33

Source: Table 23 DfT Report NB car/ptw collisions represent 38.8% of all PTW fatalities.

[1] Department for Transport's Annual Report, Road Casualties in Great Britain 2004.
[2] In 2003 there were 693 PTW fatalities, 18.4% (108) more than 2004.
[3] Powered Two Wheelers: Motorcycles, Scooters and Mopeds
[4] Casualties include fatalities, seriously injured and minor injuries
[5] Includes Taxi cabs (2,321 casualties) and minibuses (1,001 casualties)
[6] A study in 1990 in one region found that about 36% of all road casualties were involved in accidents not reported to the police (Transport Research Laboratory (TRL) Report 379,1993). Recent more comprehensive research confirms that there is a degree of under-reporting. In addition a fifth of casualties reported to the police were estimated to be unrecorded. Studies confirm the view that the police are more likely to underestimate severity of injury because of the difficulty in distinguishing severity at the scene of the accident, and that under reporting rates are higher for less vulnerable road user groups. Some pedal cyclist injuries are not sustained on public roads and should correctly be excluded. A general review on the under reporting of road traffic accidents was produced by the TRL (in Traffic Engineering & Control, 1991) and a more recent study was published in 1996 (TRL Report 173).
[7] Cyclists are not discussed in this paper however total fatalities in 2004 were 134, serious injuries were 2,174 and total casualties were 16,648. (see table 39 DfT report). 61 cyclists were killed by car drivers and 1,601 seriously injured. Bicycle casualty trends are decreasing and are probably due to a massive increase in cycle lanes in urban areas over recent years. (Source: Sustrans press release, 26th November 2001). Downloaded http://www.bikebiz.co.uk/infozone/stats.php

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Table Two

Vehicle involvement 2004			
Serious injuries resulting from collisions with cars **presumed caused by car*		Serious injuries resulting from collisions with PTWs ** presumed caused by PTW*	
car/ptw *	2,899	ptw/ptw*	105
car/pedestrian*	5,177	ptw/pedestrian*	266
car/bicycle*	1,601	ptw/bicycle*	49
car/car	6,147		
car/van	170	ptw/van	5
car/hgv-bus	157	ptw/hgv-bus	4
Total serious injuries	16,151	Total serious injuries	429

Source: Table 23 DfT Report NB car/ptw collisions represent 47.8% of all ptw serious injuries

The total number of collisions involving cars resulting in serious injuries was 16,151 of which 9,677 or 60% of those were collisions between cars and more vulnerable road users.

Table one highlights that in 2004, there were 494 deaths of car drivers and passengers, followed by 388 pedestrians, then 227 PTW riders and/or passengers, caused by cars. Table Two above, highlights that there were 6,147 serious injuries for car drivers and passengers, 5,177 serious injuries for pedestrians and then 2,899 serious injuries for PTW riders and passengers, caused by cars. In both tables, blame is not apportioned.

Collision at Junctions

In 2004 there were 175,150 car accidents at junctions of which 38,171 (22%) occurred when the car was in the process of turning right. Overall, there were 17,699 accidents at junctions involving motorcycles and mopeds of which 8,878 were motorcycles over 125cc[8].

In the same year there were 88,137 accidents involving cars at T, Y or staggered junctions[9] which represent 50% of car accidents occurring at all types of junctions[10] (for built up, non built up roads and motorways) compared to 9,656 accidents involving motorcycles at T,Y and staggered junctions which represent 55% of PTW accidents occurring at all types of junctions)[11].

Behaviour and ROWV Accidents

In November 2004, the DfT published a report called Behavioural Research in Road Safety. The report covers a variety of studies which focus on specific causes to road accidents. One of these studies is called 'An in-depth case study of motorcycle accidents using police road accident files' by the authors DD Clarke, P Ward, W Truman and C Bartle.

This study considers accidents 'involving motorcyclists (and their blameworthiness) and the problem surrounding other road users' perception of motorcycles, particularly at junctions' (page 5). The report considers factors such as 'drivers with relatively high levels of driving experience who nonetheless seem to have problems detecting approaching motorcycles' (ibid).

The study examined 1,790 motorcycle accidents from the West Midlands police reports with follow up questionnaires. However, the authors concentrated on c.1000 of these accident reports identified as 'A' class' which provided more detail of the accidents.

Who is to blame?

Accordingly, 'of the total cases, 681 (38%) involve ROWVs also known as SMIDSYs. However, less than 20% of these involve a motorcyclist who rated as either fully or partly to blame for the accident. The majority of motorcycle ROWV accidents have been found to be primarily the fault of other

[8] Table 44 DfT Report (at a junction)
[9] Unfortunately the DfT does not differentiate between these three types of junctions.
[10] Junctions defined in Table 42, DfT Report: Roundabout, T, Y or staggered, Crossroads, Multiple junction, Slip Road, Other junction, private drive or entrance, not at or within 20 metres of junction.
[11] Table 42 Vehicles: by vehicle type and manoeuvre: DfT Report 2004

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motorists. This is an even higher level of 'non-blameworthiness' in ROWV accidents than that observed in other in-depth studies, e.g. Hurt *et al 1981*. (op. cit.)'.

The study supports the DfT 2004 casualty data by identifying that 'The majority of ROWVs occur at T-junctions, which are three times as common as roundabouts or crossroads. This finding is in accordance with the work of Hole *et al*. (1996), who found that the majority of such accidents occurred at 'uncontrolled' (i.e. no stop light or sign with only give-way markings and/or signs present) T-junctions in urban environments' (page 7).

The report highlights that 'Over 65% of ROWV accidents where the motorcyclist is not regarded as to blame involve a driver who somehow fails to see a motorcyclist who should be in clear view, and indeed frequently *is* in view of witnesses or other road users in the area. Failures of observation that involve drivers failing to take account of restricted views of one kind or another, and failing to judge the approach speed and/or distance of a motorcyclist are *not* included in this category' (Ibid).

The most significant finding of this study with regards to right of way violation (ROWV) accidents, suggests that in particular, there is a marked problem with other road users observing motorcyclists. This is the phenomenon whereby drivers overlook a motorcyclist in the immediate foreground seems to be in agreement with the work of Mack and Rock (op. cit.), whose theory of 'inattentional blindness' showed that subjects may be *less* likely to perceive an object if they are looking at it directly than if it falls outside the centre of the visual field. 'Inattentional blindness' is suggested by research to be affected by four main factors: conspicuity, expectation, mental workload, and capacity (page 8).

'Some results would seem to permit the discussion of conspicuity and expectation. The fact that many motorcyclists in our sample appear to be trying to make themselves more conspicuous but are not seen (however the report does not indicate what methods were used – i.e. whether this conspicuity included bright clothing, headlights on etc), nevertheless lends credence to the idea that there is something amiss in the cognitive processes of the other involved driver. The 'expectation' factor, in particular, raises the possibility that some road users have a poor perceptual 'schema'[12] for motorcycles in the traffic scene, and therefore do not process the information fast enough when motorcyclists are observed' (page 14).

Furthermore, the research shows that 'the average age of drivers in 'at fault' ROWV accidents involving motorcycles, 41 years, is significantly higher than the equivalent group in non-ROWV accidents, 36 years ($t = 3.45$, $p < 0.05$)' (page 15).

The study continues 'For right of way accidents that involve other drivers pulling out in front of motorcyclists who are perhaps further away, it could also be that more global visual failings are contributing to the age effect. The proportion of visual error compared with other 'at fault' errors rises with age. The change in ratio occurs at too greater an age (65' years plus) to be related purely to driver skill factors, and suggests an age-related deficit' (page 16).

According to the study, 'reasons for such an increase in global visual failings with age are many. Isler *et al*. (1997) found, in an analysis of the effect of reduced head movement and other deteriorations in the visual system on the useful field of view for the drivers aged 60 years' plus, that there was an evident restriction on the distances at which approaching traffic could be brought into the central, stationary field. Even at maximum head rotation plus one saccadic eye movement[13], approaching vehicles would not be clearly perceived beyond a distance of 50 metres' (Ibid).

Driving Standards Agency

The Driving Standards Agency is responsible for determining the theoretical and practical test for car drivers. The Driving Standard Agency's practical test for hazard awareness does not specifically require that drivers look for motorcycles at junctions, in spite of the significant proportion of accidents that have been recorded in these circumstances[14].

[12] A mental representation that consists of general knowledge about events, objects or actions
[13] Very rapid, ballistic eye movement (with speeds up to 800 degrees per second)
[14] Effectively, the DSA practical test does not require that car drivers should look out for motorcyclists specifically rather, that they should look out for all other road users (ref. DSA Customer Services).

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SMIDSY Avoidance and Evasion Strategies

Duncan MacKillop is a Motorcycle Trainer and is also an aviation pilot. As a victim of SMIDSYs, he has carried out research over the last ten years to understand the reasons for this type of accident and to find solutions for motorcyclists through avoidance and evasion techniques. His research considers the phenomena of 'looming' and 'motion camouflage'.

Background

According to recent research by authors including Graham-Rowe (2005); Mizutani, Chahl and Srinivasan (2003); Anderson and McOwan (2003), the phenomenon of looming is examined and it was found that a future generation of anti-aircraft missiles could be made far harder to dodge by a guidance system inspired by the flight of dragonflies and hoverflies. The missiles will mimic a strategy called motion camouflage, which predatory insects use to trick prey into thinking they are stationary. Insects that use this technique sneak up on their prey in a way that makes them seem stationary even though they are in fact moving closer. They do this by keeping themselves positioned between a fixed point in the landscape and their prey. The paper by Anderson and McOwan describes the implementation and results of a psychophysical experiment suggesting that humans are susceptible to motion camouflage.

Of particular interest in motorcycle accidents in relation to this research on motion camouflage, is the sudden 'uncloaking' of a motorbike in the driver's field of vision and the driver's reaction to it.

Military strategy also contains methods of camouflage and the art of concealment. For example during the Second World War, the American Navy[15] used to break up outlines of quite large ships by the use of zigzag splashes of sometimes very bright colour. These methods of camouflage were first used in the 1914/18 war on both British and German ships as a measure to fool the eye when taking ranges for gun action. The stripes and abstract shapes made it hard for the user to focus and hence get an accurate distance on a visual range. (With the advent of radar, this form of camouflage became redundant). According to MacKillop, the paradox of this strategy is that motorcyclists are encouraged by government to wear bright colours and 'whizzy' patterns, when distinctive colouring and patterns were part of standard methods of concealment techniques used by the military.

Ward (2003) found that conspicuity can affect inattentional blindness and that two types of factors affect conspicuity: sensory conspicuity factors and cognitive conspicuity factors. According to Green (2003), the most important sensory conspicuity factor is contrast. Objects that are large and move or flicker are more conspicuous i.e. an ambulance. He found that there were other incidences, for example there was a series of accidents involving car drivers running into police cars parked on road (hard) shoulders. In response to this, the authorities painted the rear of the police cars with big red and while stripes. Rather than decrease, the rate of accidents actually increased. Ward suggests that these factors (bright colours) do not guarantee – by themselves – conspicuity.

Regan and Hamstra (1993) argue that the human visual system uses separate channels for tracking the leading and trailing edges in the image of an approaching object and this, combined with specific information about the size and rate of change of an object's image, provides the basis for collision avoidance when driving a car. In other words, in order to time reactions appropriately, the driver would need to gain an estimate of the time remaining before colliding with an approaching object. This could be derived from knowledge of the distance and speed of movement of the object, which the driver would not have available.

Furthermore, according to MacKillop, in both the nautical and aeronautical environments, the line of constant compass bearing between one vessel/aircraft and another is called the collision line. If an approaching vessel/aircraft stays on this line, then unless something about it is done, a collision is inevitable. One of the lessons learnt very early on in nautical and aviation careers is that the further away the vessels are from each other at first sighting, the less obvious the collision risk. It is only by taking continuous bearings of the other vessel that can determine whether a collision risk exists.

Harris, McKee and Watwmaniuk (1998) used a visual search task in which an observer was asked to detect a moving target element (pop out) among a group of stationary distracter elements. By manipulating the monocular motion components to generate the perception of either lateral (x) motion

[15] http://www.history.navy.mil/photos/sh-usn/usnsh-c/bb44.htm

or stereo (z) motion, they found that whereas x-motion pops out among stationary distracters, z-motion does not. They also found that by adding a small amount of x-motion to the target's z-motion, it allowed the observer to identify a pop out.

In the context of SMIDSYs, the closer a bike gets to the junction, the more the track of the bike would diverge from the collision line. At the greater distance the variation between the track and the collision line would change very slowly, sufficiently so to be within the allowable movement against the background of motion camouflage.

MacKillop suggests that the phenomenon of looming is the primary method to assess whether something will collide. Looming in this case can be defined as the increase in size of an object as its distance from an observer decreases. For example the size of a car would increasing significantly at is approaches, while the size of a motorcycle would not.

Why Don't Motorists see Motorcyclists Approaching?

According to MacKillop, the following list identifies the most common reasons why car drivers do not 'see' motorcycles approaching at a T Junction.

✓	Camouflage	Failure to pop-out from background
✓	Looming	Below threshold of detection
✓	Threat	Seen but not identified as important
✓	Expectation	Rarity of encounter
✓	Underestimate	Speed less than actual
✓	Negligence	Did not look
✓	Hidden	Obstruction by foreground object
✓	Physiology	Bad eyesight and restricted movement
✓	Memory recall	Pop-out not retained
✓	Chemical	Impairment – drink or drugs

All road accidents happen because of a complex network of events and circumstances that in themselves are not dangerous, but in concert with each other can prove to be quite lethal.

With the SMIDSY this network of events can in part be described as follows:

Shape. The image of a motorcycle and rider is made up of many small and discrete elements, rather than large and contiguous areas of distinct colour and shape. This helps to break up the outline of the motorcycle and thus make it less easy to detect.

AND

Shine. Daytime running lights and/or headlights may break the effect of camouflage, but may contribute to the inability of a driver to detect and analyse the outline of the oncoming motorcycle.

AND

Shadow. A factor that may or may not be relevant, but a motorcycle travelling through areas of shadow may be less likely to be observed.

AND

Sound. The sound of a motorcycle is projected rearwards away from the point of potential impact and the average modern car is well insulated against outside noise. Sound may therefore not be the giveaway that would be expected.

AND

Movement. A human must determine the z-motion of an oncoming motorcycle by reference to its x-motion. As a narrower object than a car, a motorcycle offers far less x-motion which may be below the detection threshold (ref. Definitions, page seven). The possibilities of motion camouflage may also

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affect the amount of movement detected by the driver.

AND

Colour. The image of a motorcycle presents many different colours, some bright, others dull. These splashes of colour may help to break up the outline of the motorcycle in the same way as the number of different shapes will.

AND

Right Of Way. A rider who is legally in the right, is not protected from the errors of others before or during the event, only after in a court of law.

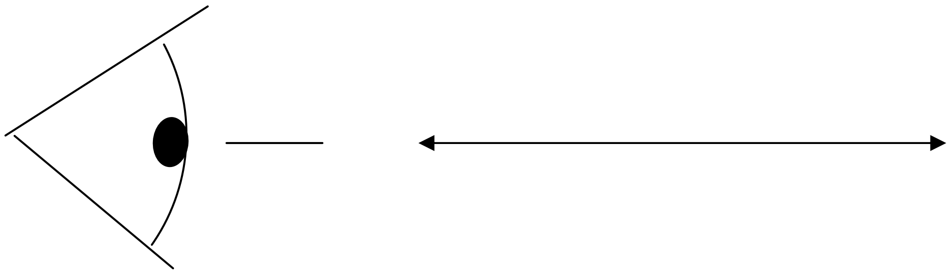
AND

Normal Accident. A SMIDSY is not a rare event and it follows that the combination of events leading up to it will be knowable. It follows that a rider who is unfamiliar with the potential of these events is likely to suffer from one.

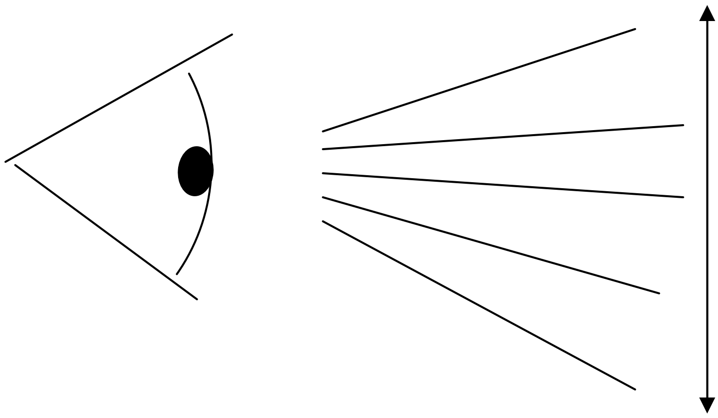
Notice that the crucial element here is the word AND as it is likely that a SMIDSY will be the result of more than one element in the causal network.

Definitions

- z-motion - The movement of a body either directly towards or away from you.



- x-motion - The movement of a body laterally across your field of vision.



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- Detection threshold - The point below which a moving object will remain hidden against its background (this is due to a number of optical and perceptual phenomena).
- Looming - The rate of expansion of a body that is exhibiting z-motion. A body will double in size with each halving of its distance. A looming wide body (such as a car) will be easier to detect (i.e. be above the detection threshold) than a looming narrow body (such as a motorcycle).

- Motion camouflage - A phenomenon where a body can remain below the detection threshold by maintaining its position against the background even if both bodies are in motion.
- Pop-out - The tendency of a moving body to be detected against a background.
- Fundamental surprise - An unexpected and rapid change in a situation that is dealt with at the lowest and most instinctive level of the mental processing stack**.** Responses are largely not commanded. A good example is the tendency to duck upon hearing the sound of a gunshot.
- Situational surprise - An unexpected and rapid change in a situation that is dealt with at the medium and higher levels of the mental processing stack. Responses are largely under command. A good example is seeing the blue lights of a police car in your mirror.
- BI.S.R.K - The behavioural elements of the mental processing stack. Commencing with **B**asic **I**nstincts at the lowest level, moving up through **S**kill based, **R**ule based and finally **K**nowledge based at the highest level.

SMIDSY – How it happens

When a motorist has to manoeuvre into a situation that will contain a number of moving targets, he must assess which of those targets will be the most likely to be in conflict, which will not be in conflict and which will be of no importance due to their distance or their movement vector. The motorist will then make a judgement as to his own planned trajectory and speed such that his predictions about the possible conflicts will be correct at the appropriate point in the future. The way in which this assessment is made is by detecting all the pop-outs (anything that's moving) determining their velocity (rate of looming) and determining their track (x + z motion vector). If the assessment shows that the motorist can complete his manoeuvre successfully then he will commit to the planned action.

Research as cited in this paper, has shown that a moving motorcycle can, in some circumstances, remain below the detection threshold of an observer and not pop-out of the background. If such a thing happens, then it is likely that the motorist will not include the motorcycle in his conflict assessment. In the absence of negligence by the car driver, failure to include a motorcycle in the conflict assessment leads to a SMIDSY situation where the motorist pulls out in front of the oncoming motorcycle leaving them little time to take avoiding action.

In the typical SMIDSY situation, within an instant of committing to the manoeuvre, the motorist suddenly detects the presence of the bike and slams on the brakes. This presents the oncoming bike with a fixed object directly in their path which is extremely difficult to manoeuvre around or stop before impact.

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Analysis of the failure to perceive the motorcycle

Pop-outs are perceived when the edge of an object is detected moving against the background. An edge exhibiting pure x-motion relative to the observer will be easily seen as it 'fires' a great many of the rods and cones that make up the retina of the eye in a relatively short space of time. An object exhibiting pure z-motion (even if it is moving at the same velocity as the previous object) fires relatively few rods and cones as it is only the expansion of the object that gives the observer any edge to detect.

In a situation with combined x+z-motion, the x-motion factor is far more detectable than any amount of z-motion and the object pops-out and can be dealt with.

In the classic SMIDSY situation, MacKillop suggests that the motorcycle has failed to pop-out because it has exhibited little or no x-motion. x-motion does however come into play the instant the motorist begins his manoeuvre. At this point the relative movement of the car and the motorcycle cause the pure z-motion of the motorcycle to convert to x-motion and therefore pop-out of the background (peripheral vision is designed to detect movement in this way). Upon realising that there is a pop-out that had not previously been analysed, the motorist is presented with a 'fundamental surprise' which causes him to immediately generate an instinctive response which often means simply slamming on the brakes. Similarly, the rider is also presented with a fundamental surprise, where the instinctive reaction is to try to stop rather than to take avoiding action, because the rider is looking at the car, the result of this reaction is to collide with the car.

Techniques for SMIDSY avoidance and evasion

The failure of the motorcycle to pop-out from the general background as seen by an observer, is a problem that no amount of observer education will currently cure in consideration of the lack of driver awareness training that the present system offers. There may well be ways to find some observational strategy for motorists that will maximize their ability to identify oncoming motorcyclists. However, until this is addressed, we can assume that the failure of the motorist to observe and absorb z-motion is a standard human failing[16]. It follows that until this issue is accepted as a given by the Driving Standards Agency and addressed as a necessary part of driver and rider training, the detection of the potential for a SMIDSY will have to lie with the potential victim i.e. the motorcyclist.

SMIDSY Avoidance

The first step to a robust SMIDSY avoidance method is for a rider to search for roadside objects that display no x-motion. The rider needs to pick out say a lamppost or tree somewhere in front of him and as he rides along, see if the post moves in relation to any of the elements that may be behind it (of course the scenery and the posts are not actually moving, but they are, relative to the rider). It will take several tries at several posts before the rider begins to fully see the x-motion present in the scenery behind most of his selected posts.

As the learning experiment continues, the rider may see that in certain situations, the scenery behind his target post moves first to the left, then stop, then move to the right. At other times he may see that a certain post in the distance displays no x-motion for a considerable amount of time and as it gets closer it suddenly displays significant x-motion.

It is at these points of zero x-motion relative to the rider that the rider would be displaying no x-motion to an observer situated by the post. This is the fundamental premise behind the SMIDSY avoidance strategy. Change the situation from that of a simple lamppost to a car waiting to pull out and it is clear that if the drivers head displays no x-motion then it is unlikely that the oncoming motorcycle will be displaying any either.

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[16] For example, we have anecdotal knowledge that a technique adopted by individual car driving instructors is to teach the driver of the car to rock forward and back as they look left and right as again this creates a degree of x-motion.

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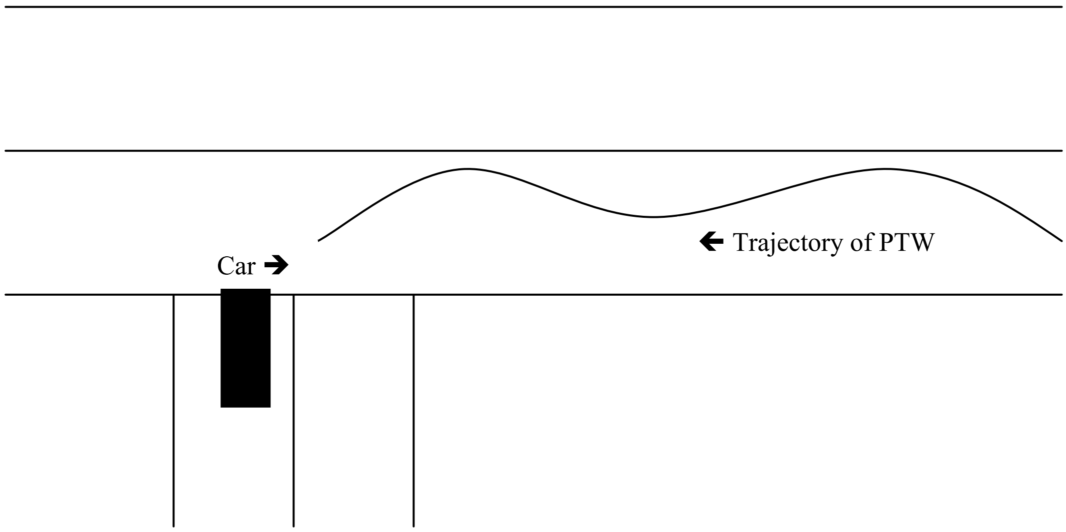
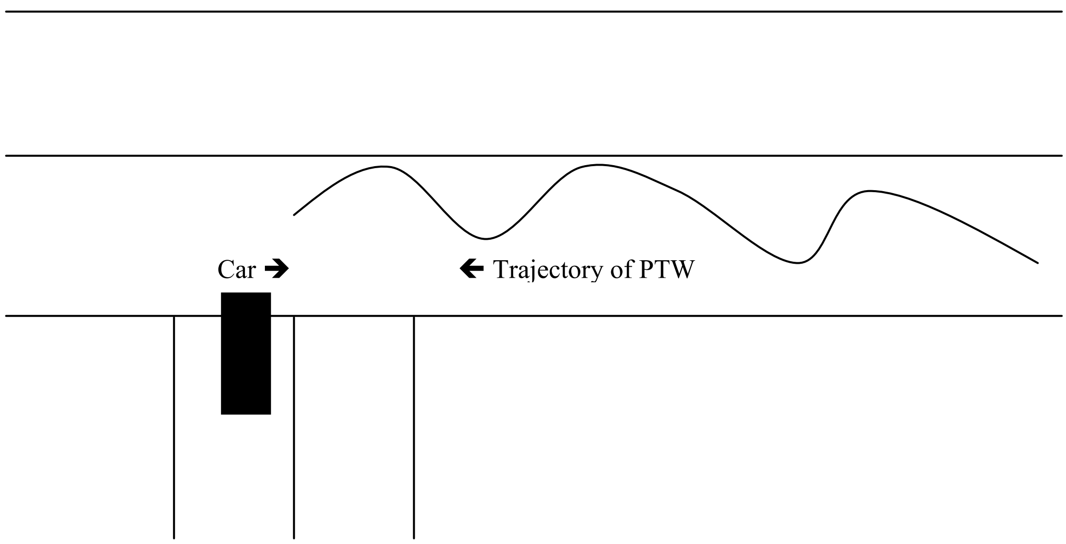


Once the potential for a SMIDSY has been identified (no x-motion of the drivers head) the rider needs to change the trajectory of his machine so that it displays the maximum possible x-motion. MacKillop's research has shown that changing the angle between the observer and the oncoming motorcycle will be sufficient to generate enough x-motion for the motorcycle to pop-out. A gentle weave, so long as the driver is looking in the general direction, will be enough to change the relative angle. In the usual SMIDSY configuration it can be seen that moving to the left might in fact be counter productive as it may well delete any x-motion that was there before and put the rider into a potentially worse situation. The weave therefore should be as much as possible to the right and as little as possible to the left for maximum effect[17].



It can also be seen that there may be situations where there is an oncoming vehicle waiting to turn into the road your target vehicle is coming out of. In this case increasing x-motion for one target might well decrease it for the other. In this situation common sense dictates that the situation may become rapidly untenable and therefore a strategy for dealing with a SMIDSY once it has happened is called for.

[17] Conversely in right hand drive countries the weave would be to the left and as little as possible to the right for maximum effect

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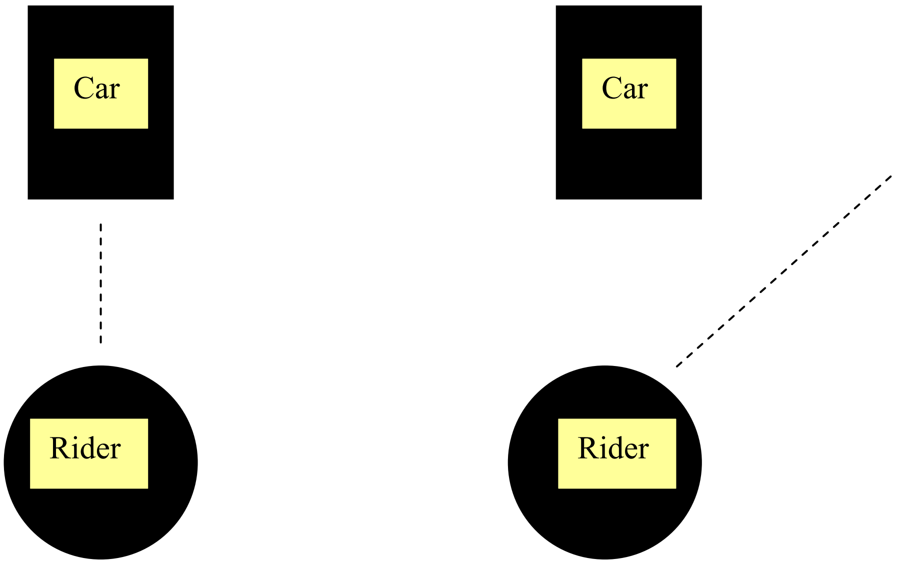
SMIDSY Evasion

Most SMIDSYs are likely to generate fundamental surprise responses in both of the parties and therefore an ability to overcome the constraints of this type of response will be valuable.
The first part of an evasion strategy is having pre planned somewhere to go (the softest available option) when and if the SMIDSY occurs. This emergency exit point is likely to be at a significant angle to the current trajectory of the motorcycle, but this is quite unimportant. Once the exit point has been identified, the rider needs to turn his head towards it (best results are obtained if the rider is asked to point his chin towards the exit, it has the same effect but is easier to do). With his head pointing towards the exit, the rider can return his eyes to scanning the scene ahead. This initially feels very strange indeed, but with perseverance it soon becomes second nature.



With the head pointing towards the exit, if a SMIDSY should occur, the rider is already setup to look where he wants to go and therefore go where he is looking. In a fundamental surprise situation the eyes usually get centred in their sockets so if the head is pointing towards the potential collision, it is likely the eyes will be too.

One of the co existing conditions during fundamental surprise situations is most often that of fear. We know that someone is overwhelmingly frightened simply by observing the way the eyes are centred, widened and with prominent whites.

In a fundamental surprise situation only those actions that are instinctive or which can be performed without command will be used (in an emergency, you will only do what you know), any strategies that need any conscious thought processes will be immediately abandoned. Because of this, just knowing about a strategy will not be sufficient for that strategy to be used in an emergency. Strategies that have been learned but not practised until they become skills, reside in the Rule based and Knowledge based or the higher levels of the mental processing stack which is usually not available in immediate emergency situations.

In order for the SMIDSY avoidance and evasion strategies to be of any value to a rider, they must be practised continuously until they no longer have to be thought about and will simply become part of normal riding procedure.

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Conclusion

The Department for Transport has spent considerable time, energy and money to promote campaigns to suggest that motorcyclists are largely responsible for their own deaths and injuries yet little has been done to overhaul the training programmes for car drivers and motorcyclists to address the specific problem of SMIDSYs.

In January 2006, the department commenced a television and radio campaign, to advise car drivers to look more carefully for riders at these types of junctions. However, as mentioned previously, the Driving Standard Agency (DSA) practical test for hazard awareness does not specifically require that drivers look for motorcycles at junctions, in spite of the significant proportion of accidents that have been recorded in these circumstances.

In 2004 there were 175,150 car accidents at junctions of which 38,171 (22%) occurred when the car was in the process of turning right. Overall, there were 17,699 accidents at junctions involving motorcycles and mopeds and 55% of these accidents occurred at T, Y and staggered junctions.

If the DSA fails to instruct trainers to teach new car drivers to look specifically for motorcyclists, then why would the government expect to lower the casualty rates for motorcycles? The preferred option by this government is to regulate motorcycles off the road, through new legislation to be introduced such as the EU Second and Third European Driving Licence Directives, but that will not solve the problem of deaths and serious injuries on British roads. As mentioned previously, car occupants and pedestrians are far more likely to die or be seriously injured than motorcyclists.

It appears that the true message is that the government is once again passing on their 'rationalisation' costs on to the public. In the first instance by increasing the charges for the practical car test by more than 24% over two years while the increase for the driving instructor's fees has increased by more than 32%. It is of concern that these cuts will not result in better quality, indeed what this exercise suggests is that the rationalisation will further debilitate the DSA and inevitably lead to poorer services for learner drivers and riders. This could lead to insufficiently trained drivers and riders, thus more potential for accidents.

The DfT report, Road Casualties in Great Britain 2004, identifies a total of 92,516 accidents caused by both car drivers (88,137) and Light Goods Vehicle (LGV) drivers (4,379) occurring at T, Y and staggered junctions. The results from these accidents were 664 deaths and 8,081 seriously injured.

While it is not possible to determine exactly how many of these deaths and injuries were specifically car/LGV occupants or motorcycle riders, what we do know from the report is that there were 9,656 accidents involving motorcycles at these specific junctions, equal to 36%[18] of all motorcycle accidents in 2004. As mentioned previously, there were 227 riders killed from injuries received in collisions with cars, which represent 39% of all motorcycle deaths.

Recommendations

In view of the EU and British government campaigns to reduce road casualties, MAG UK argues that there must be a sea change in the focus of identifying motorcyclists and moped users as safety reduction targets because this avoids the principle causes of injuries.

Better awareness

Cars are the major cause of deaths on British roads therefore the focus of government safety reduction strategies must first and foremost consider better road awareness through changing the attitude and behaviour of car drivers as well as motorcyclists.

In consideration of the findings of this paper and research which the DfT has commissioned, both the theoretical and practical hazard perception test must be overhauled to take into consideration the causes of SMIDSY accidents and thus, must identify motorcycle awareness as a fundamental part of the testing regime in order to reduce the potential for SMIDSY accidents.

[18] Total PTW accidents were 26,857 in 2004.

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Better Training

Practical training for car drivers must include consideration of inattentional blindness at junctions, which should include training drivers to rock back and forward as well as looking both ways. The government needs to address training and awareness techniques for motorcycle riders. The present system does not equip them with the necessary accident avoidance and evasion strategies, this could be easily modified by considering the changes indicated in this paper i.e. SMIDSY avoidance and evasion strategies should be included in initial rider training.

Another issue that should be addressed relates to the introduction of the ‘brake and swerve’ technique, the present attitude from government suggests that riders should head towards an opening gap but this could lead to a worst case scenario, therefore any evasion strategy should consider the safest route.

The introduction of computerized hazard perception tests are of concern because computer simulation and real life are not the same and learners may react differently. There is no substitute for real life training.

Manufacturers

Car manufacturers have an enormous burden of responsibility to bear due to the construction of cars that create blind spots such as A pillars (front pillar) and B pillars (the middle pillar). These design issues need to be addressed.

Better Data Collection

Preventative information -- Aviation, Railway and Shipping sectors gather information to analyse near misses in order to understand how to avoid future collisions, the knowledge gained from this type of research in road transport, could have profound positive effects on reducing vehicle collisions.

C*asualty and accident statistics* - The underlying statistics to determine the ‘problem’ of casualties and fatalities on our roads are used to promote policy, however the methods of determining casualties needs serious consideration. In the first instance, better reporting and clearer definitions of what constitutes a casualty is required.

Also, data are presented differently depending on circumstances and agendas.

For example, million kilometres travelled are estimates and this is due to the impossibility of knowing exactly how many miles or kilometres a motorcycle may or may not travel, this inevitably leads to inaccuracy and the potential for manipulation.

Absolute casualties or accidents do not consider the proportion of vehicles by category on the road, therefore give distorted results.

Furthermore, government statistics on vehicles in circulation differ vastly to the data recorded by industry and this creates further distortions and inaccuracies. Therefore accurate data and a realistic universal definition of data are imperative in order to have a clearer understanding of how we can improve road safety.

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Research by Elaine Hardy, National Research Officer, Motorcycle Action Group UK

With gratitude to Duncan MacKillop, Rider Instructor, Motopilot www.motopilot.co.uk

Special thanks for advice and suggestions to:

John Moss, Safety Officer Cheshire County Council (Retired)
The Motorcycle Action Group National Committee, Motorcycle Action Group UK
Sarah Gardner, Resource Officer, Motorcycle Action Group UK

March 3rd, 2006

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