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1. Brief

1.1 Instructing Solicitors

Swift & Co
Central Park
Central Town
The City
TC10 1CT

1.2 Instructions

Investigate the circumstances of a road incident. Prepare a plan, report & Photographs.

1.3 Location Of the Incident

A363 At the junction with Huish Road Keel

1.4 Vehicles and Persons Involved

Vehicle

Chrysler Neon registration W111 PKN
Driven by: Bert Root
Passengers: One – S. Carrotte

Vehicle

Suzuki Motorcycle Registration T109 KFC
Driven By: Howard Radish
Passengers: None

1.5 Witnesses

There are three independent witnesses:

Samantha Carrotte
Emily Artichoke
Alan Pears

2. Qualifications

UCCPD Forensic Road Collision Investigation. 2006

TDC Certificate in Accident Investigation for Civil & Criminal Investigations.

I am an Associate Member of the IMI and I'm Studying towards a

Qualification with the IRITE

3. Summary of the Incident

3.1 Précis of Circumstances

This is an report concerning a road traffic accident which occurred on the A363 at the T junction with Huish. The collision occurred at approximately 9.30 on Monday 29th February 2004.

At the time of the collision the road surface was dry and the weather was clear and dry.

The collision occurred at the junction with Huish just outside the Village of Keel. The Chrysler Car driven by Mr Bert Root pulled out of the junction and was in a collision with a Motorcycle being driven by Mr Howard Radish.

The Chrysler car was turning right intending to head south towards Keel. It was struck on its right hand side by the motorcycle, which was travelling North towards Norton. The car had impact damage to the right side behind the B-pillar. The passenger of the vehicle Samantha Carrotte had suffered a slight head injury.

The Motorcycle rider was thrown over the car and landed approx 12metres from the left side of the car. Mr Radish sustained injuries to his right arm and fibula. He was taken to hospital, his motorcycle had impact damage to its front forks and engine.

When Pc Bean attended the scene all the vehicles were still in there post impact positions. Pc Bean carried out a report and took measurements of the scene.

4. Evidence

4.1 Evidence Supplied

I have been supplied copies of statements from: -

Samantha Carrotte the passenger in the Chrysler car.

Emily Artichoke, independent witness.

Alan Pears, independent witness.

Pc Bean, Police report

4.2 Examinations and Comparison of Witness Evidence

4.2.1 Statement of Samantha Carrotte

Samantha Carrotte was the passenger in the Chrysler car. As per her Statement *“We had stopped at the junction of the main road between Norton and Paulton intending to turn right. We had waited about 30 seconds and just after a Saab passed on the main road going north Bert pulled out. All of a sudden there was a smash and the left side of my head hit the window causing a small cut. I got out of the car and saw a motorcyclist lying in the road on the Norton side of the car about 12 metres away”*

Samantha Carrotte describes the damage as *“ the motorcycle had hit just behind the drivers door and the door was all dented”*

“I made sure Bert was ok and he said that he had not seen the motorcycle”

“I did not see him either”

“When we pulled out of the junction I would describe us as accelerating normally. This is not to say particularly fast and not particularly slow”

4.2.2 Statement of Emily Artichoke

Emily Artichoke was walking along the A363 towards the village of Keel. She states *“I do not remember seeing a Chrysler Neon at the junction as I walked passed”*

“As I walked around the bend towards the white Hart public house a very noisy motorcycle went passed me very quickly”.

“The motorcycle was very close to the white line in the centre of the road. Almost immediately I heard a loud smash. I did not hear any noise of skidding. I turned round and looked back round the corner to see the motorcycle lying on the ground by the rear passenger door of a silver car which was stationary in the left hand lane.”

“At the time of the incident the weather was good and it was dry”

4.2.3 Statement of Alan Pears

Alan Pears was driving in a Saab Car in front of the motorcycle.

He states “ *The speed limit in keel is 30mph (13.4ms⁻¹) and as I entered the village I slowed to this speed. The motorcycle actually dropped back to some 20 – 25 metres behind*”

“*I was still doing about 30mph (13.4ms⁻¹) and because of the bend I lost sight of the motor cycle behind me.*”

“*Just passed the white Hart pub and round the bend is a junction on the left to Huish. There was a car stopped in the junction waiting to turn right. The front of the car was level with the white stop line. As I passed the car I remember thinking god i hope the driver sees the motorcycle.*”

“ *I looked back to see the car pull out into the road. I looked back again and saw the motorcycle collide with drivers side of the car just behind the drivers door.*”

“*I slammed on my brakes and watched a the motorcyclist flew over the car*”

“*The motorcyclist was still alive although his arm appeared to be broken. He landed some 12 metres beyond the car which was now stationary across the nearside lane with its centre offside wheel on the centre white line.*”

“*The driver of the car came up to me and said I never saw him he must have been going too fast*”

“*The weather at the time of the incident was fine and the road surface was dry*”

4.2.4 Police report of Pc Roger Bean

The report confirms that the Chrysler car was in a collision with a Yamaha motorcycle. Both vehicles were *“still in situ and had not been moved prior to my attendance”*

“ the Chrysler which I had ascertained had pulled out of the Hiush junction to turn right towards Poulton”

The Chrysler had damage *“To the rear passenger door behind the B- pillar”*

He comments on the damage to the Motorcycle *“crush damage to the front wheel and forks, which had been pushed back into the front of the engine”*

He confirms that the motorcycle was travelling from the direction of Poulton.

On the position of the motorcyclist *“ there was a pool of blood in the centre of the nearside lane 12.2 meters beyond the nearside of the Chrysler Neon”*

He quotes that the weather was fine and dry and the motorcycle did not leave any skid marks.

Pc Bean took measurements of the scene and made a sketch.

4.2.5 Comparison of the evidence

From the comparison of the evidence it would appear that: -

1. On the day of the incident the weather was fine and the road was dry.
2. The Chrysler car did stop at the junction before it turned right toward the village of Keel.
3. The motorcycle was travelling north towards Norton.
4. The motorcycle struck the car on the rear door behind the b-pillar.
5. The motorcyclist was thrown 12.2 meters beyond the nearside of the Chrysler car.
- 6 The motorcycle did not leave any skid marks.
7. The motorcycle suffered damage to the front forks and engine.
8. The incident occurred in the left hand lane of the A363 at the junction for Huish
9. The collision happened at approx 9.30 am

5. Scene Visit

5.1 introduction

At 9.30am on the 2nd September 2004 I attended the scene of the collision.

The road was in good condition and the road markings could be clearly seen.

I took measurements of the scene and using both the measurements and scene data from the statements, I produced one plan not to scale.

I also took a number of photographs of the approach to the junction and impact Point.

Photos 1-2 are of the approach to the left hand bend and 3 is on the bend.

Photo four is the first view of the junction the motorcycle would have had heading north.

5.2 Description of the A363 heading north (motorcycles direction of travel)

The A363 is a single carriageway road with two flows of traffic one in each direction. At a point of 150metres from the Huish junction there is a bus stop on the left before the White Hart public house. A sign can be seen on the left at the end of the bus stop showing the approaching bend. Chevrons separate the road the road and are bordered with broken white lines.

Highway code rule 109.

Areas of white diagonal stripes, if the area is bordered by a broken white line, you should not enter the area unless it is necessary and you can see that it is safe to do so.

There is a sign on the left lane before the bend advising a slow speed

On the right side a path can be seen with a lay-by before the public house.

The road cannot be seen past the public house and a building can be seen on the right opposite the public house. Trees and shrubs can be seen these continue until a small building starts. ***See photo 1***

When level with the public house the diagonal lines separating the lanes Continue. A small path runs along the front of the public house and a warning Sign is coming into view. The right side has no path and a buildings exterior wall backs onto the edge of the road. Slight wear in the road can be seen in the tyre track sections. It can also be clearly seen that this road has had surface dressing work carried out some time ago. The road starts to turn to the left just passed the sign and a wall starts to run along the road at this point. ***See photo 2***

At approx 80 metres from the Huish junction the warning sign can be clearly seen. The sign indicates that there is a junction ahead and a school crossing is close by.

Highway code Rule 184. Drive slowly and be particularly aware of young cyclist and pedestrians. In some places, there may be a flashing amber signal below the school warning sign which tells you that there may be children crossing the road ahead. Drive slowly until you clear the area

There is also a sign on the road advising a slow speed, the wall continues running along side the road. There are private access roads on both sides of the road. The lines dividing the road change into a single broken white line.

Highway code Rule 106. A broken white line. This marks the centre of the road. When this line lengthens and gaps shorten, it means that there is a hazard ahead. Do not cross it unless you can see the road is clear well ahead and wish to overtake or turn off.

Shrubs mark the edge of the road on the right side. *See photo 3*

After passing the first of the private access roads the road can be seen for some 100 metres and the bends can be seen clearly. The wall continues as does the small path. Shrubs also continue to mark the right edge of the road. The junction for Huish can just be seen coming into view on the left side.

Wear again can be seen in the tracks of the road. *See photo 4*

Plan A has details of the final positions of the Chrysler and motorcycle.

The plan also has the final position of the motorcyclist. All the details listed by Pc Bean are included in this plan.

5.3 General points

The road is subject to a national speed limit of 30mph (13.4 ms⁻¹)

The road has had surface dressing work carried out and is in good condition.

Pc Bean “

There is limited street lighting along this stretch of road although this will not have any bearing on this incident

6. Investigation & Reconstruction

6.1 calculations to establish μ the coefficient of friction of the tyre/road interface

Skid test were carried out at a speed of 30mph (13.4ms^{-1}). The skidded

Displacements were measured using a tape measure

Data

Test one	12.6-skidded displacement
Teat two	13.1-skidded displacement

Check accuracy.

The tests skids produced skid lengths, which are 0.5 metres difference. This equates to a percentage difference of 4%. This is within accepted tolerances.

A speed of 29mph is used in the calculations to allow for braking which would occur before lock up. The longest skid, (13.1m) is used in the following calculations. This will result in a lower coefficient of friction, which will produce the lowest speeds for the vehicle.

To calculate μ

Equation: $v^2 = u^2 + 2 a S$

With the vehicle slowing, a may be replaced by $-\mu g$. This gives

$$v = u^2 - 2 \mu g s$$

Where the final velocity is zero hence

$$0 = u^2 - 2 \mu g s$$

Transposing for μ gives

$$\mu = \frac{u^2}{2 g s}$$

Enter the known values

$$\mu = \frac{12.96^2}{2 \times 9.81 \times 13.1} \qquad \mu = \frac{167.96}{257.02}$$

$$\mu = 0.65$$

6.2 Calculate the speed of the motorcycle at point of impact.

A guide to the speed at impact can be gained by using Searle's equations for pedestrian throw. Searle derived two equations to calculate the launch speed of a pedestrian in a collision with a car. The equations produce a range of speeds. The exact speed cannot be calculated, as the actual angle of projection cannot be determined. Although normally applied to pedestrians in collision with a car, Searle himself states that the equations can be applied to other situation such as motorcycle collisions. In this case, the launch height of the motorcyclist is approximately equal to a pedestrian being thrown from a bonnet and, the angle of projection will be in the same range.

The witness Alan Pears states " I slammed on my brakes and watched as the motorcyclist flew over the car"

Using Searle's equation for minimum speed

$$V_{\min} = \sqrt{\frac{2 \mu g s}{1 + \mu^2}}$$

Enter known values

$$V_{\min} = \sqrt{2 \times \frac{0.7 \times 9.81 \times 13.8}{1 + 0.7^2}}$$
$$V_{\min} = \sqrt{\frac{189.53}{1.49}}$$
$$V_{\min} = \sqrt{127.20}$$
$$V_{\min} = 11.27 \text{ ms}^{-1}$$

$\mu = 0.7$
$g = 9.81$
$s = 13.8$

The minimum launch speed was 11 ms^{-1} (25mph)

Using Searle's equation for maximum speed

$$V_{\max} = \sqrt{2 \mu g s}$$

$$V_{\max} = \sqrt{2 \times 0.7 \times 9.81 \times 13.8}$$

$$V_{\max} = \sqrt{189.53}$$

$$V_{\max} = 13.76 \text{ ms}^{-1}$$

The maximum launch speed was 13.7 ms⁻¹ (30mph)

The value for mu for a pedestrian sliding across the road surface has been established from tests. As an average a value of 0.7 is used

**As the cyclist was travelling on the motorcycle at the time of the collision, this range represents the approximate speed of the motorcycle at impact
Therefore the velocity of the motorcycle was between 11ms⁻¹ (25mph) & 13ms⁻¹ (30mph)**

6.3 Establishing the length of time that the motor cycle was in view

Photograph four shows the view the motorcycle would have had as it travelled around the corner. This is the point at which the cyclist would have his first view of the junction.

The view of the Chrysler driver is limited to a distance of 35 metres as after that point a wall restricts the view. If we assume that Mr Root (car) did look to the right before pulling onto the A363 then there would appear to be three reasonable hypotheses that can be drawn;

1. That he failed to see the motorcycle which was in view, or
2. That he saw the motorcycle and believed that he had time to make the Manoeuvre, or
3. That the motorcycle was not in view when he looked to the right

With reference to point a, the Highway Code states the following in relation to road junctions

Rule 107. *Take extra care at junctions. Check your position and speed. Junctions are practically dangerous for cyclists, motorcyclists and pedestrians, so watch out for them before you turn*

Rule 110. *At a junction with broken white lines across the road (it may also have a Give Way sign or triangle marked on the road) you must give way to traffic on the other road.*

With reference to point b, the highway code states

Rule 117. *Wait until there is a safe gap between you and any oncoming Vehicle. Watch out for cyclists, motorcyclists and pedestrians, then make the turn, but do not cut the corner. Take great care when turning into main road, you will need to watch for traffic in both directions and wait for a safe gap*

We can now establish if Mr Root had sufficient time to carry out the manoeuvre of turning right onto the road.

The time that the motorcycle was in view can be calculated from the equation

$$S = V t$$

The equation assumes a constant speed for the Motorcycle

Using the average speed calculations from **6.2** the V_{\min} & V_{\max}

and the sight line of the Chrysler driver we can enter the know values.

Transpose for t

$$t = \frac{S}{V}$$

$$t = \frac{35}{11}$$

$$t = 3.2 \text{ seconds}$$

$$t = \frac{S}{V}$$

$$t = \frac{35}{13}$$

$$t = 2.7 \text{ seconds}$$

Therefore if the motorcycle came into view just after Mr Root had looked to the right he would have had a between 2.7 & 3.2 seconds to carry out the manoeuvre

6.4 Calculate the time required for the Chrysler car to clear the left hand lane

As the Chrysler was stopped at the white line on the junction

Alan Pears “*There was a car stopped at the junction waiting to turn right. The front of the car was level with the white stop line*”

The car would need to travel 3.3 metres which is the road width and 3.2metres which is the cars length to completely clear the lane.

We can use a range of acceleration rates to gain an average value.

Using the equation

$$S = u t + \frac{1}{2} a t^2$$

As the vehicle starts from stationary the equation can be simplified and transposed for t to give

$$t = \sqrt{\frac{2 S}{a}}$$

Entering the data we get

$$T = \sqrt{\frac{2 \times 6.5}{1}}$$

$$t = 3.6 \text{ seconds}$$

Therefore it would take the car 3.6 seconds to completely clear the left lane.

This exceeds the time that the motorcycle would have been in view (2.7 – 3.2seconds)

If we use a higher acceleration rate of 1.5ms^{-2} we obtain the following

This rate represents a moderate acceleration rate.

S Carrotte *“When we pulled out of the junction I would describe us as accelerating normally. That’s to say not particularly fast and not particularly slow”*

$$T = \sqrt{\frac{2 \times 6.5}{1.5}}$$

$$t = 2.9 \text{ seconds}$$

The time is now reduced by 0.7 seconds.

Therefore the Chrysler car would have required between 2.9 and 3.6 seconds to clear the left hand lane completely.

6.5 How much time did the Chrysler car take to reach point of impact.

The Chrysler cars point of rest was 3.5 metres from the Stop Line road marking on the junction.

Pc Bean *“I further ascertained that his Yamaha 400cc motorcycle registration T109 KFC and a Chrysler Neon W111 PKN, which had collided at the junction were still in situ and had not been moved prior to my attendance”*

Samantha Carrotte *“All of a sudden there was a smash and the left hand side of my head hit the window causing a small cut. We stopped instantly”*

Using the range of speeds 1.0ms^{-2} and 1.5ms^{-2} we can calculate the times.

And using the equation $S = u t + \frac{1}{2} a t^2$

Simplified and transposed for t

$$t = \sqrt{\frac{2 S}{a}}$$

$$t = \sqrt{\frac{2 S}{a}}$$

$$t = \sqrt{\frac{2 \times 3.5}{1.0}}$$

$$t = \sqrt{\frac{2 \times 3.5}{1.5}}$$

$$t = 2.6$$

$$t = 2.2$$

The time required for the Chrysler to reach the point of impact was between 2.2 and 2.6 seconds

6.6 Calculate the speed required for the Chrysler to clear the lane and avoid the motorcycle

The motorcycle takes between 2.7 & 3.2 seconds to reach impact point.

Using acceleration speeds of 1ms^{-2} & 1.5ms^{-2} in our calculations produced times of 2.9 and 3.6 seconds to clear the lane completely.

The distance for the car to clear the lane is 6.5 metres

The minimum time available is 2.7 and maximum 3.2 seconds

$$t = \sqrt{\frac{2s}{a}}$$

$$t = \sqrt{\frac{2 \times 6.5}{2}}$$

$$t = 2.5 \text{ seconds}$$

Using 2ms^{-2} therefore this is the minimum speed required to clear the lane avoiding the motorcycle

For the Chrysler car to clear the lane completely it would require an minimum acceleration of 2ms^{-2}

7. Conclusions

1. A collision between a Yamaha motorcycle and a Chrysler car occurred at approx 9.30 am on Thursday 30 January 2004 on the A363 close to the village of Keel at the Junction for Huish. On the day of the incident the weather was fine and dry.
2. The Yamaha motorcycle registration T109 KFC being ridden by Mr Howard Radish was travelling north towards Norton.

The motorcycle was in a collision with a Chrysler car registration W111 PKN being driven by Mr Bert Root. The Chrysler car turned right of the junction and was struck by the motorcycle on its driver side rear passenger door behind the b-pillar. Mr radish the motorcycle rider was thrown over the car and landed 12.2 metres from the left side of the car. Mr Radish sustained injuries to his arm and fibula. The Chrysler had pulled out a distance of 3.5metres when it was struck by the motorcycle. The motorcycle suffered damage to the front forks and wheel.
3. The junction which the Chrysler pulled out of is controlled by a stop line.

Highway code Rule 147. You must stop behind the line at a junction with a 'Stop' sign and a solid white line across the road. Wait for a safe gap in the traffic before you move off.

The collision occurred in the left hand lane of the A363. A wall running parallel to the road obscures the view of the approach to the junction for Huish. This also blocks the view for any vehicle wishing to turn out of the junction. For the view to improve a vehicle must cross the stop line by over 1 metre to get a clear view.

4. The motorcyclist was travelling between 11 & 13ms⁻¹ (24 – 30mph) at point of impact and would have been in the Chrysler cars unrestricted view for between 2.7 and 3.2 seconds.

Highway code rule 124. Adapt your driving to the appropriate type and condition of the road you are on. In particular where there are junctions, be prepared for vehicles emerging

The car would have required a time of between 2.9 & 3.6 seconds to completely clear the lane and avoid the motorcycle.

This is calculated using information on the speed stated by the witness Samantha Carrotte.

“Not particularly fast and not particularly slow”

5. For the Chrysler car to clear the lane and avoid the motorcycle, it would need to be accelerating at a minimum of 2 ms⁻².

The calculations for the speed of the motorcycle does not take the deceleration of the motorbike into consideration so this must be treated as a minimum speed (25 and 30mph). However it must be noted that the motorcycle did not leave skid marks and the motorcycle was

“very close to the white line in the centre of the road”

Emily Artichoke. This could indicate a racing line (straightening out the corner)

Highway code Rule 132. Take extra care on country roads and reduce your speed at approaches to bends, which can be sharper than they appear, and at minor junctions and turnings, which may be partially hidden

or a motorcyclist may take this line for a clearer view of the road ahead.

6. There are three possibilities why the driver Mr Root pulled out of the

junction onto the A363

- a) He pulled out and failed to see the motorcycle
- b) He saw the motorcycle and believed he could clear the left lane
- c) The motorcycle was not in view when he prepared to pull out

With reference to point (a) both the passengers in the car state they did not see the motorcycle, if point (b) were the case, there would have been a rapid acceleration and that was not stated by any of the witnesses. Point c is possible due to the view being obscured from the driver's position.

The car took 2.2 – 2.6 seconds to reach the point of impact this equates to speeds of 1 – 1.5ms⁻²

If the acceleration of the car was increased by 0.5ms⁻² the vehicle would have cleared the lane, that being, if scenario three was the cause of the collision.

