Motorcyclists on the Strategic Road Network

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Document scope

This report provides insight into motorcyclists involved in police reported injury collisions between 2010 and 2014, which was the most recent available finalised data set at the time of commission. However, some information from 2015 has been provided in the introduction to provide additional context.
The fundamental purpose of the report is to understand in detail the kinds of people who are exposed to road risk as motorcyclists on the strategic road network. Because of this person-centred approach, it would not be appropriate to confine analysis exclusively to motorcyclists who suffered injury, but to rather to take a more inclusive approach in order to maximise insight.

As a consequence of this approach, it is important to note that:

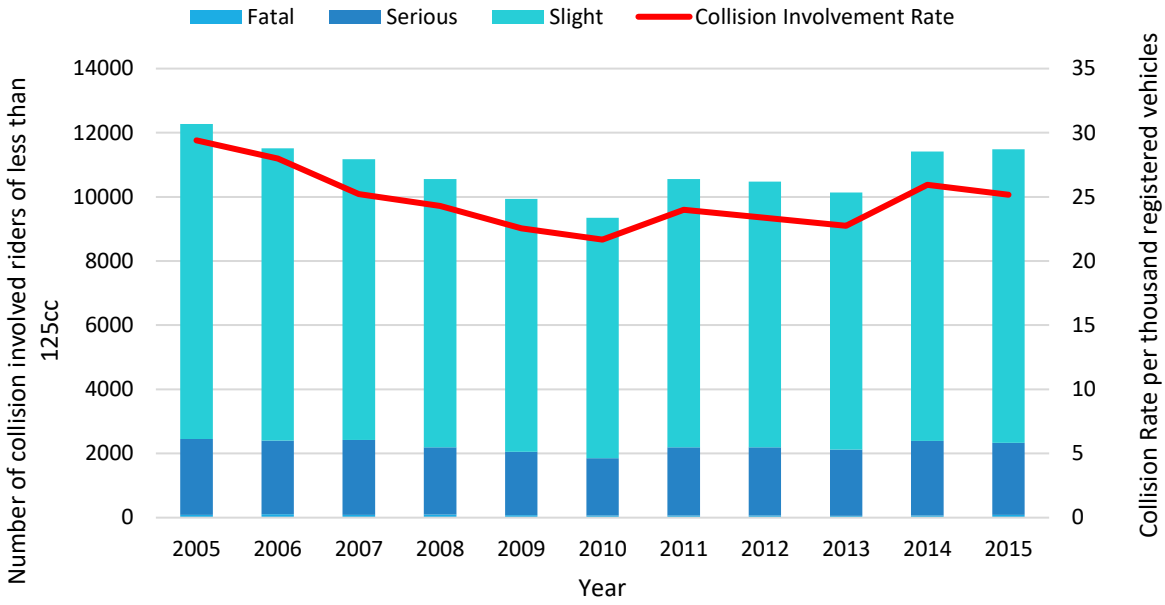
- all references to "involved riders" refer to riders of motorcycles who were involved in a collision in any way, regardless of whether or not they became a casualty; and
- all references to "collision severity" refer to the most grievous injury suffered by any casualty involved in the event, regardless of whether or not that casualty was a motorcyclist.

Introduction

In Great Britain in 2015, 91 motorcycle riders of machines under 125cc were involved in fatal collisions, and a further 2,237 in serious and 9,152 in slight collisions. The casualties in these collisions could be the motorcyclist themselves and/or other parties. Figure 1 puts these collision involvement figures for Great Britain in context. Riders involved in collisions, by severity, since 2005 are shown as bars, while the red line indicates the collision involvement rate per thousand licensed vehicles with engines less than 125cc[1]. It shows a general downward trend of riders involved from 2005 until 2010, with a gradual increase in numbers since then.

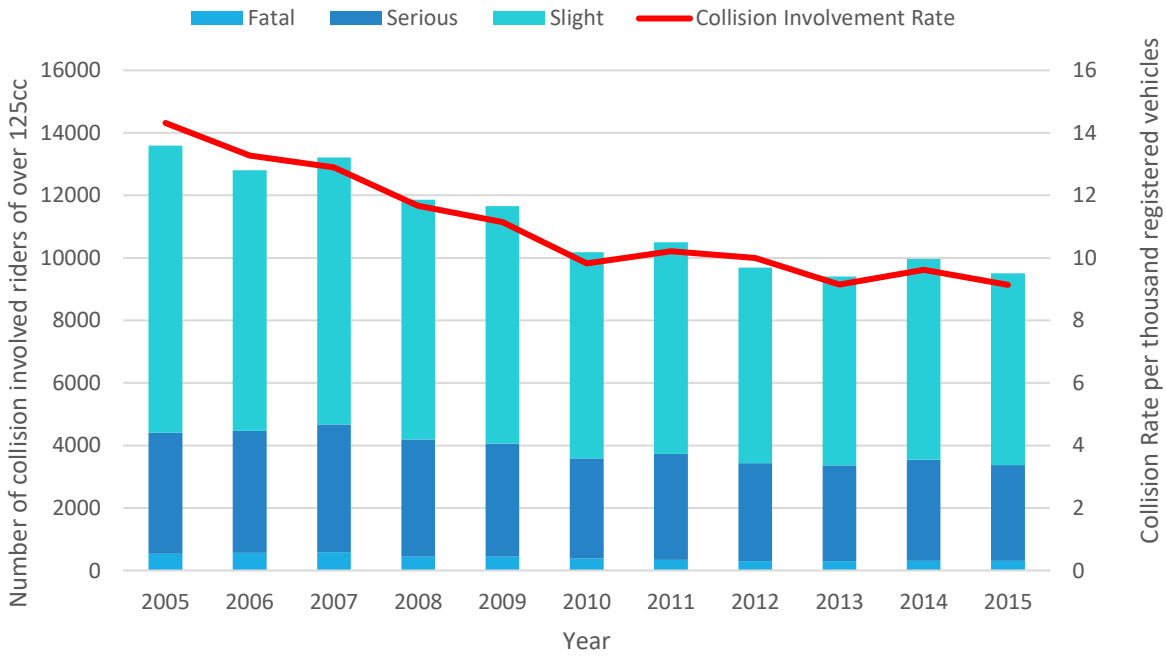
[1] Statistical Pocket Guide v2: The UK Motorcycle Industry in a Nutshell, (Motor Cycle Industry Association Limited, January 2015), p.7

Figure 1 – All GB involved riders on MC up to 125cc, by collision severity – Rate per thousand registered vehicles



For riders on motorcycles over 125cc, there is a higher severity ratio: on average, 35% of the riders of larger motorcycles who were involved in an injury collision were in an incident which resulted in death or serious injury (compared to 21% of crash-involved riders of motorcycles up to 125cc). There were 307 riders of motorcycles over 125cc were involved in a fatal collision in Great Britain in 2015. A further 3,067 were involved in serious collisions with 6,316 involved in collisions resulting in slight injuries. Figure 2 shows that nationally there has been a downward trend in collision involvement amongst riders of larger motorcycles since 2005, but in recent years this reduction has slowed and levelled out.

Figure 2 – All GB involved riders on MC over 125cc, by collision severity – Rate per thousand registered vehicles



This report starting with the '*Collision Profiles – What?'* sets out analysis undertaken using STATS19 collision data from 2010 to 2014 from MAST, an online analysis tool which combines casualty and collision data from the Department for Transport with socio-demographic insights created by Experian through Mosaic Public Sector. The postcodes of drivers and casualties involved in collisions are used to determine where they live, and therefore to which Mosaic *Groups* these individuals are likely to belong. This can be used by road safety professionals to understand who needs to be targeted in road safety interventions. The report focuses on riders of both motorcycle types from England who have been involved in collisions anywhere on the Strategic Road Network (SRN). The intention of this report is to provide Highways England with a full understanding of the types of collision involving motorcyclists on the SRN and to equip them with the tools to target the issue[2].

The report works through the analysis by first determining the extent to which motorcycle riders are involved in collisions on the SRN, and in what context they are involved. The location of the collisions will be examined to determine if the riders are involved in collisions on strategic roads in their home region or elsewhere on the network.

A large part of the analysis focuses on profiling the motorcyclists, with the aim of producing 'personas' that can be used to visualise the target audience. These personas are created using a variety of socio-demographic data, including looking at Indices of Multiple Deprivation, rurality and Mosaic Groups. Profiling in this way allows the practitioner to understand how motorcyclists will respond to a road safety intervention and in what way it should be delivered.

Figure 3 shows motorcyclist collision involvement figures for the SRN since 2005. It shows the number of riders involved in collisions, by severity in the bars and the red line indicates the average collision involvement over the last 3 years. It shows a slight downward trend, but generally numbers have remained fairly static.

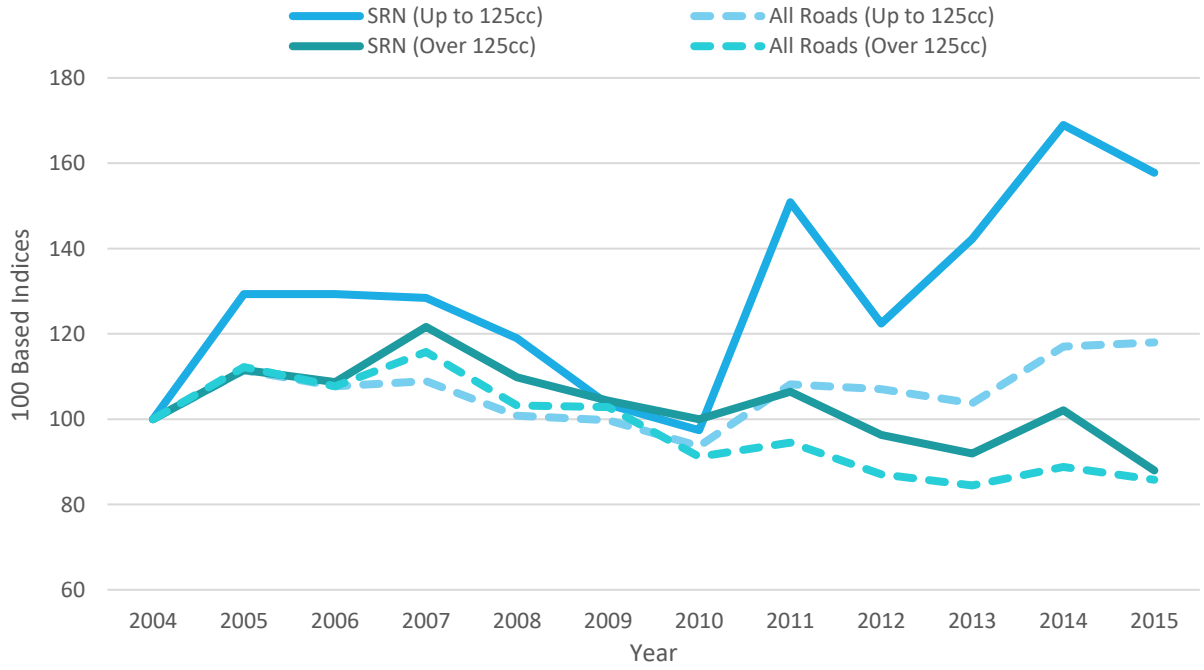
For riders on motorcycles over 125cc, there is a higher severity ratio: on average, 41% of the riders of larger motorcycles who were involved in an injury collision since 2005, were in an incident which resulted in death or serious injury (compared to 27% of collision-involved riders of motorcycles up to 125cc).

[2] Health and Safety 5-year plan, (Highways England, 2015), p.35

Figure 3 – Involved riders from England on the Strategic Road Network (SRN), by collision severity

Figure shows that for Motorcyclists on bikes up to 125cc involved in collisions on the SRN, there was a small increase in 2005 before falling back by 2010, however since then there has been a significant increase. For all roads in England, there has been increases since 2010 although not as significant as on the SRN. For motorcyclist on bikes over 125cc, the indices for the SRN have more closely followed those for all roads in England, with the SRN indices slightly higher in most years.

Figure 4 - Involved riders from England in collisions in England, indexed using 2004 figures as a base



Risk Profile

This profile covers two distinct areas: information about the collision and information about the person involved. Both are relevant to the analysis and are considered separately.

Collision Profiles

WHAT?

Between 2010 and 2014, motorcyclists on bikes up to 125cc accounted for only 1% of all drivers or riders involved in KSI collisions, compared involved riders on bikes over 125cc who accounted for 3%. However, when looking at the percentage of all KSI casualties these numbers increase, with up to 125cc accounting for 2% of all KSI and over 125cc motorcyclists accounting for 10%. Motorcyclists involved in collisions on over 125cc have the highest KSI ratio of any vehicle at 41% with those of up to 125cc on 27%. The actual numbers are shown in Table 1 showing drivers and riders from England involved in collisions on the Strategic Road Network (2010-2014).

Comparisons with drivers/riders from England involved in collisions on all roads in England have been made and 100-based indices calculated (for totals greater than 30 and over 1% of the total). Where drivers from England involved in collisions on the SRN are over-represented in collisions compared to England's roads as a whole, the value in the last column is over 100. This is the case for car and goods vehicle drivers. Motorcyclists on bikes up to 125cc have a low index (19), with larger motorcyclists being slightly under-represented compared to the national norm (20% lower).

Table 1 – 2010-2014 drivers and riders from England involved in collisions on the Strategic Road Network (SRN)

Vehicle Type	Fatal	Serious	Slight	Total	% KSI	% of All KSI	% of All Collisions	All roads Index
Car	1,143	7,565	66,531	75,239	12%	67%	79%	110
Taxi	16	77	486	579	16%	1%	1%	32
Minibus	5	38	215	258	17%	0%	0.3%	-
Motorcycle up to 125cc	**20**	**190**	**581**	**791**	**27%**	**2%**	**1%**	**19**
Motorcycle over 125cc	**123**	**1145**	**1,832**	**3,100**	**41%**	**10%**	**3%**	**80**
Light Goods	139	726	5347	6212	14%	7%	7%	145
Heavy Goods	376	1,083	5,726	7,185	20%	11%	8%	354
Bus	11	40	295	346	15%	0%	0.4%	-
Cycle	25	181	514	720	29%	2%	1%	10
Other	24	96	447	567	21%	1%	0.6%	-

The number of motorcyclists on bikes up to 125cc who were involved in collisions are shown in figure 5 (and Table 2), with collision severity as series and the red line showing a 3-year moving average. It shows that although numbers are fairly low, since 2010 the overall trend has been increasing with numbers in 2014 the highest in the last 10 years and up 73% from 2010. In 2014, 27% of riders were involved in a KSI collision.

Figure 5 – Involved riders up to 125cc from England on the SRN, by collision severity

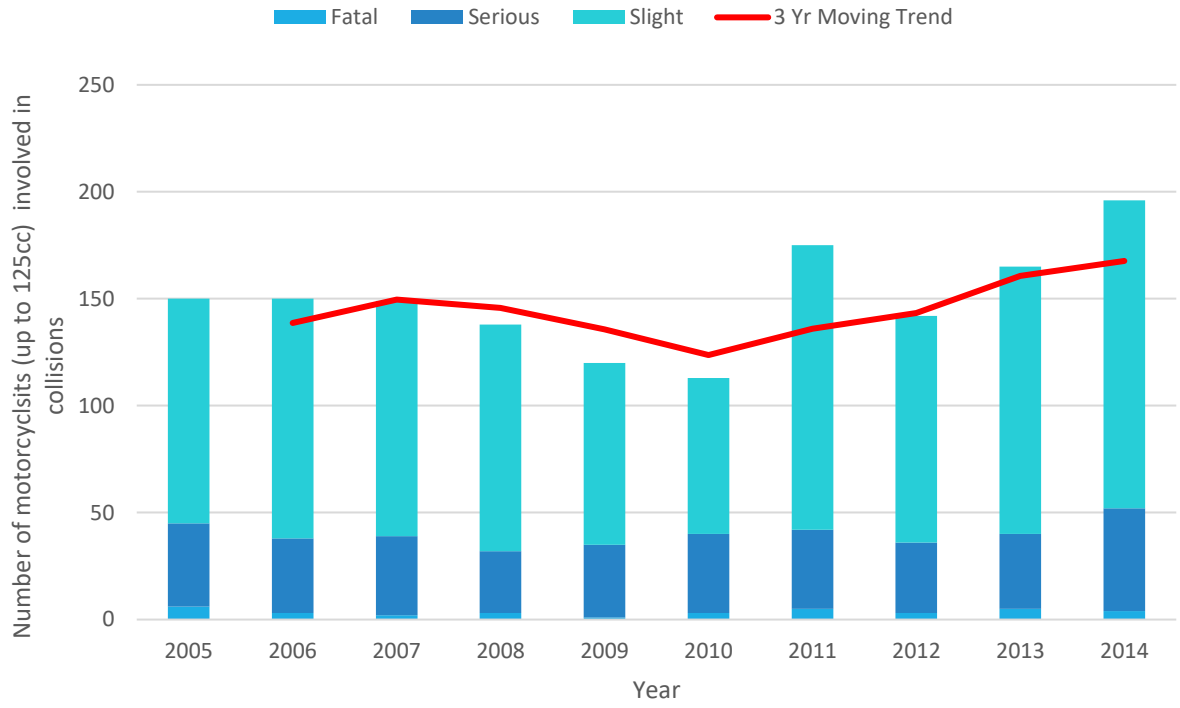


Table 2 – Number of involved riders up to 125cc from England on the SRN, by collision severity

Year	Fatal	Serious	KSI	Slight	Total
2005	6	39	45	105	**150**
2006	3	35	38	112	**150**
2007	2	37	39	110	**149**
2008	3	29	32	106	**138**
2009	1	34	35	85	**120**
2010	3	37	40	73	**113**
2011	5	37	42	133	**175**
2012	3	33	36	106	**142**
2013	5	35	40	125	**165**
2014	4	48	52	144	**196**
Total	**37**	**393**	**430**	**1,184**	**1,614**

Motorcyclists on bikes over 125cc who were involved in collisions are shown in figure 6 (and Table 3), with collision severity in the columns and the red line shows a 3-year moving average. It shows that despite an increase in 2014, the overall trend has been falling with numbers gradually reducing over the last decade. In 2014 43% of riders were involved in a KSI collision which is the highest in 10 years and up from 38% in 2010.

Figure 6 - Involved riders over 125cc from England on the SR, by collision severity

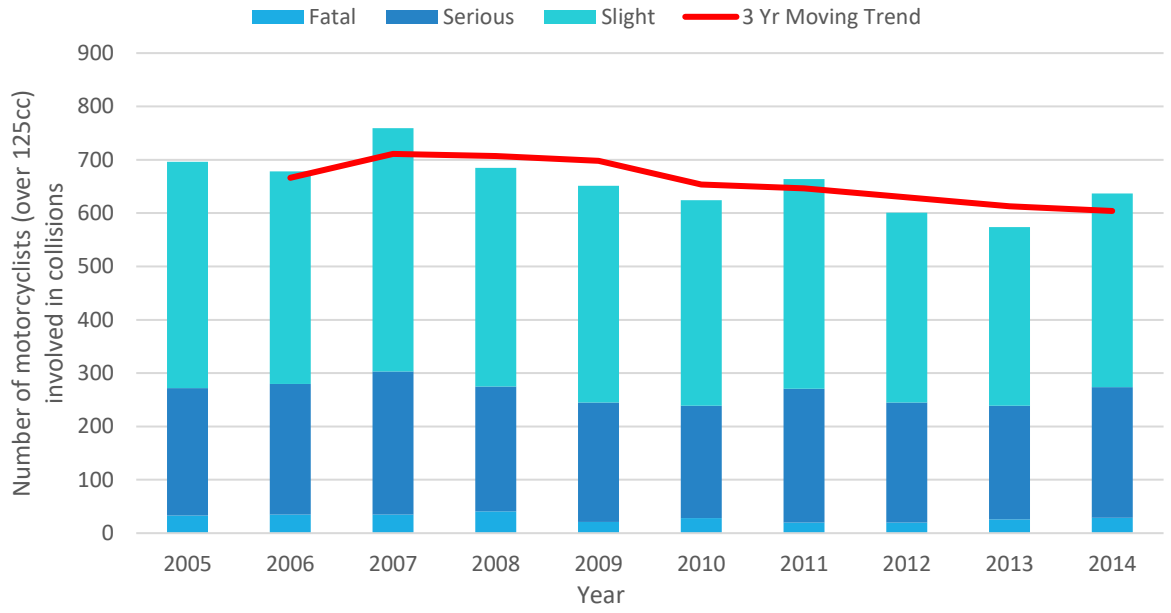


Table 3 – Number of involved riders over 125cc from England on the SRN, by collision severity

Year	Fatal	Serious	KSI	Slight	Total
2005	33	239	272	424	**696**
2006	35	245	280	398	**678**
2007	35	268	303	456	**759**
2008	41	234	275	410	**685**
2009	21	224	245	406	**651**
2010	28	211	239	385	**624**
2011	20	251	271	393	**664**
2012	20	225	245	356	**601**
2013	26	213	239	335	**574**
2014	29	245	274	363	**637**
Total	**314**	**2,549**	**2,863**	**4,330**	**7,193**

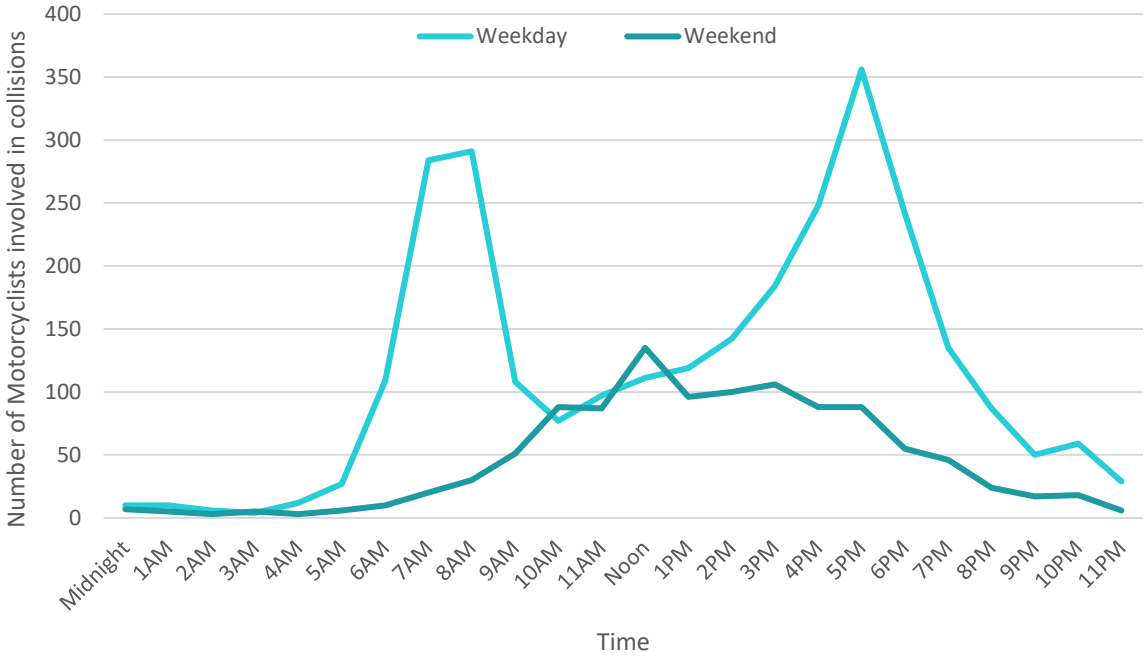
In order to understand whether or not the increase in collision involvement on the SRN for up to 125cc resident motorcycles, and the decrease for over 125cc motorcycles, are part of a general trend or unique to the Network, comparisons have been made with all roads in England. These are shown in on page 7. For both the SRN and all England's roads, 2004 has been used as a starting point and 100-based indices created to show how each subsequent year compares to the numbers of motorcyclists involved in collisions in 2004.

WHEN?

This section of the analysis looks at when motorcyclists from England were involved in collisions on the SRN between 2010 and 2014.

There are definite peaks in collision involvement amongst motorcyclists at rush hours, as shown in figure 7. There are fewer riders involved in collisions at weekends and these tend to be spread across the day. For motorcycles up to 125cc, 79% were involved in collisions on weekdays, compared to over 125cc bikes with 70% involved on weekdays. Motorcyclists involved on the SRN are similar to those involved on all England roads for weekday collisions – 79% on up to 125cc and 72% over 125cc motorcyclists.

Figure 7 – Involved riders (of all motorcycles) time of collision on the SRN, by weekday and weekend

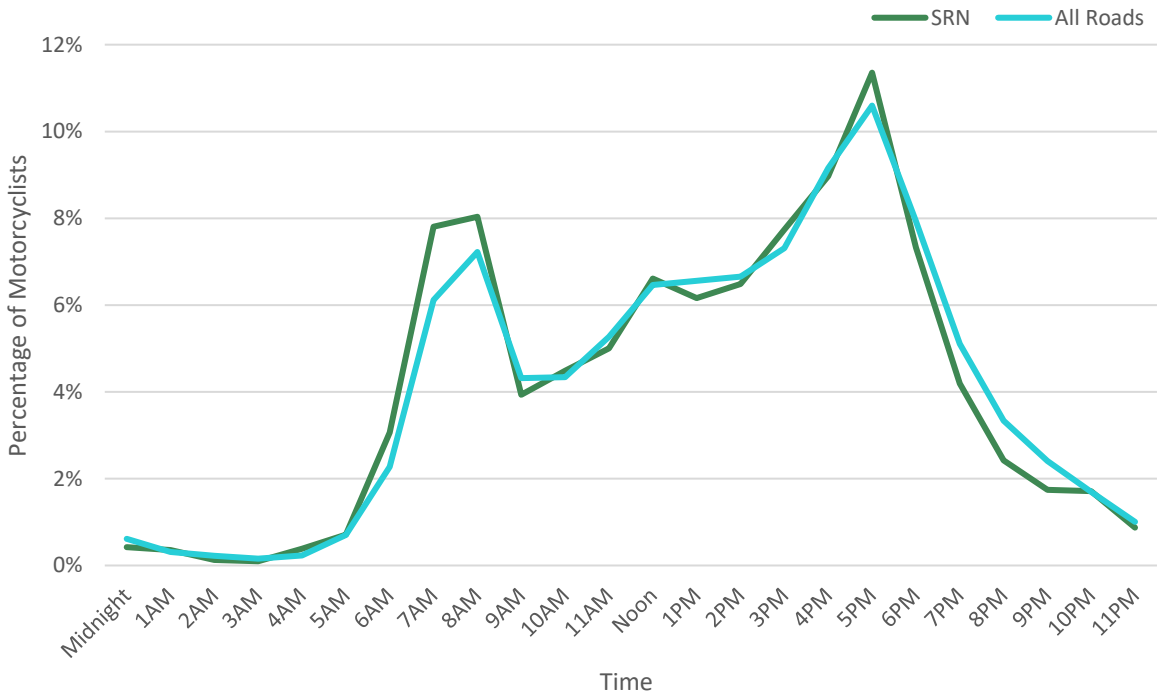


In order to understand if the time of day analysis is a feature of collisions involving motorcycles (up to 125cc and over 125cc) or if this is a trend unique to the SRN, analysis has been undertaken comparing motorcyclists involved in collisions on the SRN compared to those on all England's roads. Figure 8 and figure 9 show the time of day when the two groups of riders are involved in collisions on the SRN as well as when motorcyclists are involved in collisions on all roads in England. For riders on motorcycles up to 125cc, it shows that overall, the trends are very similar for both the SRN and all England roads with the morning and evening peaks at the same time.

Figure 8 - Involved riders (up to 125cc) by time of collision (any day of the week) on the SRN and on all England

Figure 9 shows that riders on motorcycles over 125cc share a similar trend for both the SRN and for all England roads, much like riders on motorcycles up to 125cc.

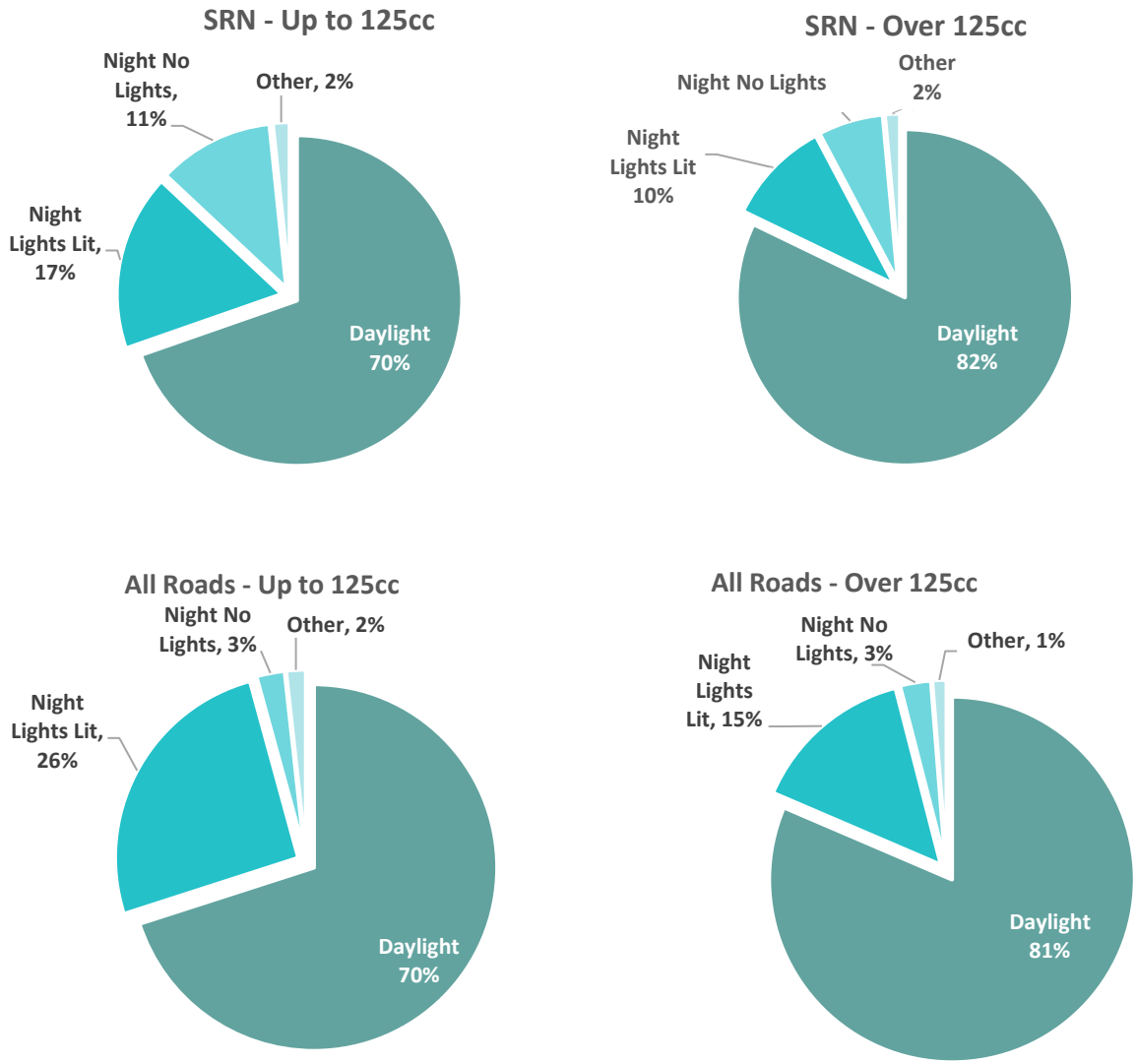
Figure 9 – Involved riders (over 125cc) by time of collision (any day of the week) on the SRN and on all England roads



Related to time of day analysis are lighting conditions. Figure shows the lighting conditions at the times when the various groups of motorcyclists were involved in injury collisions. It shows that 70% of motorcyclists who were involved in collisions on motorcycles up to 125cc on the SRN were in daylight at the time and the remaining riders were at night, 17% with streetlights lit, 11% with no street lighting and 2% other (streetlights unlit or unknown). There is the same daylight percentage for 125cc motorcyclists on all roads, but a higher number with streetlights lit at 26%, with only 3% at night with no lights and 2% other.

For those riding motorcycles over 125cc, there is a higher percentage of collisions on both the SRN and all roads in England during daylight with 82% and 81% respectively. Again on all roads compared to the SRN there is a higher percentage with streetlight lit with 15% on all roads compared to 10% on the SRN.

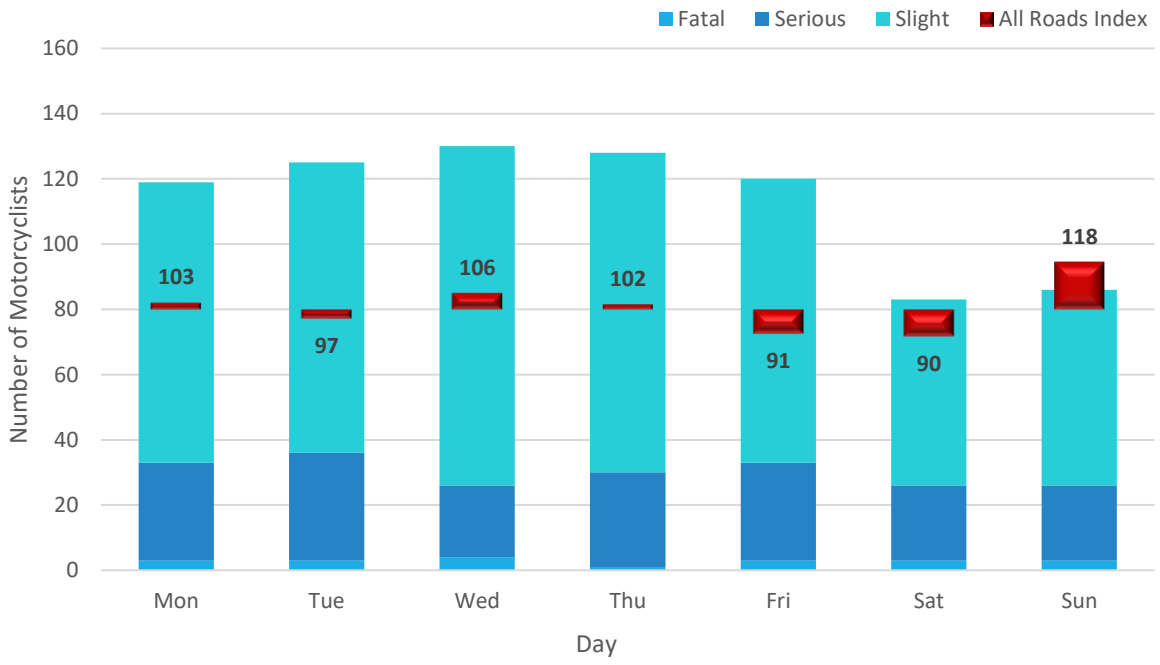
Figure 10 - Lighting conditions when motorcyclists were involved in collisions



The days of the week on which the motorcyclists were involved in collisions are shown in Figure and Figure . In these charts, the red bars compare motorcyclists involved in collisions on the SRN with those on England's roads as a whole, where indices over 100 show a higher proportion occurring on the SRN. For example, the proportion of riders involved in collisions on a Sunday on the SRN is 18% higher than on non-strategic roads, indicated by the 100-based index value of 118.

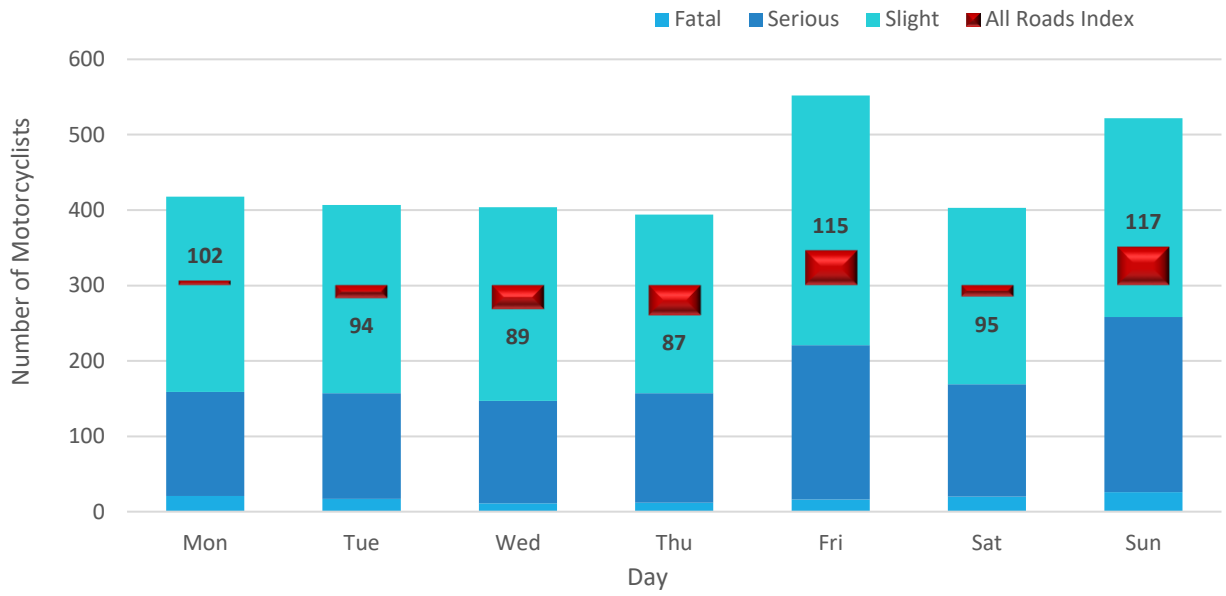
For motorcyclists on bikes up to 125cc involved in collisions on the SRN, there is a fairly even number throughout the working week (15-16% a day), whilst at weekends there are fewer (10-11% a day) motorcyclists involved in collisions. There are a similar number of riders involved in collisions on Monday to Thursday, whilst the numbers of riders in collisions on Friday and Saturday are marginally under represented with riders on Sundays over-represented.

Figure 11 – Day of week when riders (up to 125cc) were involved in collisions on the SRN



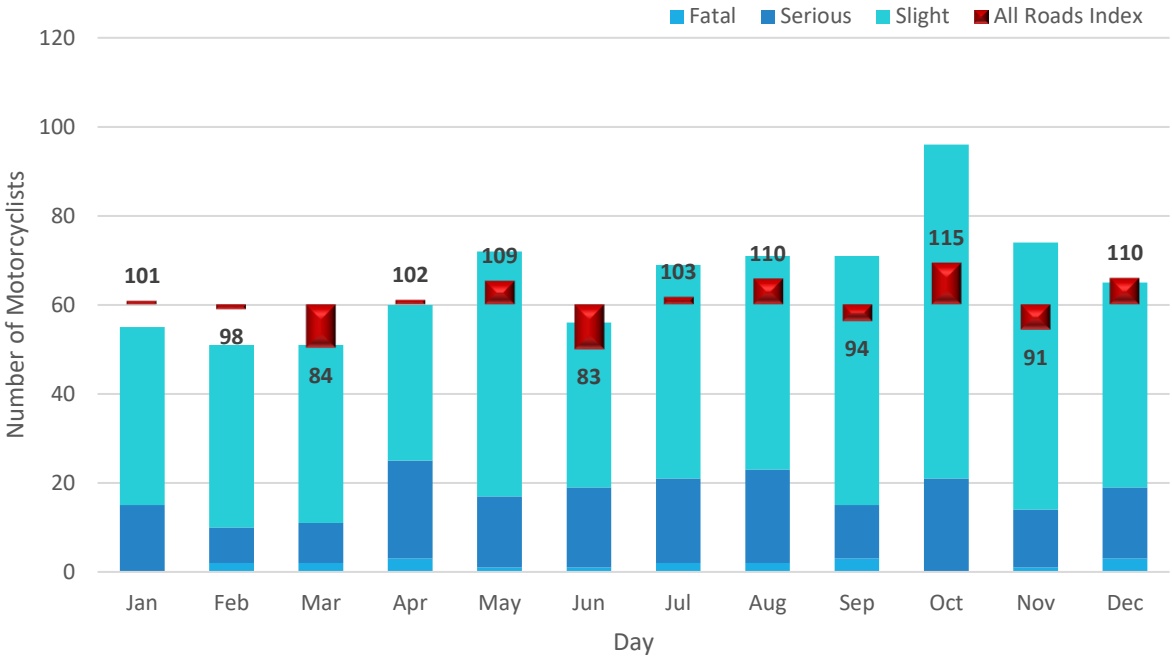
For collisions involving riders on motorcycles over 125cc on the SRN, there is a slightly different pattern when comparing to all roads in England than with motorcyclists on bikes under 125cc. On Wednesday and Thursday motorcyclists are under-represented whilst on Friday and Sunday they are over-represented. This over-representation is in line with the peaks in collision involvement with 18% on Fridays and 17% on Sundays. Monday to Thursday and Saturdays each account for 13% of the total number of motorcyclists involved in collisions.

Figure 12 - Day of week when riders (over 125cc) were involved in collisions on the SRN



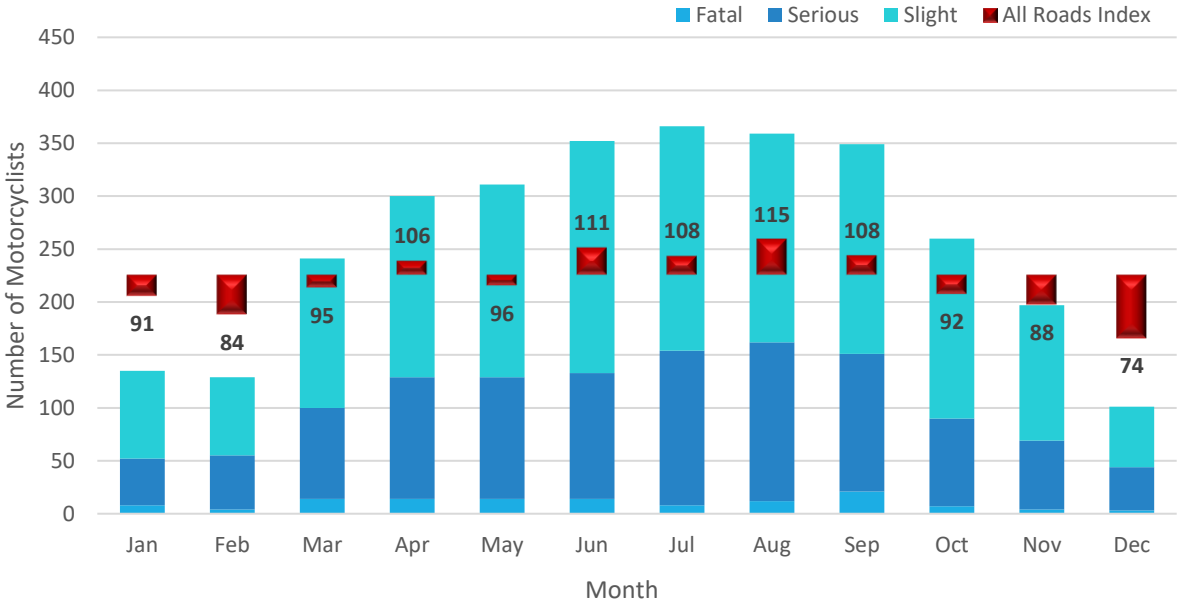
The month of the year in which motorcyclists were involved in collisions on the SRN are shown in figure 13 and figure 14. For motorcyclists on bikes up to 125cc, there is a peak in October which accounts for 12% of all collisions and a low in February to March (6% in each month). The remaining months account for between 7% to 9% of collisions. The red bars show the index score compared to all roads in England. The months of March and June are under-represented, whilst October as well as containing the highest numbers is also over-represented, along with May, August and December which are slightly over-represented. However, collision numbers in all months are relatively low, so only limited inference can be drawn from index scores. In October and November there is also a peak in 16-19 year olds involved in collisions, with 41% for October and 45% for November, compared to the monthly average of 33% of collisions involving 16-19 year olds. These months coincide with start of a new term time so the rise could be down to student riders, but again collisions numbers are low.

Figure 13 – Month of year when motorcyclists (up to 125cc) were involved in collisions on the SRN



For motorcyclists on bikes over 125cc, there is a clear increase in the summer months with numbers at their highest from June to September, peaking in July. The six months from April to September account for two thirds of all collision involved motorcyclists on bikes over 125cc on the SRN. December has the fewest number of collisions with 3%, with three months from December to February accounting for only 12%. December is most under-represented with February and November also under-represented. The months of June to September are all slightly over-represented with index scores from 108 to 115.

Figure 14 – Month of year when motorcyclists (over 125cc) were involved in collisions on the SRN



The weather conditions at the time the motorcyclists were involved in the collisions were examined (Table 4). Over 80% of motorcyclists (up to and over 125cc) on both the SRN and all roads in England as a whole, were involved in collisions in fine and still weather.

Table 4 – Weather conditions when motorcyclists were involved in collisions

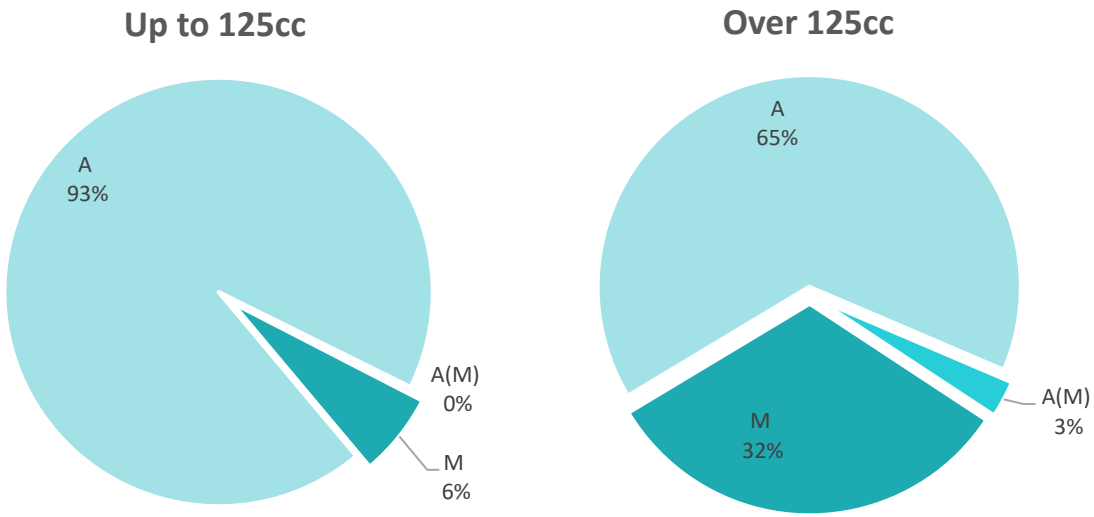
	SRN		All England Roads	
Weather Conditions	**Up to 125cc**	**Over 125cc**	**Up to 125cc**	**Over 125cc**
Fine & Windy	2%	1%	1%	1%
Fog or Mist	1%	1%	0%	0%
Other	2%	1%	2%	1%
Wet & Still	11%	9%	14%	8%
Wet & Windy	1%	1%	1%	1%
Fine & Still	83%	87%	80%	88%
Not Known	1%	1%	1%	1%

Associated with weather is the road surface condition. Sixty-eight percent of riders on motorcycles up to 125cc were involved in collisions on dry roads at the time of their collision, (this is the same as on all roads in England), with a further 30% on wet or damp road surfaces. For motorcyclists on bikes over 125cc, 79% were on dry surfaces at the time of their collision, as were 79% of those on all roads in England.

WHERE?

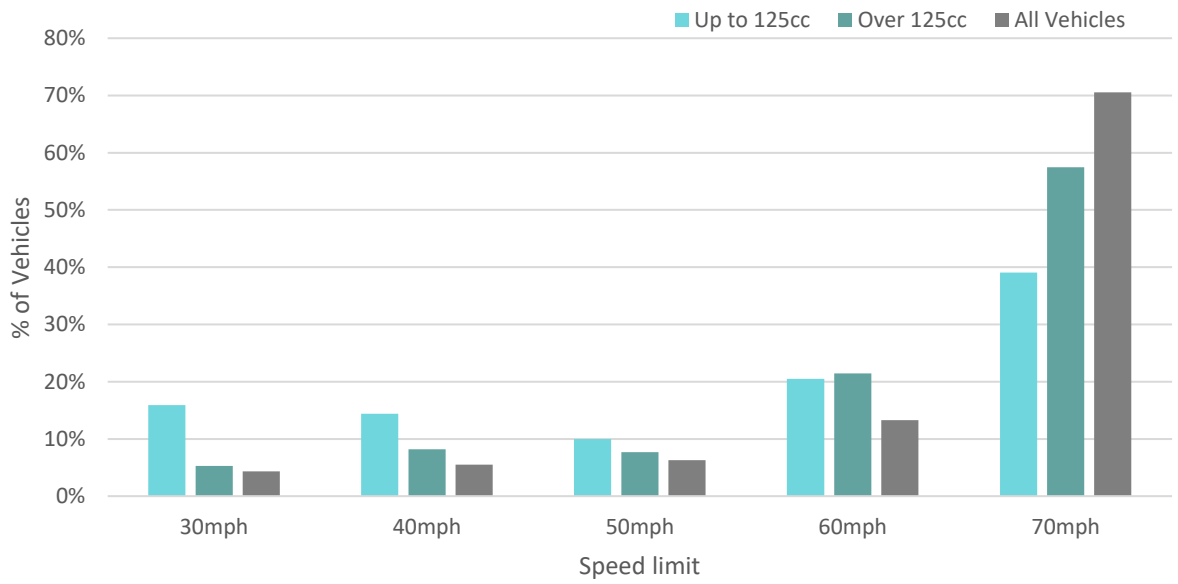
The next section looks at the road characteristics of where motorcyclists were involved in collisions. In terms of road class, 93% of motorcyclists on up to 125cc bikes were involved in collisions on A roads (6% on Motorways), compared to 65% of those on bikes over 125cc, as shown in figure 15. However, it should be taken into consideration that only riders on bikes above 50cc are permitted to travel on motorways, therefore only 77% of motorcyclists involved in collisions on up to 125cc bikes were actually permitted on all roads. For over 125cc motorcycle riders, 35% were on motorways, 32% of those on regular M roads with the remaining 3% on A(M) roads.

Figure 15 – Road class where riders are involved in collisions on the SRN



As shown in figure 16, motorcyclists on bikes both up to 125cc and over 125cc, have the largest proportion of SRN collisions on 70mph roads - 39% for up to 125cc motorcyclists and 57% for over 125cc. However, this is below the proportion for all vehicles involved in collisions on the SRN at 71%. With up to 125cc motorcycles, there is a higher percentage of collisions in all other speed limit zones compared to all vehicles, with 30-40 mph and 50-60mph accounting for 30% each. For over 125cc riders, only 13% were involved in collisions on 30-40mph roads, compared to 29% for 40-50mph roads.

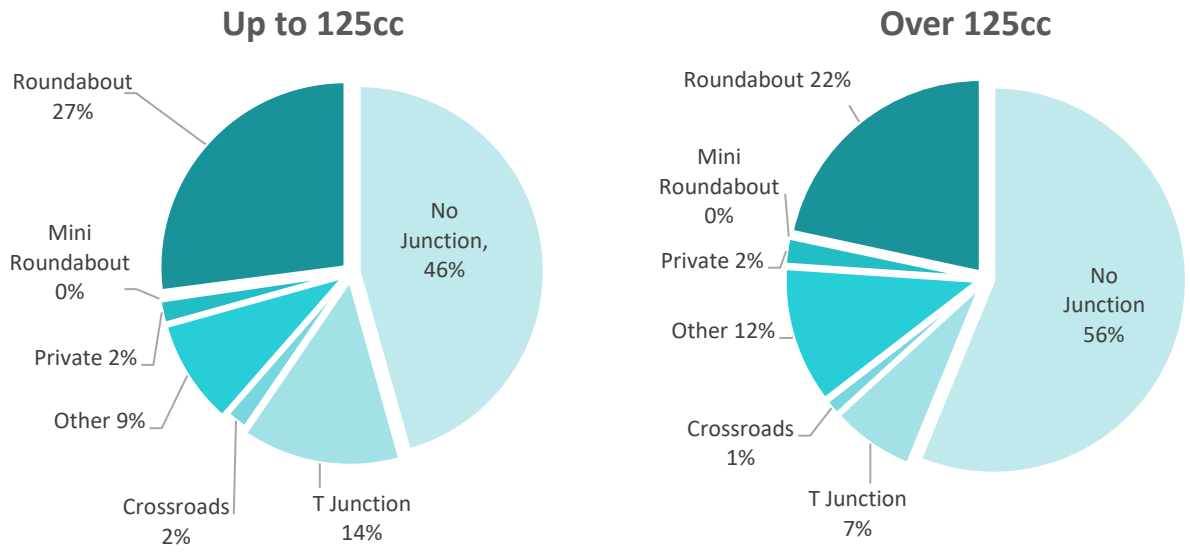
Figure 16 – Road speed limit where riders were involved in collisions on the SRN, compared to all involved vehicles



Of motorcyclists on bikes up to 125cc, 43% are involved in collisions on dual carriageways compared to 29% on single carriageway roads. The remainder are involved in collisions on roundabouts (22%) and one way/slip roads (6%). For motorcyclists on bikes over 125cc, 56% are involved in collisions on dual carriageways compared to 20% on single carriageway roads. Roundabouts account for 15%, with 9% of collisions occurring on one way/slip roads.
When compared to collisions involving any vehicle type on the SRN the percentages are slightly different. Dual carriageways represented 71% of all collisions, compared to 14% on single carriageway roads and 7% each on roundabouts and one way/slip roads. This indicates both types of motorcyclist are more likely to be involved in collisions at roundabouts and on single carriageway roads than other road users.

Junction details were also analysed and are displayed in figure 17. Roughly half of motorcyclists involved in collisions on the SRN, were not at a junction at the time of their collision. For up to 125cc motorcyclists, 46% were not at a junction and 56% of over 125cc motorcyclists were not at a junction, which compares to 70% of drivers of all vehicles involved in collisions on the SRN. At roundabouts, 27% of up to 125cc motorcyclists and 22% of over 125cc motorcyclists were involved in a collision, compared to 12% of all vehicles. At T-junctions and crossroads 16% of up to 125cc motorcyclists were involved in collisions, with 8% of over 125cc motorcyclist, compared to 6% of drivers of all vehicles. This might indicate issues with visibility (in that other vehicles approaching the junction are pulling out into the path of the motorcyclists without looking properly/seeing the motorcyclist) particularly with up to 125cc motorcyclists, or that the motorcyclists themselves are exiting junctions into the path of oncoming vehicles.

Figure 17 – Junction details of locations where riders are involved in collisions on the SRN



Manoeuvre analysis, discussed in detail later in the

How? section, shows that 55-60% of the motorcyclists were travelling straight ahead, implying that the other involved vehicles were emerging from the junctions, not the motorcyclist.

The junction control where the motorcyclists were involved in collisions were analysed. Overall, on the SRN, 47% of motorcyclists (up to 125cc) were involved in collisions at Give Way or uncontrolled junctions, compared to 38% for over 125cc motorcyclists, as shown in Table 5. This is lower than on all roads in England with 62% of motorcyclists (up to 125cc) involved in collisions at Give Way or uncontrolled junctions, compared to 56% for over 125cc motorcyclists

Table 5 – Junction control where riders were involved in collisions on the SRN

	SRN		All England Roads	
Junction Control	**Up to 125cc**	**Over 125cc**	**Up to 125cc**	**Over 125cc**
Authorised person	0%	0%	0%	0%
Auto traffic signal	7%	6%	10%	10%
Give way or uncontrolled	47%	38%	62%	56%
Not Applicable	44%	54%	26%	33%
Stop sign	0%	0%	1%	0%
Unknown	2%	2%	1%	1%

How?

After looking at when and where motorcyclists on the SRN were involved in collisions, the analysis now explores how these collisions occurred.

In order to understand the circumstances surrounding how motorcyclists were involved in collisions, it is important to look at the other vehicles involved. Table 6 shows the percentages of motorcyclists where at least one of the other type of vehicle was involved. As one motorcyclist can be involved in a collision with multiple different parties and some of the categories are not mutually exclusive (such as a car driver also being a senior driver), the percentages do not add up to 100%. It should also be remembered that the motorcyclists themselves could be the senior or young drivers in the bottom two rows.

Table 6 - Number of riders, by other vehicles involved (not equal to 100% as multiple parties may be involved)

Crash Involved	SRN		All Roads	
	Up to 125cc	Over 125cc	Up to 125cc	Over 125cc
Bus involved	0%	0%	1%	1%
Car involved	62%	62%	69%	67%
HGV involved	6%	5%	1%	2%
Van involved	7%	7%	6%	6%
Pedal cycle involved	0%	0%	1%	1%
Senior driver involved	8%	10%	7%	10%
Young driver involved	60%	21%	60%	25%

The analysis shows that a high percentage of the riders were in crashes where a car was involved and also that a high percentage of young drivers or riders were involved (which could be the motorcyclists themselves). The proportions are similar for motorcyclists on the SRN and all roads in England, with some slight exceptions - there is higher HGV involvement amongst motorcyclists on the SRN, which could be expected due to a higher proportion of traffic on these roads consisting of these vehicles. There is a slightly lower number of cars involved in collisions for both up to 125cc and over 125cc motorcyclists on the SRN, along with a slightly lower number of young drivers involved in collisions with motorcycles over 125cc compared to on all roads in England.

The majority of the motorcyclists who were involved in a collision on the SRN collided with one other vehicle (66% for up to 125cc riders and 60% for over 125cc riders), with 24% of up to 125cc and 25% of over 125cc involved in single vehicle collisions, as shown in figure 18 and figure 19. These percentages differ slightly from those for motorcyclists involved in collisions on all roads in England. On all roads, there is a higher percentage of up to 125cc riders who were involved in collisions with one other vehicle (76%) collisions and a lower percentage of those involved in single vehicle collisions (19%). Similarly, for over 125cc riders, there is a higher percentage on all England roads for those involved in collisions with one other vehicle (70%), and a lower percentage of those involved in single vehicle collisions (21%). For collisions involving 3+ vehicles on all roads in England, both up to 125cc (6%) and over 125cc (9%) motorcyclists were involved in fewer collisions than on the SRN.

Figure 18 – Riders (up to 125cc) involved in collisions on the SRN by number of vehicles involved in the collision

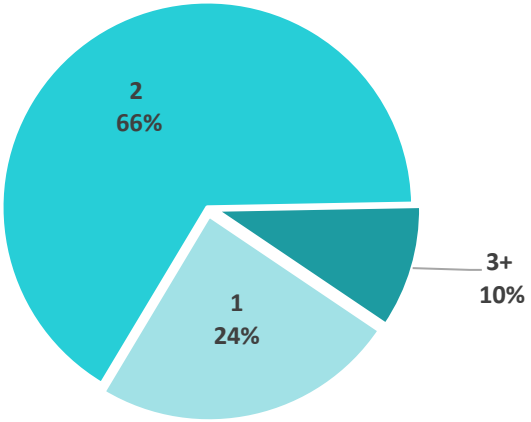
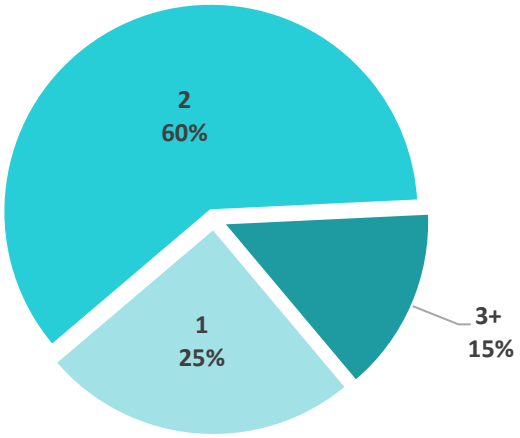


Figure 19 – Riders (over 125cc) involved in collisions on the SRN by number of vehicles involved in the collision



Looking at who the casualties were, 97% of motorcyclists on bikes up to 125cc were injured themselves, compared to 95% on bikes over 125cc. On all roads in England, 95% of motorcyclists on bikes up to 125cc and 93% over 125cc were injured themselves. Of motorcyclists on bikes up to 125cc, 2.3% had injured passengers on the SRN compared to 1.2% on all England roads. This increased to 5.4% and 5.6% for the SRN and all England's roads, for riders of motorcycles over 125cc. There were just 0.4% of up to 125cc riders and 0.4% of over 125cc riders on the SRN who injured a pedestrian in their collision (compared to 4% and 3% of motorcyclists on all England's roads).

Analysis of the manoeuvres of motorcyclists on the SRN found that 60% of those on up to 125cc and 56% of those on over 125cc motorcycles were travelling straight ahead and this is similar to the manoeuvres for motorcyclists on all roads in England (as shown in figure 20 by an index of 105 and figure 21 with an index of 107).

For SRN motorcyclists on bikes up to 125cc, 9% were performing a stop-start manoeuvre, which is slightly over-represented (index of 110) compared to motorcyclists on all England roads, whilst 6% were performing an overtake on the offside, which is under-represented (index of 53). For motorcyclists on bikes over 125cc, 10% were performing a stop-start manoeuvre, which is over-represented (index of 129) compared to motorcyclists on all England's roads.

Moving Lane accounts for just 5%, but is also over-represented considerably (index of 390), showing motorcyclists on bikes over 125cc are almost four times as likely to be involved in a collision when moving lane on the SRN than on all roads in England. Manoeuvres which are under-represented include: Ahead Bend (index of 76) and Overtake Offside (index of 67), which each account for 9% of collisions involving bikes over 125cc on the SRN.

Finally, motorcyclists Turning Right is also under-represented although the sample size for this manoeuvre is quite low.

Figure 20 – Manoeuvres of riders (up to 125cc) involved in SRN collisions, indexed by riders on all England's roads

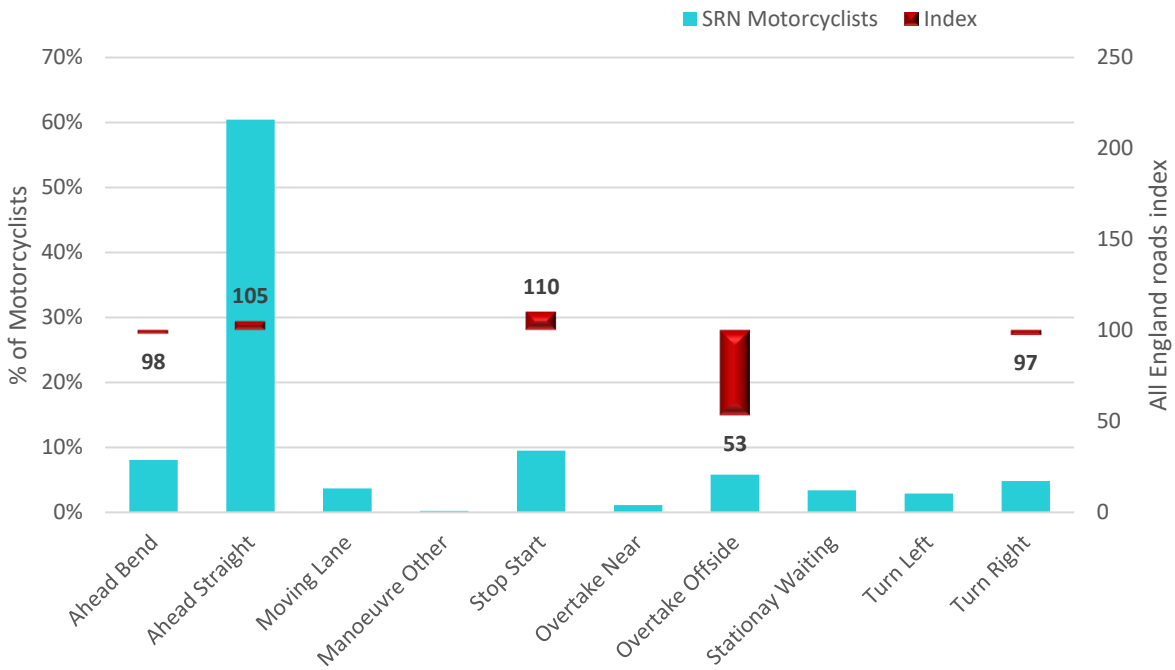
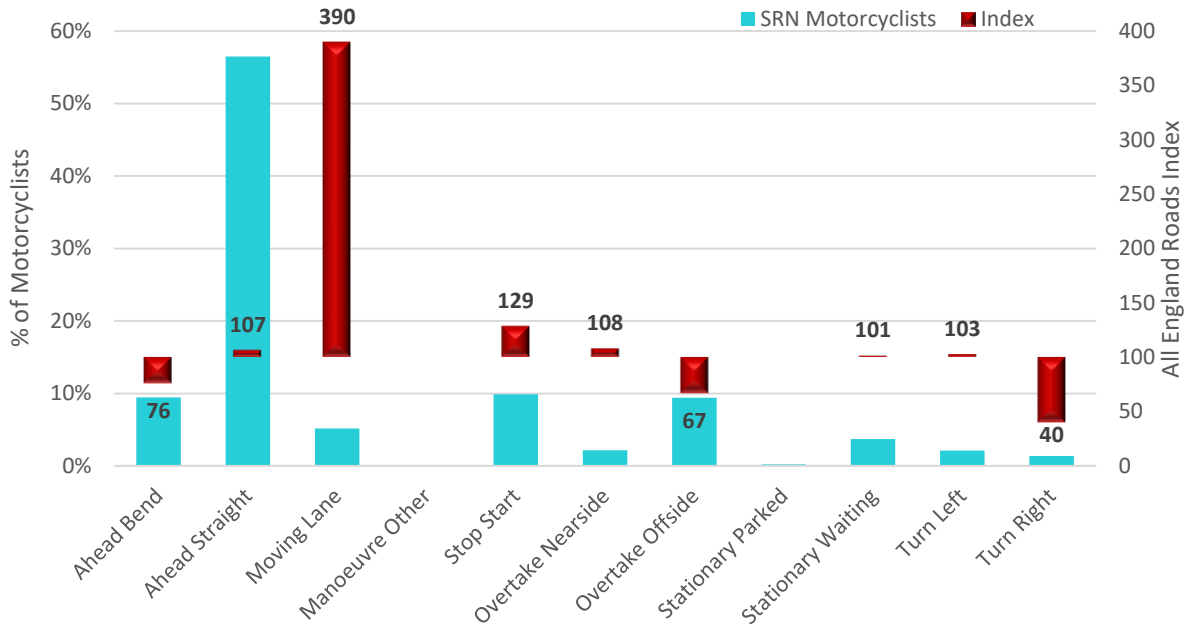


Figure 21 – Manoeuvres of riders (over 125cc) involved in SRN collisions, indexed by riders on all England's roads



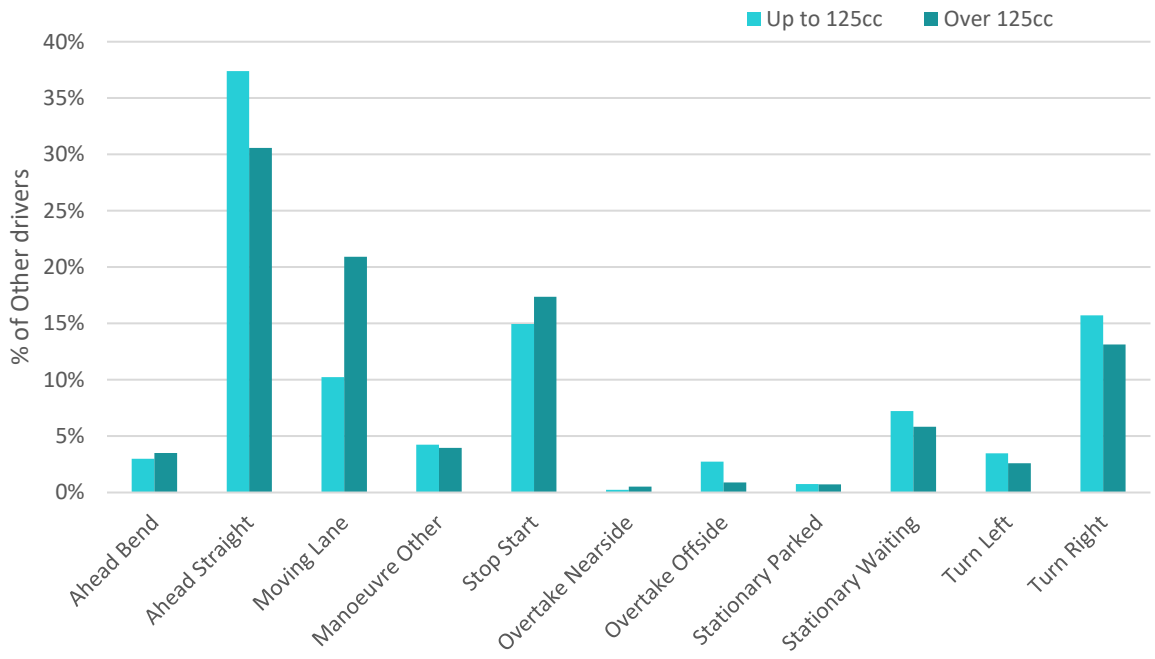
The manoeuvres of the related vehicles can also be analysed. As cars and goods vehicles (HGVs and vans) account for over 90% of other vehicles involved in collisions with motorcyclists on the SRN, and over 80% of the other vehicles involved in 2 vehicle collisions, the analysis focuses on these. Their manoeuvres are shown in figure 22 shows that over 37% of the other vehicles were travelling straight ahead at the time of the collision with motorcyclists on bikes up to 125cc, compared to 31% with other vehicles in crashes with bikes over 125cc.

Moving lane accounted for 21% of other vehicle manoeuvres in collisions with bikes over 125cc, compared to 10% of those in collisions with bikes up to 125cc.

Vehicles turning right accounted for 16% of those in collisions with bikes up to 125cc and 13% of bikes over 125cc.

Finally, vehicles performing stop start manoeuvres accounted for 15% of those in collisions involving motorcyclists on bikes up to 125cc and 17% of those on bikes over 125cc.

Figure 22 – % of related cars and goods vehicles involved in 2 vehicle collisions with motorcycles, by manoeuvre



It is possible to analyse the contributory factors (CFs) recorded by a police officer when completing the collision records. The following analysis only looks at collisions investigated at the scene by an officer and even then, it needs to be remembered that these factors reflect the officer's opinion at the time of reporting and might not be the result of extensive investigation. Analysis has been undertaken on the collision-involved motorcycle riders on the SRN by the CFs assigned to them and also by the CFs assigned to the related driver (using data from MAST Professional).

Table 7 shows the proportions of motorcycle riders who were assigned a CF on the SRN and on all roads in England, compared to all vehicle users. It shows that 67% of riders on bikes up to 125cc and 68% on bikes over 125cc are thought to have contributed to their collision in some way and were assigned at least one contributory factor. This compares to 64% for riders on bikes up to 125cc and 63% on bikes over 125cc on all England's roads.

Table 7 – Proportion of collision involved riders on the SRN assigned any CF

	All Vehicles	Motorcyclists up to 125cc	Motorcyclist over 125cc
SRN – Assigned Any CF	56%	67%	68%
All England Roads – Assigned Any CF	59%	64%	63%

Figure 23 shows the contributory factors with the highest proportions, assigned to motorcyclists on the SRN as a percentage of all motorcyclists receiving any CF (in collisions attended by a police officer) and also indexed against CFs assigned to motorcyclists involved in collisions on all roads in England. Indices were not calculated for CFs representing less than 1% of riders or where the total was less than 30. It should be noted that participants in collisions can be assigned more than one CF so the percentages of vehicles will add up to more than 100%. Individual CFs have been grouped together in the categories are shown in Appendix B – Contributory Factor Groupings.

The analysis shows that the highest percentage (31%) of up to 125cc motorcyclists receive 'Observation Errors' and this is under-represented for both up to 125cc and over 125cc motorcyclists.

The highest percentage (26%) of over 125cc motorcyclists receive 'Control Errors' which was also received by 28% of up to 125cc motorcyclists. 'Control Errors' was represented as expected for up to 125cc motorcyclists, but under-represented for over 125cc motorcyclists.

'Nervous Behaviour' was received by 27% of up to 125cc motorcyclists and was also over-represented; however, this category was under-represented for over 125cc motorcyclists who received a much lower percentage (4%).

'Road Surface' is the fourth largest category with 17% for up to 125cc motorcyclists and is marginally under-represented. For over 125cc motorcyclists 'Road Surface' represents 10% and is under-represented compared to motorcyclists involved in collisions on all roads in England.

Of the remaining contributory factor groupings, motorcyclists on bikes over 125cc are under-represented in all groups aside from 'Close Following' and 'Vehicle Defects' for which they are over-represented. Motorcyclists on bikes under 125cc are represented as expected for 'Manoeuvre Errors' and under-represented for 'Speed Choices'.

Figure 23 – Riders involved in collisions on the SRN by attributed CFs, indexed against all England's roads

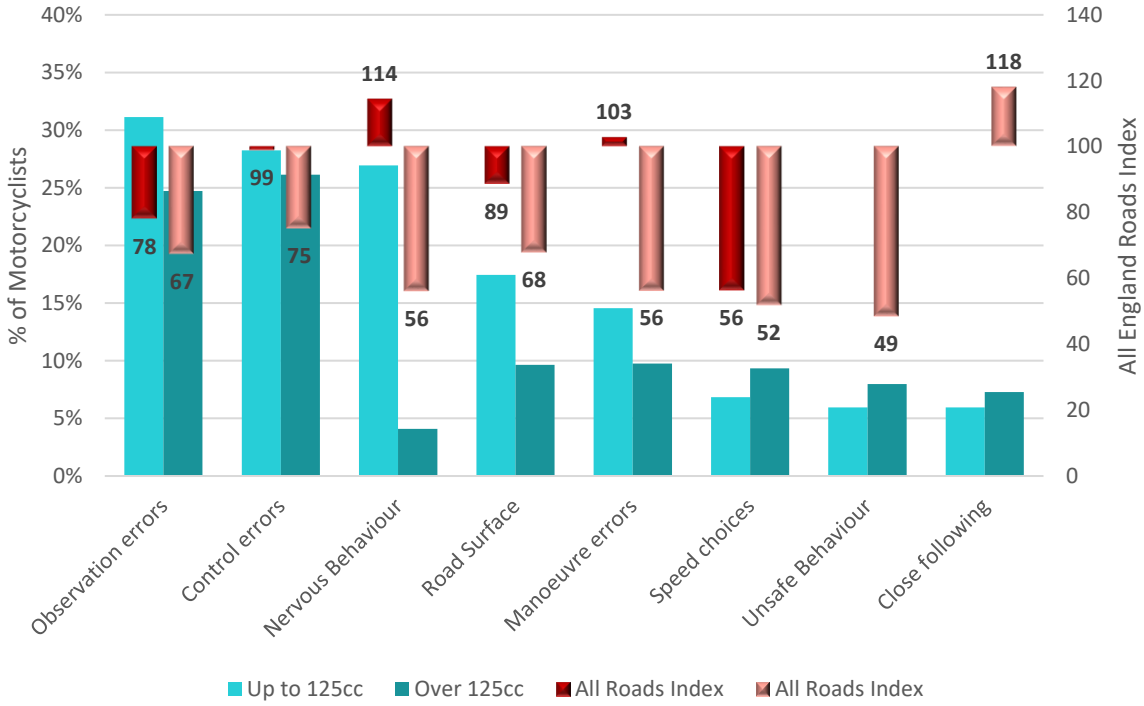


Figure 24 shows the contributory factors assigned to car drivers involved in collisions with motorcyclists on the SRN. These are also indexed against the CFs assigned to car drivers involved in collisions with motorcyclists on all England's roads.

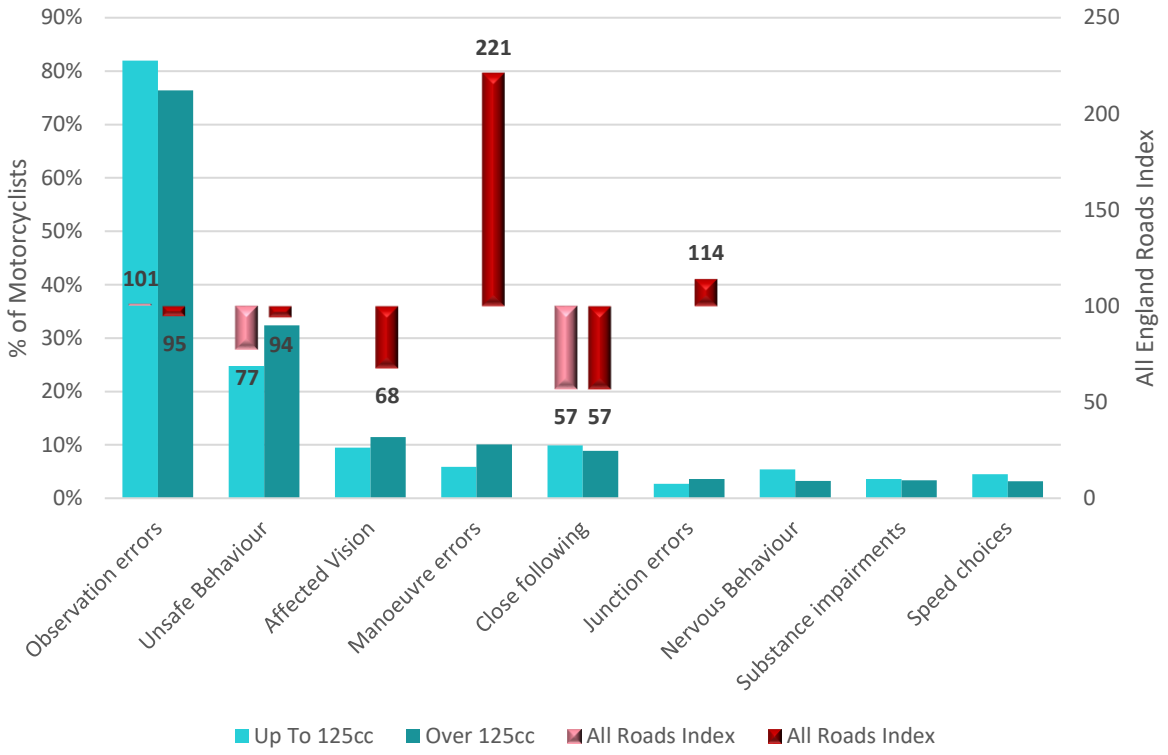
The analysis shows that the most commonly assigned CFs to car drivers are 'Observation Errors', with 82% for collisions involving up to 125cc motorcyclists and 76% for collisions involving up to 125cc motorcyclists.

For collisions involving up to 125cc motorcyclists, 25% of car drivers were assigned 'Unsafe Behaviour' compared to 32% of collisions involving over 125cc motorcyclists, with those involved in collisions with up to 125cc motorcyclists under-represented when compared to collisions on all England's roads.

For the remaining most commonly attributed CFs, 10% of car drivers involved in collision with up to 125cc motorcyclists were assigned 'Close Following' with these also under-represented, 9% were assigned 'Affected Vision' and 6% 'Manoeuvre Errors', however the numbers are too low to calculate index scores.

For car drivers involved in collisions with over 125cc motorcyclists, 'Affected Vision' was assigned to 11% and 'Close Following' were assigned to 9% were both under-represented. 'Manoeuvre Errors' were assigned to 10% with these also considerably over-represented and 'Junction Errors' were assigned to 4% with these drivers also over-represented.

Figure 24 – CFs assigned to car drivers in 2 vehicle collisions with riders on the SRN, indexed by all England roads



Motorcycle Rider Profiles

Moving away from the ‘when, where and how’ questions, we can now explore the ‘who’ question. It is essential to understand more about the people involved in the collisions, including information about their everyday lives, as well as demographics.

The ages of motorcyclists (on bikes up to 125cc) from England, by severity are shown in figure 25. It shows that the single largest group are aged from 16-19 which accounts for 33% of the total number of motorcyclists (up to 125cc) involved in injury collisions on the Strategic Road Network. This is followed by motorcyclists aged 20-24 which accounts for 21%. These numbers are indexed against motorcyclists (up to 125cc) involved in injury collisions on all roads in England. There is some under-representation amongst 25-39 year olds and over-representation amongst 40-54 year olds, although the sample sizes are too small to take any definitive conclusions from this.

Figure 25 – Age of riders (up to 125cc) from England involved in collisions on the SRN

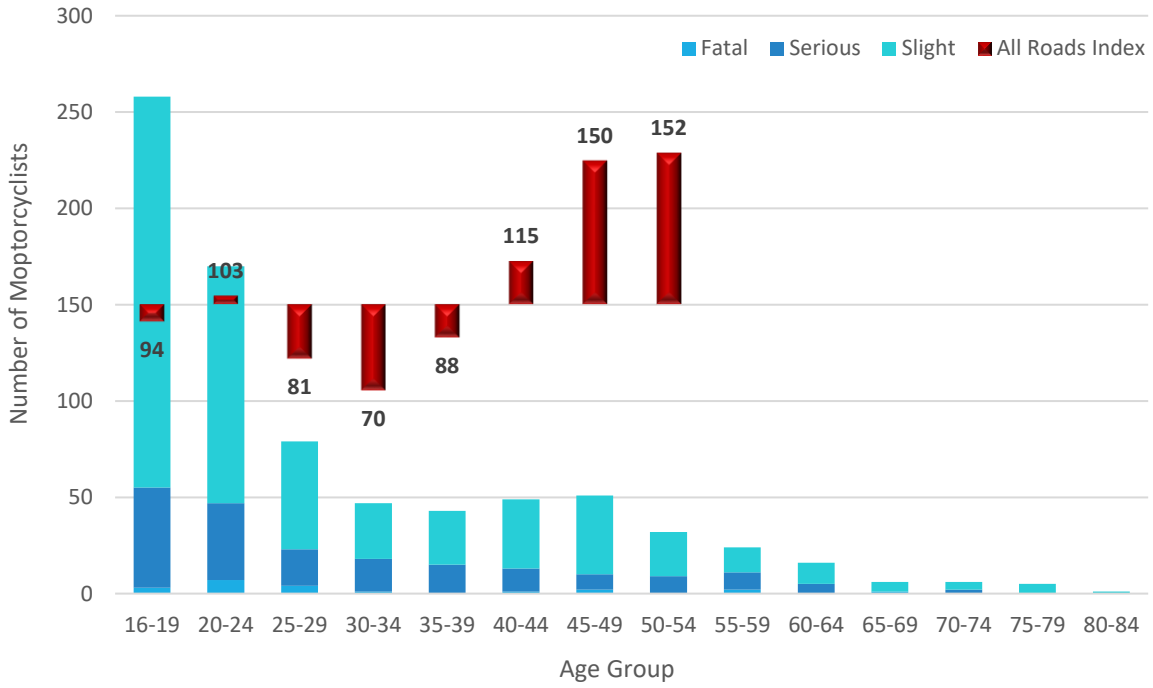


Figure 26 shows the ages of motorcyclists (on bikes over 125cc) from England, by severity, involved in collisions on the SRN. Compared to motorcyclists on bikes up to 125cc there is a more even split amongst age groups. The largest group are aged 45-49 which accounts for 15%, although this is closely followed by those ages 40-44 and 50-54 which each account for 13%. Again the numbers are indexed against motorcyclists (over 125cc) involved in collisions on all roads in England. Motorcyclists aged 16-19 are most under-represented although the sample size is small, and those aged 20-29 are also under-represented. Motorcyclists over the age of 45 are over-represented, with over-representation rising as the age group increases. However, the sample sizes fall as age increases, so less confidence can be placed in the index scores.

Figure 26 – Age of riders (over 125cc) from England involved in collisions on the SRN

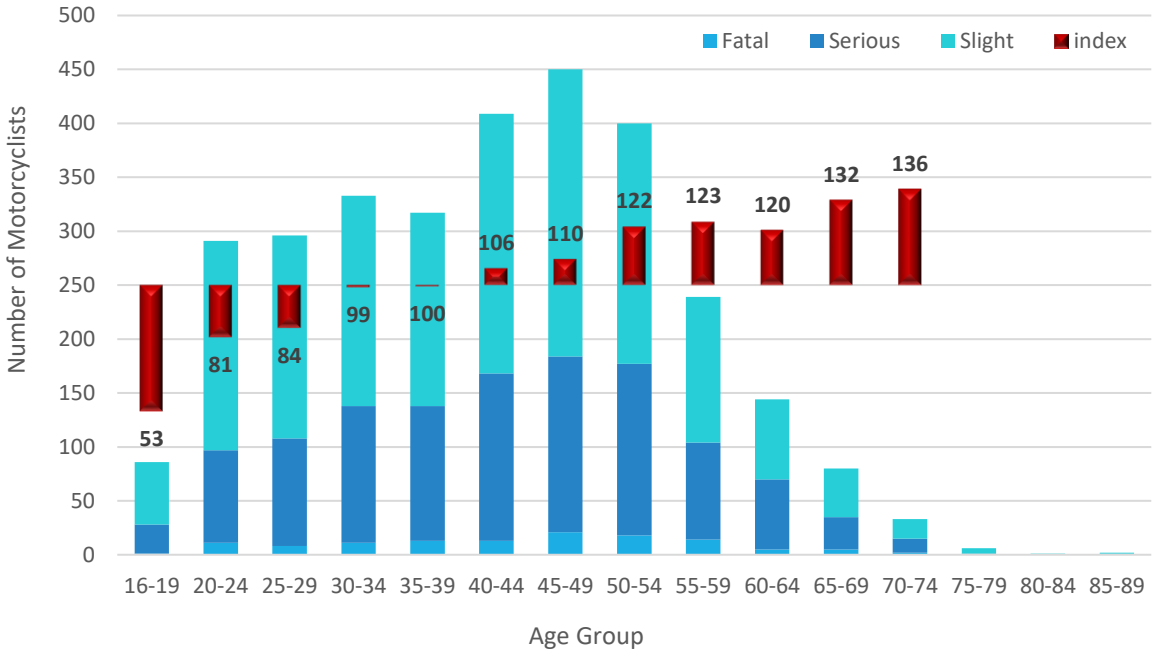


Figure 27 below shows the regional rate of riders involved in collisions (on the HE network indexed against the adult population of that region) compared to the national rate, with the strategic road network highlighted in blue. The South East and East have the highest rates (riders per year per 100,000 adult population) with 3.1 and 2.6 respectively. The lowest rate is in London with 0.7 riders per year, with the North West and North East also low with 1.1 and 1.3 respectively. To see the breakdown within each region, see Appendix C – Maps, starting with Figure showing the East of England.

Figure 27 - Regional breakdown of collisions on the SRN - riders per year per 100,000 adult population

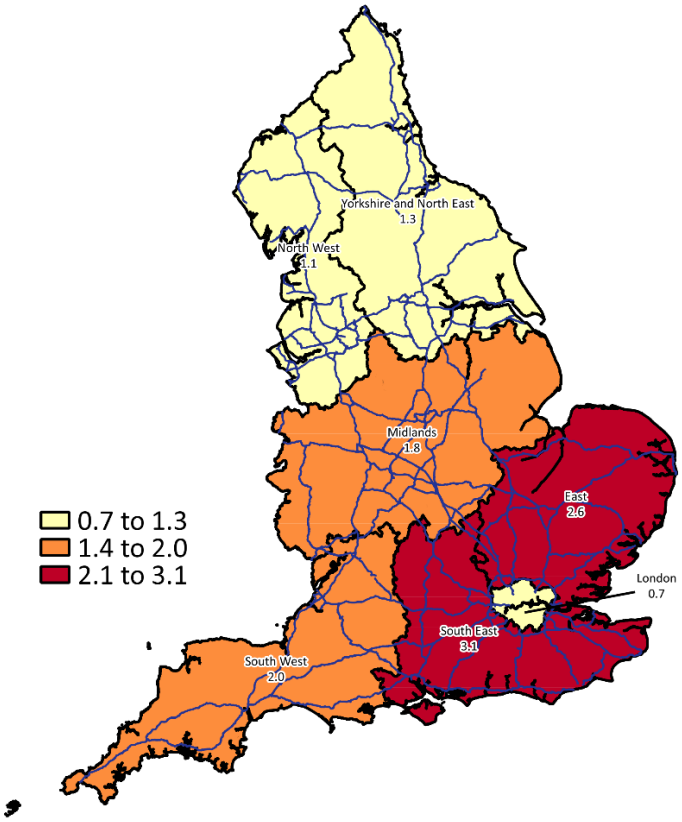


Figure 28 shows the breakdown in England by home region, and by motorcyclist's engine size. London has the smallest proportion of resident motorcyclists of up to 125cc bikes at 10%, compared to the Midlands with 27% and Yorkshire and North East at 25%. The average split for the whole of England is 20% for up to 125cc and 80% for over 125cc. Overall there were 3,891 motorcyclists from England involved in fatal or serious collisions on the strategic road network.

Figure 28 – Riders involved in collisions on the SRN by home region and engine size

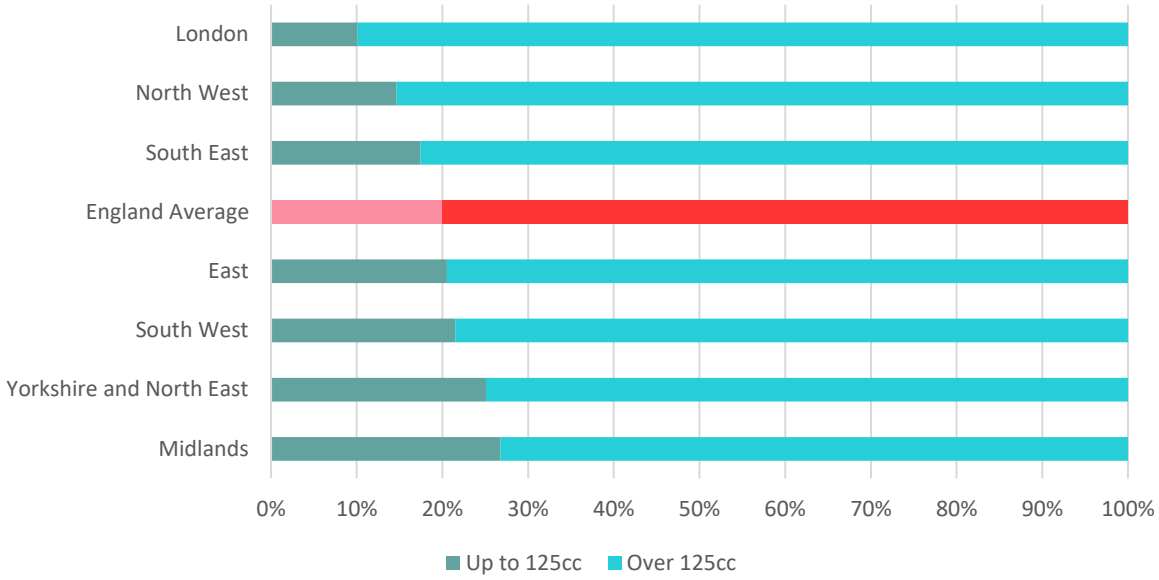
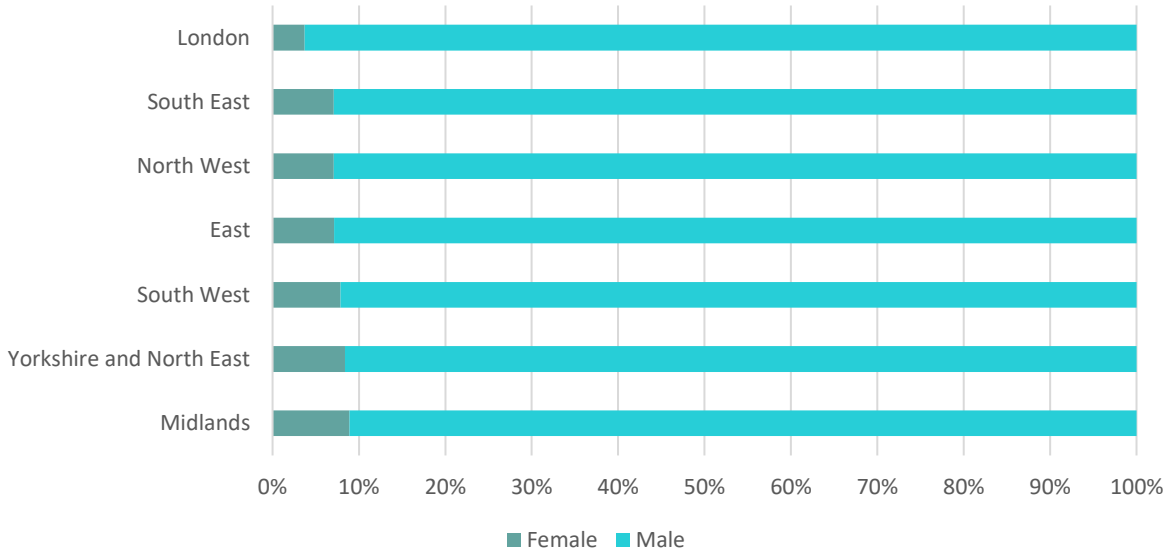


Figure 29 shows the gender breakdown by home region for all motorcyclists. The Midlands have the highest proportion of female motorcyclists involved in collisions with 9%, whilst London has the fewest with 4%. The average for England is 7% female and 93% male.

Figure 29 – Gender of riders from England, involved in collisions on the SRN



Journey purpose, shown in Table 8, can be used to gain an idea of what the motorcyclists were doing at the time of their collision. There are three types of journey purpose recorded in STATS19: 'school related', where 'school pupil' is a student taking themselves to school and 'school run' where a child is being taken to school; 'work related', separated into 'commute' and 'work' where the latter is a journey undertaken for work purposes; and 'other' includes all other activities (shopping, leisure purposes, driving/riding for fun) but also includes where journey purpose is not known. It is not possible to tell the proportions of 'not knowns' included in 'other', compared to known journey purposes which were not school or work-related. This should be borne in mind when using the journey purpose field.

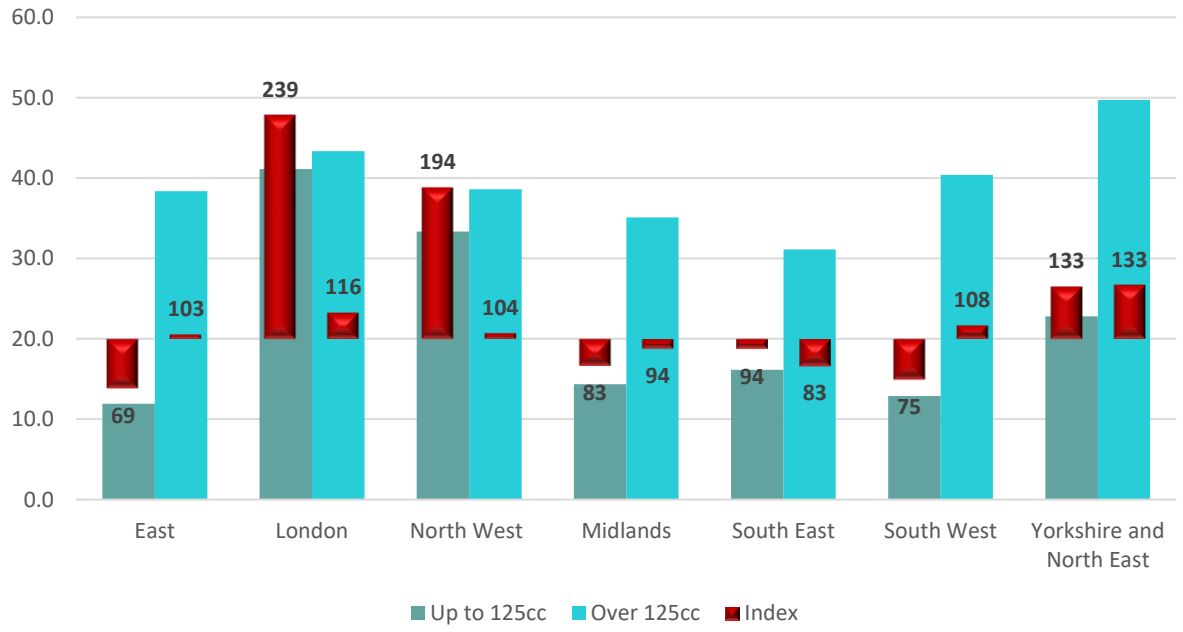
For commuting, the South East is the region with the highest proportion of resident motorcyclists at 23%, whilst London has the lowest proportion at 11%. The South West has the highest proportion of 'Other' at 80%, with the East and South East lowest at 65% and 66% respectively. For work, unsurprisingly, London has the highest proportion at 15%, whilst the South West has the lowest at 5%. There were only a handful of motorcyclists who were involved in collisions as a school pupil or on a school run, as would be expected with strategic roads.

Table 8 - Journey purpose of riders involved in collisions on the SRN

Region	Commute	%	Other	%	School Pupil/Run	%	Work	%	Total
East	133	22%	397	65%	3	0%	81	13%	**619**
London	25	11%	177	74%		0%	36	15%	**242**
North West	141	19%	536	71%	1	0%	73	10%	**324**
Midlands	60	19%	227	71%		0%	34	11%	**741**
South East	256	23%	723	66%	3	0%	119	11%	**1102**
South West	64	14%	362	80%		0%	25	6%	**445**
Yorkshire & North East	79	19%	314	76%	1	0%	20	9%	**260**
Total	**758**	**19%**	**2737**	**70%**	8	0%	**388**	**10%**	**3891**

Distance from home can be calculated in kilometres using the distance between crash location and home postcode for each motorcyclist, averaged across the whole group of motorcyclists. The calculation does not plot along routes but is instead an 'as the crow flies' distance. Figure 30 below shows the average distance from home for up to 125cc and over 125cc motorcyclists, indexed against the national (England) average for each type.

Figure 30 – Collision involved riders on the SRN average distance from home, indexed by SRN average for all vehicles



In England, motorcyclists on bikes up to 125cc, were on average 17.2km from home at the time of their collision, compared to 37.3 km for motorcyclists on bikes over 125cc. On bikes up to 125cc, residents from London (index 239) and the North West (index 194) are considerably further from home, whilst residents from Yorkshire and North East (index 133) are also over-represented, meaning they're further away from home at the time of their collisions than the national average. Residents from the East (index 69), Midlands (index 83) and South West (index 75) are closer to home at the time of their collisions.

For motorcyclists on bikes over 125cc, residents of Yorkshire and the North East are most over-represented with an index score of 133, with residents of London (index 116) also on average further from home at the time of their collisions. Resident motorcyclists of the South East are closest to home (index 83) at the time of their collision.

Figure 31 shows the percentage of motorcyclists involved in collisions (on the strategic road network) in their home region, indexed against all roads in the region. Motorcyclists on up to 125cc bikes from the North West are under-represented with a higher proportion involved in collisions in other regions. Motorcyclists on bikes over 125cc from the North West and South West are also under-represented in collisions in their home regions. As it would be expected, there are no regions where collisions on strategic roads involving drivers from the same region are over-represented compared to all roads.

Due to there being much shorter lengths of strategic road in the London region, the majority of resident motorcyclists from here are involved in collisions in other regions and as a result, the index scores show London being considerably under-represented. This is also because when indexed against all roads, 97% of motorcyclists on up to 125cc bikes and 90% of motorcyclists on over 125cc bikes from London are involved in the region.

Figure 31 – Collision location of involved riders on the SRN

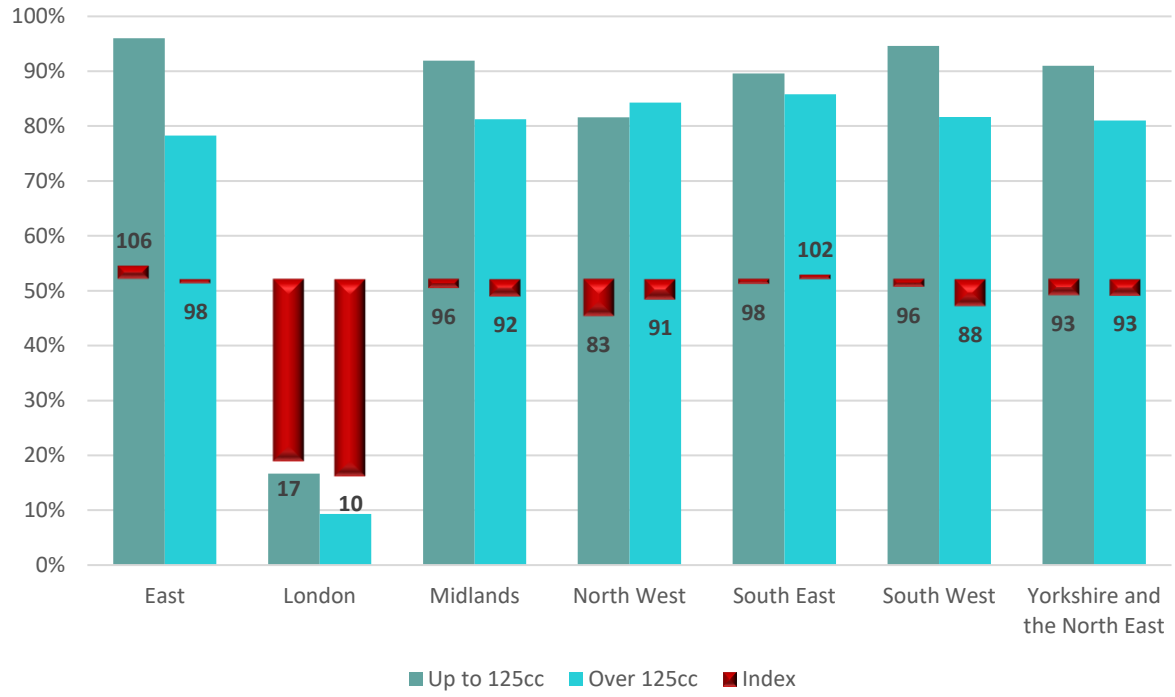


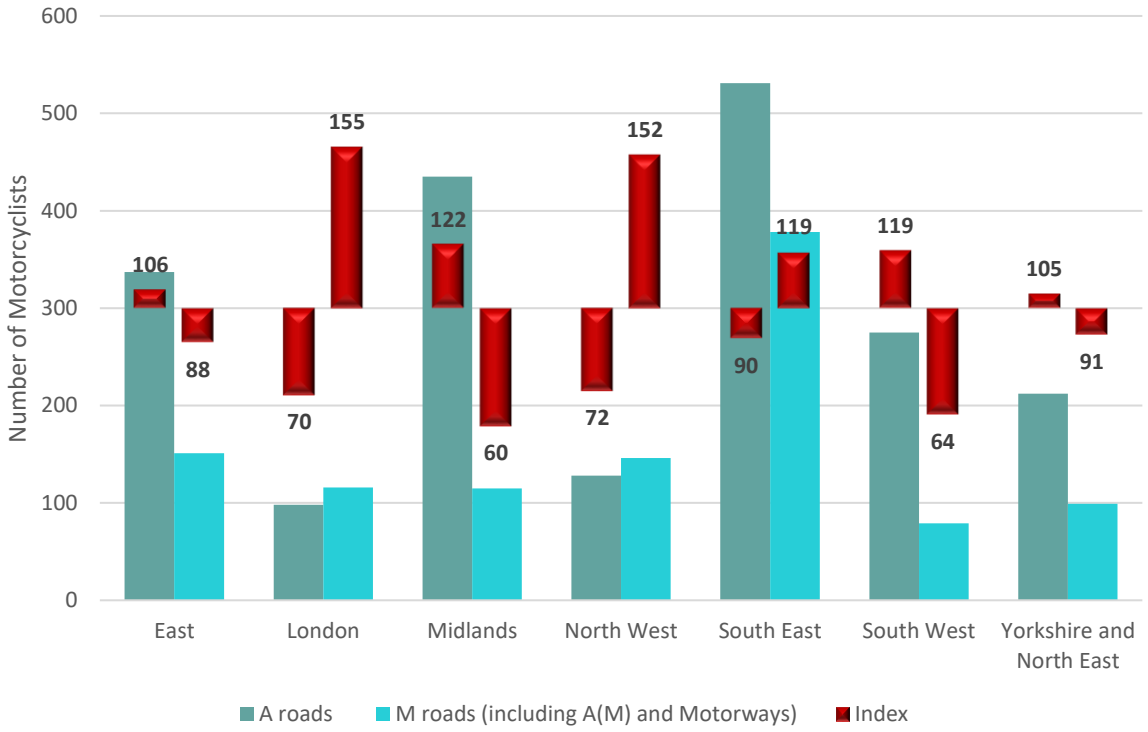
Table 9 shows the percentage of motorcyclists from a region involved in collisions in that region, by road class. For example, 89% of motorcyclists from the East involved in collisions on A-roads, were involved on A-roads in the East. Motorcyclists from the East, South West and South East have the highest percentage of collision involvement in their home regions on A-roads. Motorcyclists from the North West and South East have the highest percentage of collision involvement in their home regions on M-roads.

Table 9 – % of motorcyclists from each region, involved in collisions in that region, by road class

Region	% on A-Road	% on M-Road
East	89%	62%
London	3%	17%
Midlands	89%	51%
North West	84%	84%
South East	87%	85%
South West	88%	67%
Yorkshire and North East	88%	70%

Figure 32 below shows the breakdown of collisions involving motorcyclists who were on bikes over 125cc. These numbers are by driver home region and indexed against the national average. On A-roads, motorcyclists from the Midlands and South West are over-represented, whereas those from London and the North West are most under-represented. On M-roads, motorcyclists from London and the North West are the most over-represented, whilst those from the East, Midlands and South West are under-represented. Interestingly motorcyclists from London and the North West are the only regions where there are a greater number of injury collisions on M-roads than on A-roads.

Figure 32 – Collisions involving riders (over 125cc) on the SRN, by road class and riders' home region



Mosaic Analysis

Mosaic classification is based on the individual postcodes provided in STATS 19 records for each rider and uses the Experian Mosaic socio-demographic classification system (for details see **http://publicsector.experian.co.uk/Products/Mosaic Public Sector.aspx**). Typically, 85% of postcodes can be matched to a Mosaic Type, so this analysis is based on about five out of six of all motorcyclists. There are a number of Mosaic Types in each group, and for this analysis Mosaic Group has been used as the most appropriate choice for available sample sizes

The green bars indicate the number of motorcyclists in each Mosaic Group, with figures corresponding to the left hand vertical axis. The red bars show the "Index" for each Mosaic Group. An Index value of 100 indicates that the number of motorcyclists is in proportion to the adult population of England's communities where that Group predominates. A value of 200 would mean that this Group is involved in collisions at twice the expected rate; a value of 50 would imply half the expected rate. Displaying the data overlaid on a single chart allows quick and easy analysis of motorcyclists and relative risk. The Index value becomes less significant as the number of motorcyclists decreases and random change lowers confidence levels.

Figure 33 – Motorcyclists (up to 125cc) by mosaic group, indexed against England adult residents

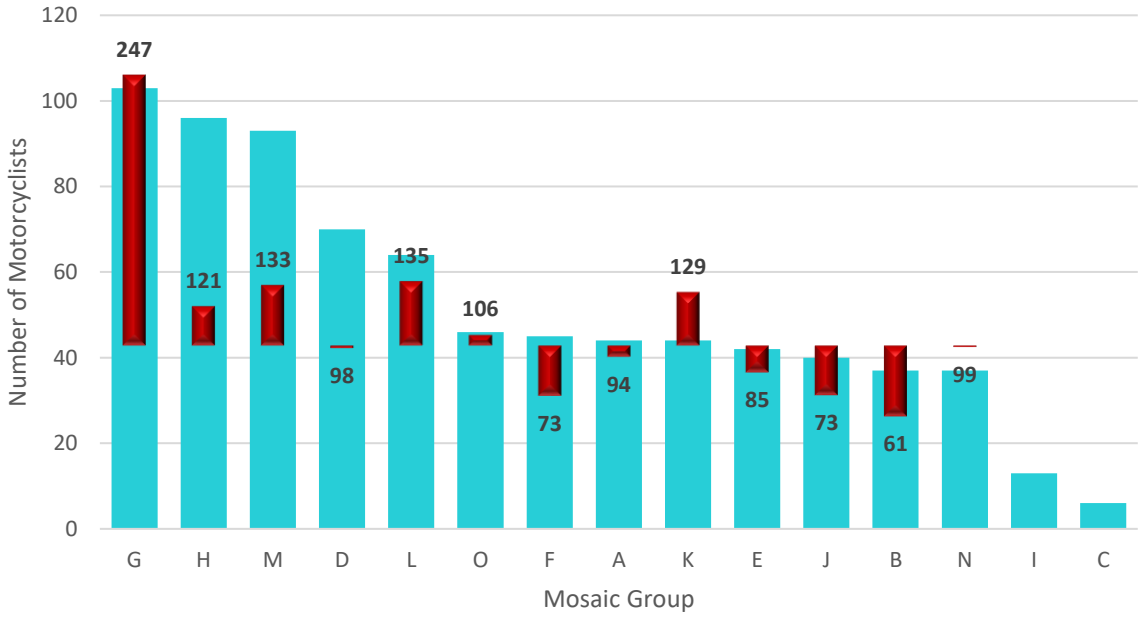


Figure 33 shows motorcyclists (up to 125cc) involved in collisions by Mosaic Group of the postcode they live in. The red bars show the index value based on the population of these groups living in England. The highest number comes from *Rural Reality* (Group G), with this group also significantly over-represented. Other groups over-represented include *Aspiring Homemakers* (Group H), *Family Basics* (Group M), *Transient Renters* (Group L) and *Modest Traditions* (Group K).

Groups under-represented include *Senior Security* (Group F), *Rental Hubs* (Group J) and *Prestige Positions* (Group B). However, as sample sizes decrease less confidence can be placed in index values and the sample size for all groups in this case are quite small.

Figure 34 – Collision involved riders (over 125cc) on the SRN by mosaic group, indexed against England adult residents

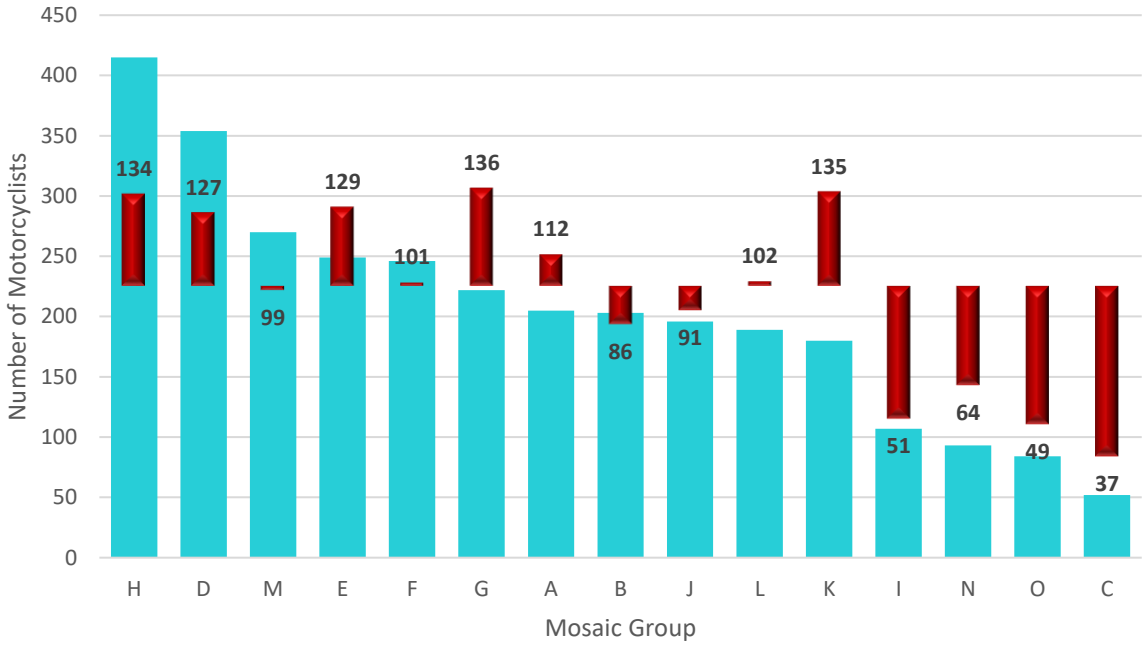


Figure 34 shows motorcyclists (over 125cc) involved in collisions by Mosaic Group of the postcode they live in. The green bars show the index value based on the population of these groups living in England. The highest number comes from *Aspiring Homemakers* (Group H), with this group also over-represented. Also with a high number of motorcyclists from *Domestic Success* (Group D) which is over-represented.

With a large number of motorcyclists involved in collisions, *Family Basics* (Group M), *Senior Security* (Group F) and *Transient Renters* (Group L) are represented as expected. *Suburban Stability* (Group E), *Rural Reality* (Group G), *Country Living* (Group A) and *Modest Traditions* (Group K) are over-represented. *Prestige Positions* (Group B) and *Rental Hubs* (Group J) are slightly under-represented.

Groups with low numbers and under-represented include *Urban Cohesion* (Group I), *Vintage Value* (Group N), *Municipal Challenge* (Group O) and *City Prosperity* (Group C). However once again, as sample sizes decrease less confidence can be placed in these index values.

Table 10 details some most over-represented Mosaic Groups amongst motorcyclists in England. They have been selected based on the Groups over-represented for both up to 125cc and over 125cc motorcyclists, or those most over-represented amongst over 125cc motorcyclists as the sample sizes for this group are much larger.

Table 10 – Profile of most over-represented mosaic groups

Group H Aspiring Homemakers	**Group D** Domestic Success	**Group K** Modest Traditions	**Group G** Rural Reality
Aspiring Homemakers are typically younger families, couples who are yet to have children, and singles in their 20s and 30s. A good number are setting up homes for the first time. Couples can be married or more likely co-habiting, and where there are children they are usually of nursery or primary school age. Homes are likely to be semi-detached and terraced properties, modest in size but with three bedrooms and mostly owned; three-quarters of Aspiring Homemakers are in the process of buying their house with a mortgage. Most Aspiring Homemakers are driven by affordability when it comes to choosing where to live. They select either modest priced housing on newer estates, larger homes in better value suburbs that give them more space, or the least expensive	Families in Domestic Success are headed by couples typically aged in their late 30s and 40s, many of whom have school age children. Parents in this group are the most likely to have a degree and may have delayed having children until their careers were established. They now live in good-sized three or four bedroom detached properties, owned with a considerable mortgage outstanding. Their lives are now settled and they have very comfortable standards of living. These are homes they can expect to stay in while their children grow up. Company car ownership is high, a benefit of working for well-known organisations or professional firms in sectors such as finance, property, information technology and professional services.	Modest Traditions consists of people aged mostly between 46 and 65 who have worked hard to buy their own homes and are now benefiting from that decision. They live in older two or three bedroom terraced or semi-detached homes, some bought from the local council. They are a combination of single people, married couples and families with grown-up children still living at home. Where children are able to contribute to the family income they are likely to be better off than their neighbours. Modest Traditions tend to work in lower level jobs, perhaps in skilled trade occupations for which an apprenticeship was as useful as a degree, or in administrative or customer service jobs. When shopping they tend to be focused on what they want and are not easily	Rural Reality are a mix of families, mature couples and older singles living in rural locations in lower cost housing. Some live in developments that have sprung up around villages, others in scattered hamlets or in remote communities. These tend not to be picture-postcard country properties, but more affordable two or three bedroom bungalows, semis or terraces often built post-war or more recently. Seventy per cent of this group own their own homes, while others rent from social landlords. Overall more people are employed than retired. Those employed may work in agriculture and related industries, or in local manufacturing or retail. People are more likely to have lower level supervisory roles, routine and semi-routine jobs than managerial roles. A

homes in popular suburbs. The majority of Aspiring Homemakers are in full-time employment with a few part-time workers. The starter salaries they earn mean that most can manage their household budgets, but outgoings can be high so they appreciate the benefits of buying and selling on auction sites. Unsecured loans can help with larger purchases. They own smartphones, are keen social networkers, manage their bank accounts online and download a large number of apps.	Domestic Success are frequent internet users. As well as being constantly connected for work, they enjoy the time-saving convenience of banking, shopping and managing bills online. They love owning the latest technology and, in addition to smartphones, they are the most likely group to own tablets.	distracted. However, at the supermarket they are the most likely to notice offers and advertising on trolleys and shelves. Modest Traditions aren't generally up-to-date with the latest technology but many will have mobiles for basic communication and will make some use of the internet for information.	relatively high proportion of these people are self-employed. Rural Reality are unlikely to use digital technology in their work, and slower broadband speeds can limit internet use at home. However, they sometimes use auction sites for buying and selling items, and order groceries from mainstream supermarkets online. Satellite TV is popular as are local newspapers and local radio.

Index of Multiple Deprivation (IMD)

As well as looking at the Mosaic socio-demographic classifications, it also possible to look at relative deprivation using the UK IMD values for each postcode. IMD uses a range of economic, social and housing data to create a single deprivation score for each small area of the country. The analysis uses deciles, which creates ten groups of equal frequency across the entire population, ranging from the 10% most deprived areas to the 10% least deprived areas.

Figure 35 below shows the breakdown of motorcyclists (on bikes up to 125cc) from England who were involved in collisions on the strategic road network. Aside from the least deprived 10% decile with 7% of the total, there is a fairly even split between the remaining deciles with the less deprived 20% to the most deprived 10% ranging between 9% and 12%. The least deprived 50% account for 47%, compared to most deprived 50% which accounts for 53%.

Figure 35 – IMD of collision involved riders of up to 125cc bikes

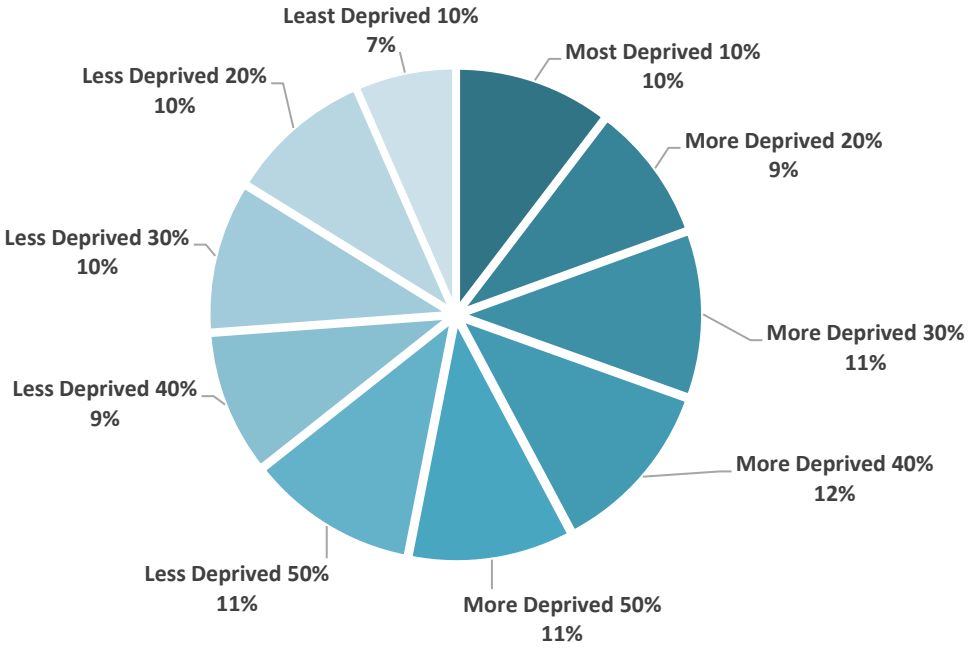


Figure 36 shows the same breakdown of motorcyclists, but for those who were on bikes over 125cc. The least deprived deciles account for a greater percentage than for those on up to 125cc motorcycles, with the least deprived 10-20% deciles accounting for 22%, compared to 17% for up to 125cc motorcyclists. As expected, the most deprived deciles account for a lower percentage than for up to 125cc motorcyclists, with the most deprived 10-20% accounting for 14% compared to 19% for up to 125cc motorcyclists.

Figure 36 – IMD of collision involved riders of over 125cc bikes

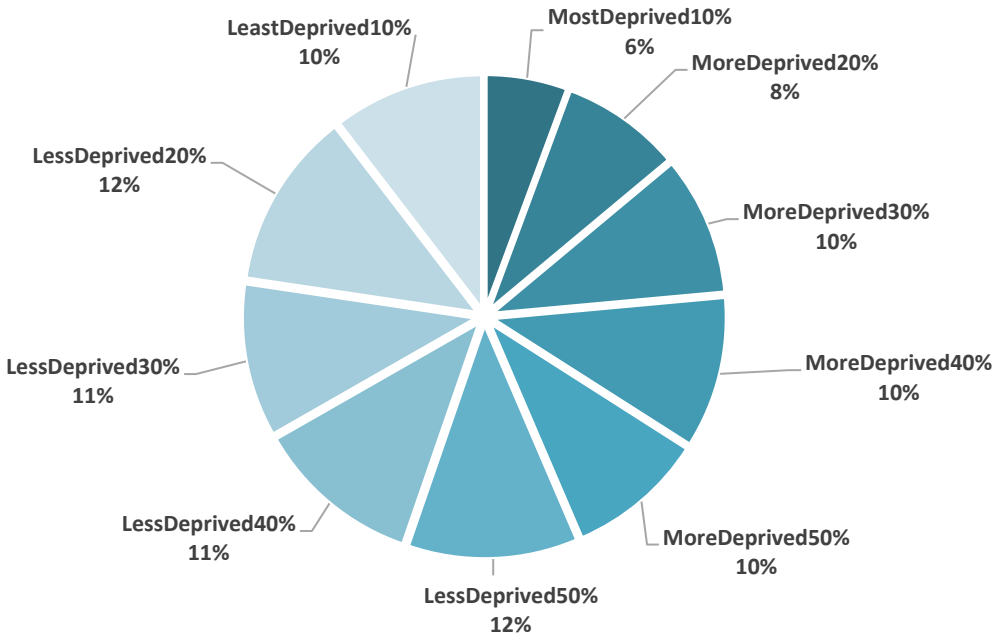


Figure 37 and figure 38 show the breakdown by region of motorcyclists within the less deprived 10-50% IMD deciles and the most deprived 10-50% compared to the national average. The regions with the highest percentage of motorcyclists from these least deprived deciles are from the East, South West and South East, with these regions also over-represented. The regions with the least motorcyclists from these least deprived deciles and most under-represented are Yorkshire and North East and London. When looking the most deprived deciles this pattern reverses with the East, South West and South East accounting for the smallest percentage and the most under-represented.

Figure 37 – Regional breakdown of motorcyclists in the least deprived 10-50% IMD deciles

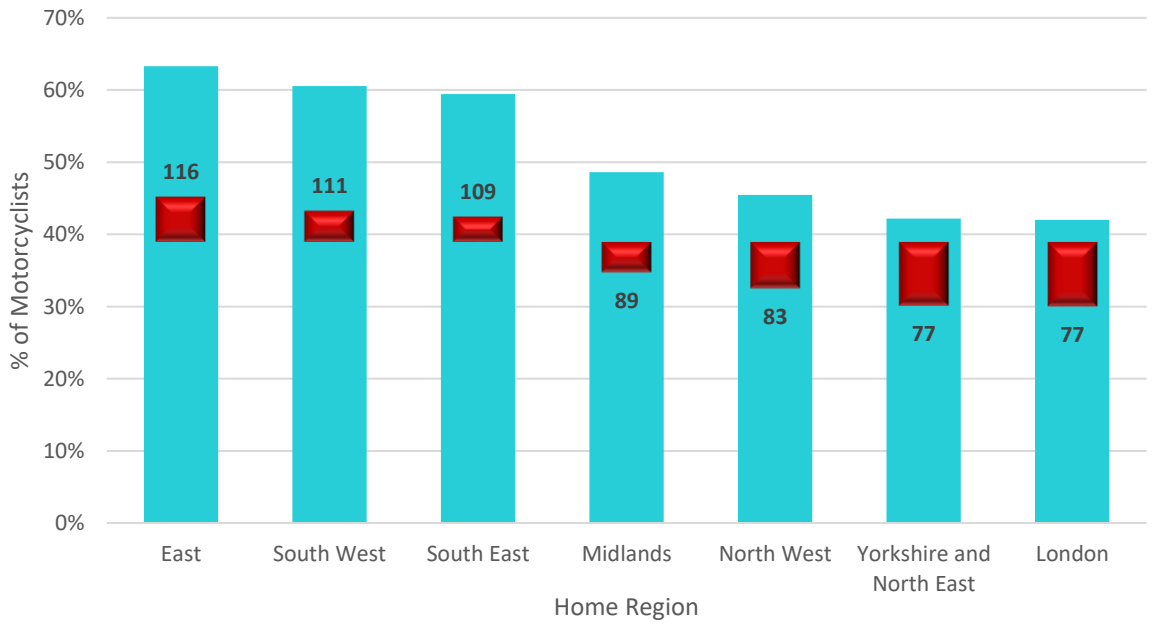


Figure 38 – Regional breakdown of motorcyclists in the most deprived 10-50% IMD deciles

Personas

The analysis of the socio-demographic data as well as the collision information has allowed a picture to be built up about the kinds of motorcyclists who are involved in collisions. More than one type of motorcyclist has emerged, both in terms of socio-demographic profiling and collision analysis. The findings allow key characteristics to be collated into personas. Parallels have been drawn from the multiple data sets in the creation of these personas to ensure alignment along clear data points.

There are **5** personas which have emerged from the analysis:

1 – 'Adam' – is in his early 40s and lives in a semi-detached suburban house with his wife, Amy, and their two young children. His community belongs to Mosaic Group H. The family has a modest household income and he currently works in a routine occupation in Public administration and defence; Electricity, gas, steam and air conditioning; or manufacturing. He is likely to have studied A-levels or an apprenticeship after his GCSE's. The family likely own a car and he also owns an over 125cc motorcycle which he uses for commuting and the occasional leisure ride. Adam is likely to be involved in a collision during rush hour peaks, between 7 and 8am and 3-6pm on his commute to and from work. Adam is often travelling straight ahead with a higher percentage of collisions from travelling straight ahead occurring as the speed limit of the road increases, so it could be that visibility at higher speed is an issue. He could perhaps be persuaded to improve how visible he is to other motorists (through clothing and high visibility additions to his motorbike). Adam is also involved in single vehicle collisions at a slightly higher rate than other 125cc motorists. There could be a skills deficit that might need to be addressed – Adam is often considered to have contributed to his collisions through observation errors (failed to look properly or failed to judge other's path or speed) and control errors (which include sudden braking, swerving and loss of control). These contributory factors suggest that some training could be beneficial. Adam neither has a positive or negative view of the police so other agencies might be more appropriate to use for message delivery. However, he does like using

new technology (he is a regular Facebook and Twitter user) so these could be used to deliver messages to him.

2 – 'Jonathan' – is in his early 50s and lives in a detached house with his wife, Clare, and their two teenage children. His community belongs to Mosaic Group D. The family has a high household income and Jonathan has good qualifications, a degree and works in a higher managerial position in Information and communication; financial and insurance; Professional scientific and technical; or Public administration and defence. Jonathan has a company car which he uses for work and he also has an over 125cc motorcycle which he uses for leisure riding. Jonathan is likely to be involved in a collision at the weekend between 10am and 5pm. Jonathan is often travelling straight ahead and is involved in single vehicle collisions at a higher rate than the norm. He could perhaps be persuaded to improve how visible he is to other motorists (through clothing and high visibility additions to his motorbike). There could also be a skills deficit that might need to be addressed – Jonathan is often considered to have contributed to his collisions through observation errors (failed to look properly or failed to judge other's path or speed) and control errors (which include sudden braking, swerving and loss of control). All of these contributory factors suggest that some training could be beneficial. Jonathan is generally confident in the police so they could be used for engagement with him. However, he is comfortable using new technology (he uses social media most days) so this could be used to deliver messages to him.

3 – 'Jordan' – is in his early 20s and lives in a post-war terraced house with his partner, Donna, and their two young children. His community belongs to Mosaic Group M. The family has a very low household income and he currently works in a routine occupation in transport and storage; administrative and support service; or water supply, sewerage and waste management. He is likely to have no qualifications or 1-4 GCSE passes. Jordan doesn't currently have a car and he and his family all walk, use public transport or he uses his motorcycle. Jordan rides a motorcycle with an engine up to 125cc and is likely to be involved in a collision during rush hour peaks, around 8am and 5pm. Jordan is most often travelling straight ahead at the time of his collision but at a lower proportion than the national rate. He could perhaps be persuaded to improve how visible he is to other motorists (through clothing and high visibility additions to his motorbike). There could also be a skills deficit that might need to be addressed – Jordan is often considered to have contributed to his collisions through observation errors (failed to look properly or failed to judge other's path or speed), control errors (which include sudden braking, swerving and loss of control) and nervous behaviour (including nervous, uncertain or panic, learner or inexperience and unfamiliar with vehicle). These contributory factors suggest that some training could be beneficial. Whilst not specifically revealed in the analysis, Jordan's low income might indicate that bike maintenance and the procurement of appropriate safety equipment is an issue. Jordan has a negative view of the police so other agencies might be more appropriate to use for message delivery. However, he does like using new technology (he is a Facebook and Twitter user) so these could be used to deliver messages to him.

4 – 'Shane' – is an 18-year-old student who lives with his parents in a rural semi-detached property in a large village. The family have a low to mid household income and his community belongs to Mosaic Group G. Shane uses his motorcycle as a means of getting to and from school during the week, and also to commute to his part time job and meet up with his friends. His is likely to be involved in collisions between 7-8am and between 5-8pm. Shane is most often travelling straight ahead, at a higher proportion than the national rate and is also most often involved in 2 vehicle collisions, again at higher proportion than the national rate. He could perhaps be persuaded to improve how visible he is to other motorists (through clothing and high visibility additions to his motorbike). There could also be a skills deficit that might need to be addressed **–** Shane is often considered to have contributed to his collisions through nervous behaviour (including nervous, uncertain or panic, learner or inexperience and unfamiliar with vehicle) and control errors (which include sudden braking, swerving and loss of control). These

contributory factors suggest that some training could be beneficial. Shane has a negative view of the police so other agencies might be more appropriate to use for message delivery. However, he does like using new technology (he is a Facebook and Twitter user) so these could be used to deliver messages to him.

5 – 'Ryan' – is in his early 20's and live with his partner Katie in a two bed terraced house in the suburbs. They have a low to mid household income and his community belongs to Mosaic Group H. Ryan studied A-levels and has a mid-level position within Electricity, Gas, steam and air conditioning; Manufacturing; or Public administration and defence. Ryan uses an up to 125cc motorcycle for commuting and he is likely to be involved in collisions between 7-8am and 4-7pm. Ryan is most often travelling straight ahead, but at a lower proportion than the national rate. He could perhaps be persuaded to improve how visible he is to other motorists (through clothing and high visibility additions to his motorbike). There could also be a skills deficit that might need to be addressed **–** Ryan is often considered to have contributed to his collisions through nervous behaviour (including nervous, uncertain or panic, learner or inexperience and unfamiliar with vehicle), observation errors (failed to look properly or failed to judge other's path or speed) and control errors (which include sudden braking, swerving and loss of control). These contributory factors suggest that some training could be beneficial. Ryan has neither a positive or negative view of the police so they could be used for engagement with him along with other agencies. However, he does like using new technology (he is a Facebook and Twitter user) so these could be used to deliver messages to him.

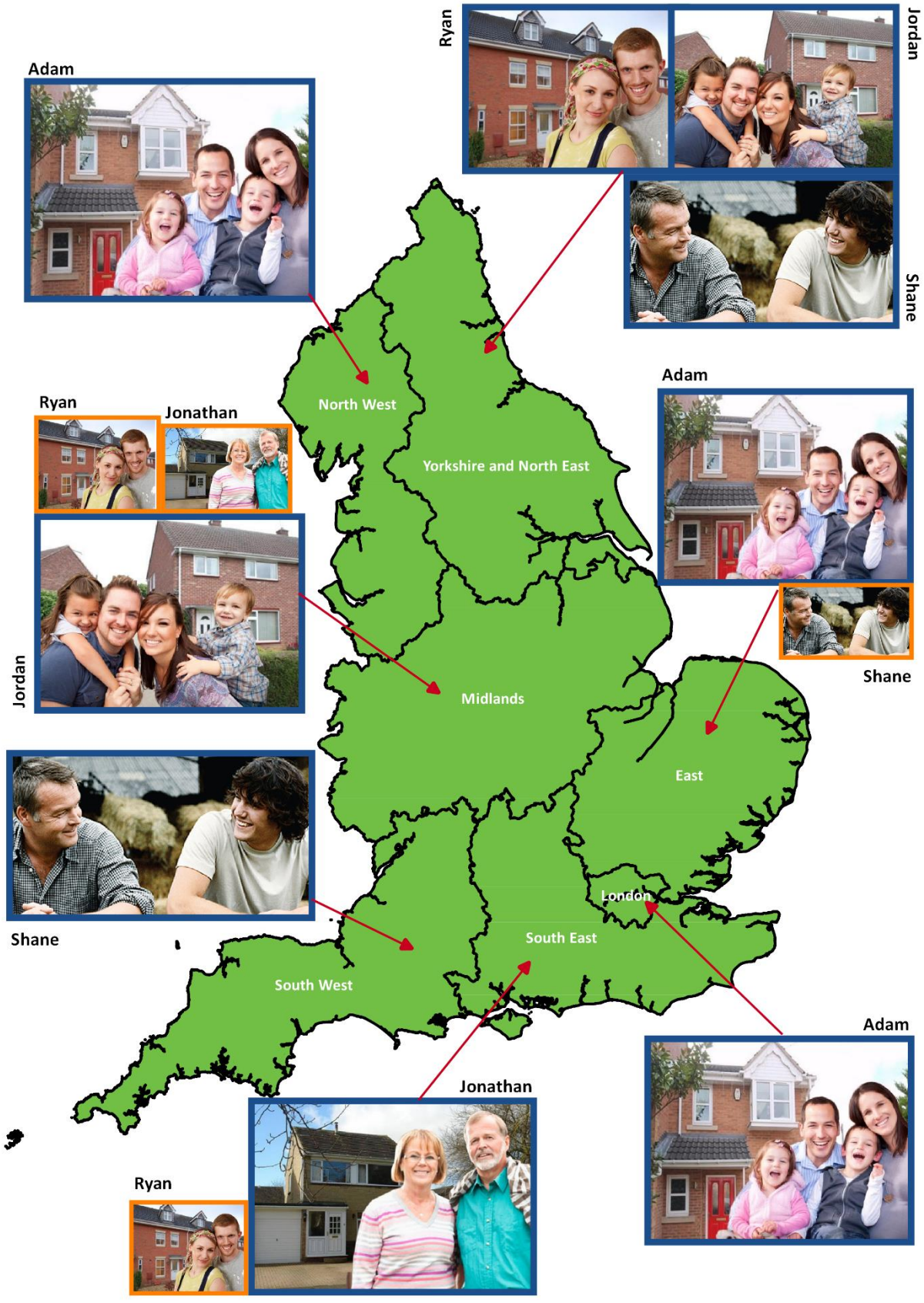
Personas By Region

After the analysis of the socio-demographic data and collision to provide the basis for the motorcyclist personas highlighted above, these were then assigned to the regions in England in which they are generally more likely to be residents.

Figure 39 below shows this information with the 'main' personas for each region (shown in the blue boxes) and in some cases a secondary persona for types who are also represented in that region but not as prominent (in the orange boxes).

For over 125cc motorcyclists, Adam is most likely to be a resident in the East of England, London and the North West. Whilst Jonathon is most likely to be a resident of the South East and is also represented in the Midlands. For up to 125cc motorcyclists, Jordan is most likely to be a resident of the Midlands and Yorkshire and the North East. Ryan is most likely to be a resident of Yorkshire and the North East, Midlands and is also represented in the South East. Shane is most likely to be a resident of South West, Yorkshire and the North East and is also represented in the East.

Figure 39 – Personas by region



Appendix A – Mosaic Group Composition

Group	Name	Description
A	Country Living	Well-off owners in rural locations enjoying the benefits of country life
B	Prestige Positions	Established families in large detached homes living upmarket lifestyles
C	City Prosperity	High status city dwellers living in central locations and pursuing careers with high rewards
D	Domestic Success	Thriving families who are busy bringing up children and following careers
E	Suburban Stability	Mature suburban owners living settled lives in mid-range housing
F	Senior Security	Elderly people with assets who are enjoying a comfortable retirement
G	Rural Reality	Householders living in inexpensive homes in village communities
H	Aspiring Homemakers	Younger households settling down in housing priced within their means
I	Urban Cohesion	Residents of settled urban communities with a strong sense of identity
J	Rental Hubs	Educated young people privately renting in urban neighbourhoods
K	Modest Traditions	Mature homeowners of value homes enjoying stable lifestyles
L	Transient Renters	Single people privately renting low cost homes for the short term
M	Family Basics	Families with limited resources who have to budget to make ends meet
N	Vintage Value	Elderly people reliant on support to meet financial or practical needs
O	Municipal Challenge	Urban renters of social housing facing an array of challenges

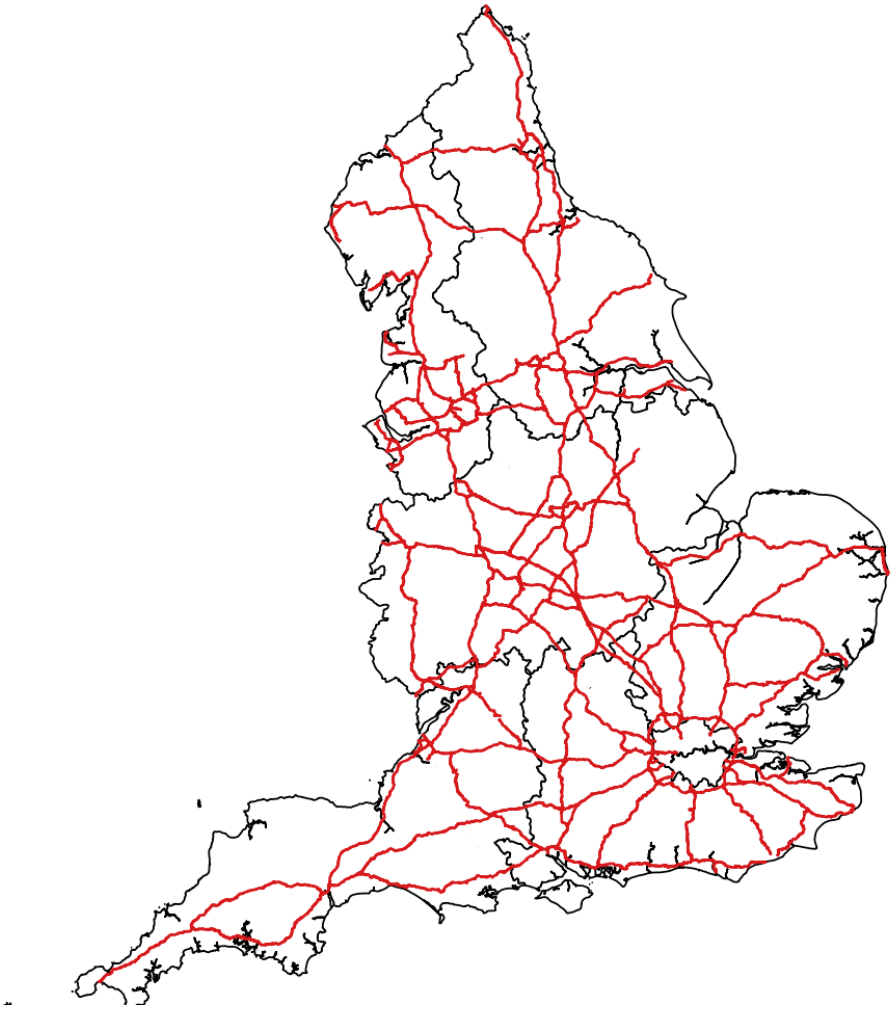
Appendix B – Contributory Factor Groupings

In order to facilitate analysis and identify broad similarities in road user behaviour, this report groups contributory factors assigned by police officers who attend collisions into the following taxonomy. For clarity, which individual contributory factors which have been included in each grouping is shown below.

Injudicious Action	Driver Errors or Reactions	Driver Impairment or Distraction	Behaviour or Inexperience	Other
Traffic Contraventions	**Manoeuvre Errors**	**Substance Impairments**	**Nervous Behaviour**	**Vehicle Defects**
Disobeyed automatic traffic signal	*Poor turn or manoeuvre*	*Impaired by alcohol*	*Nervous, uncertain or panic*	*Tyres illegal, defective or under-inflated*
Disobeyed double white lines	*Failed to signal or misleading signal*	*Impaired by drugs (illicit or medicinal)*	*Learner or inexperienced driver/rider*	*Defective lights or indicators*
Disobeyed 'Give way' or 'Stop' signs or markings	*Passing too close to cyclist, horse rider or pedestrian*		*Inexperience of driving on the left*	*Defective brakes*
Disobeyed pedestrian crossing facility			*Unfamiliar with model of vehicle*	*Defective steering or suspension*
Illegal turn or direction of travel				*Defective or missing mirrors*
				Overloaded or poorly loaded vehicle or trailer
Speed Choices	**Control Errors**	**Distraction**	**Unsafe Behaviour**	**Road Surface**
Exceeding speed limit	*Sudden braking*	*Driver using mobile phone*	*Aggressive driving*	*Poor or defective road surface*
Travelling too fast for conditions	*Swerved*	*Distraction in vehicle*	*Careless, reckless or in a hurry*	*Deposit on road (e.g. oil, mud, chippings)*
	Loss of control	*Distraction outside vehicle*		*Slippery road (due to weather)*
Close Following	**Observation Error**	**Health Impairments**	**Pedal Cycle Behaviour**	**Affected Vision**
Following too close	*Failed to look properly*	*Uncorrected, defective eyesight*	*Vehicle travelling along pavement*	*Stationary or parked vehicle(s)*
	Failed to judge other person's path or speed	*Illness or disability, mental or physical*	*Cyclist entering road from pavement*	*Vegetation*
			Not displaying lights at night or in poor visibility	*Road layout (e.g. bend, winding road, hill crest)*
			Cyclist wearing dark clothing at night	*Buildings, road signs, street furniture*
	Junction Errors	**Fatigue Impairment**	**Pedestrian Behaviour**	*Dazzling headlights*
	Junction overshoot	*Fatigue*	*Crossing road masked by stationary or parked vehicle*	*Dazzling sun*
	Junction restart (moving off at junction)		*Failed to look properly*	*Rain, sleet, snow or fog*
			Failed to judge vehicle's path or speed	*Spray from other vehicles*
			Wrong use of pedestrian crossing facility	*Visor or windscreen dirty or scratched*
			Dangerous action in carriageway (e.g. playing)	*Vehicle blind spot*
			Careless, reckless or in a hurry	
			Impaired by alcohol	
			Impaired by drugs (illicit or medicinal)	
			Pedestrian wearing dark clothing at night	
			Disability or illness, mental or physical	

Appendix C – Maps

Figure 40 – Map of the roads on the strategic road network



In order to analyse where motorcycle riders involved in collisions on the strategic road network are from, a rate of riders per year per 100,000 adult population has been calculated for each local authority district. The following maps (Figures 40-47) show the percentage difference to the national rate for each local authority district in England, by region. For example, the rate for South Norfolk of 3.1 riders per 100,000 adult population is 72% higher than the national rate of 1.8.

Figure 41 –Percentage difference to national rate by local authority district – East of England

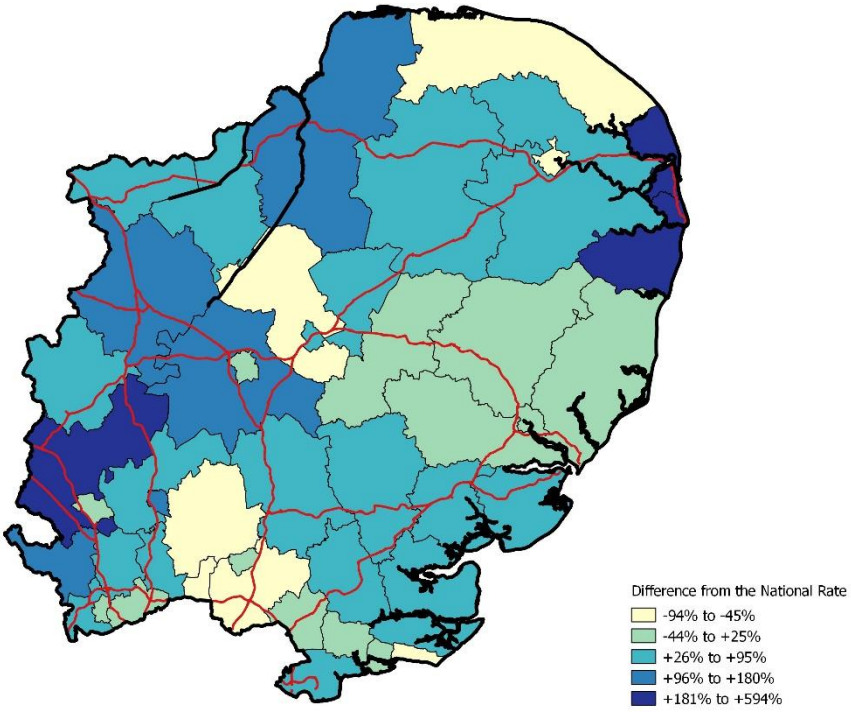


Figure 42 - Percentage difference to national rate by local authority district – London

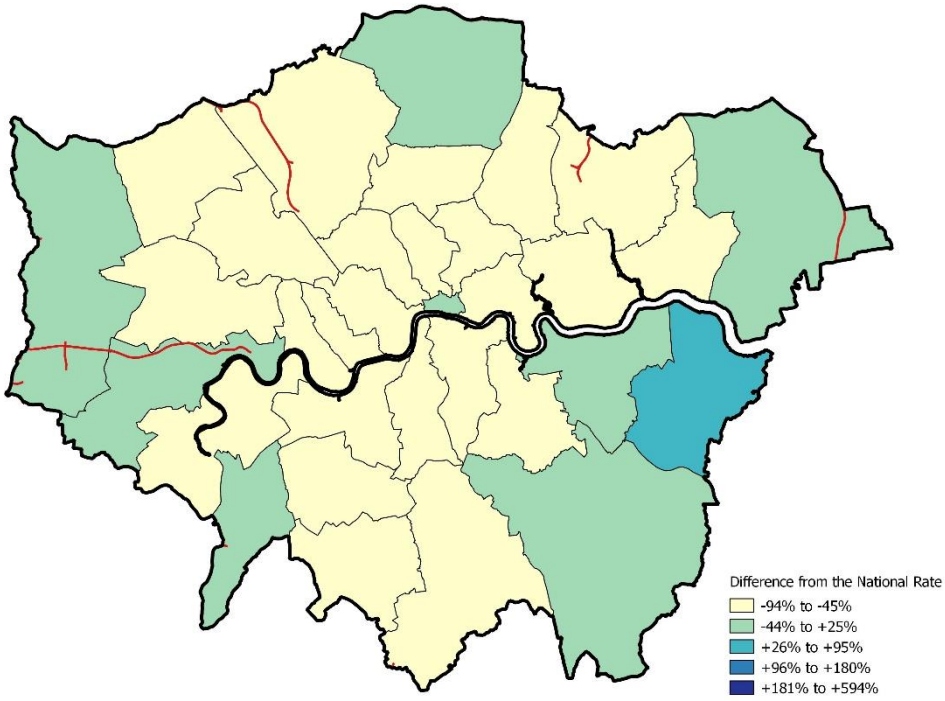


Figure 43 – Percentage difference to national rate by local authority district – Midlands

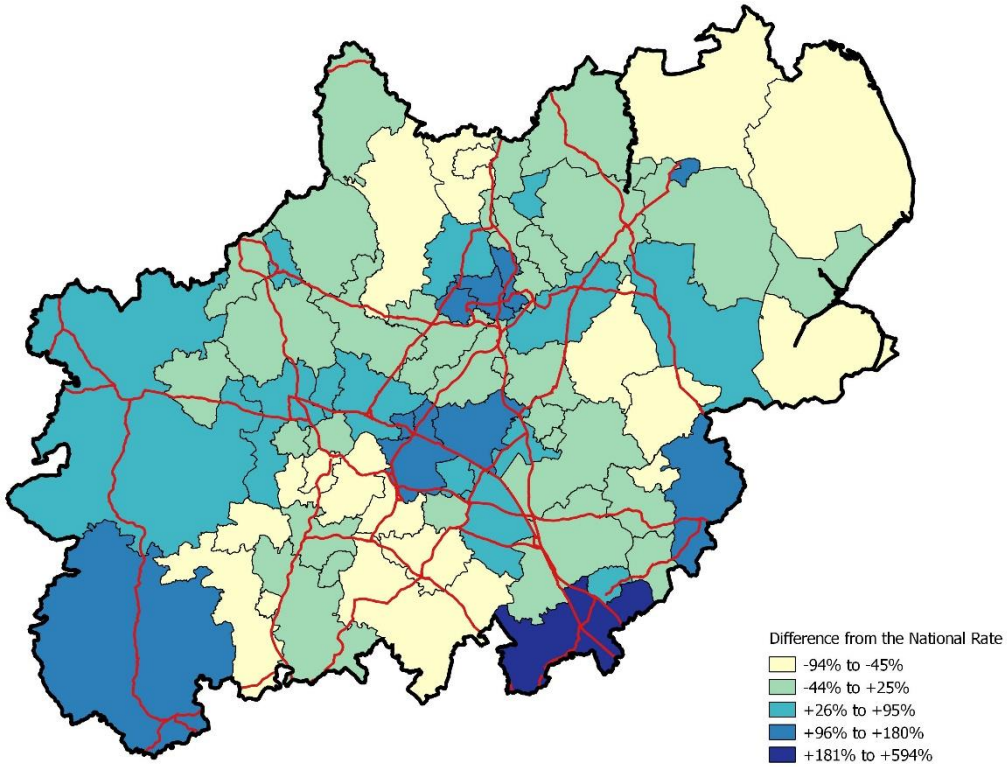


Figure 44 - Percentage difference to national rate by local authority district – North West

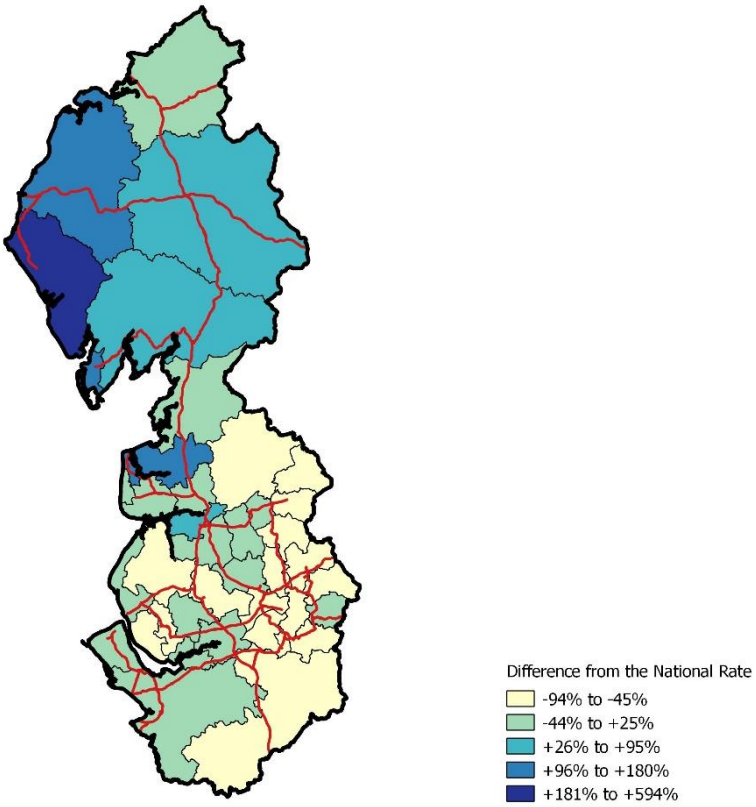


Figure 45 – Percentage difference to national rate by local authority district – South East

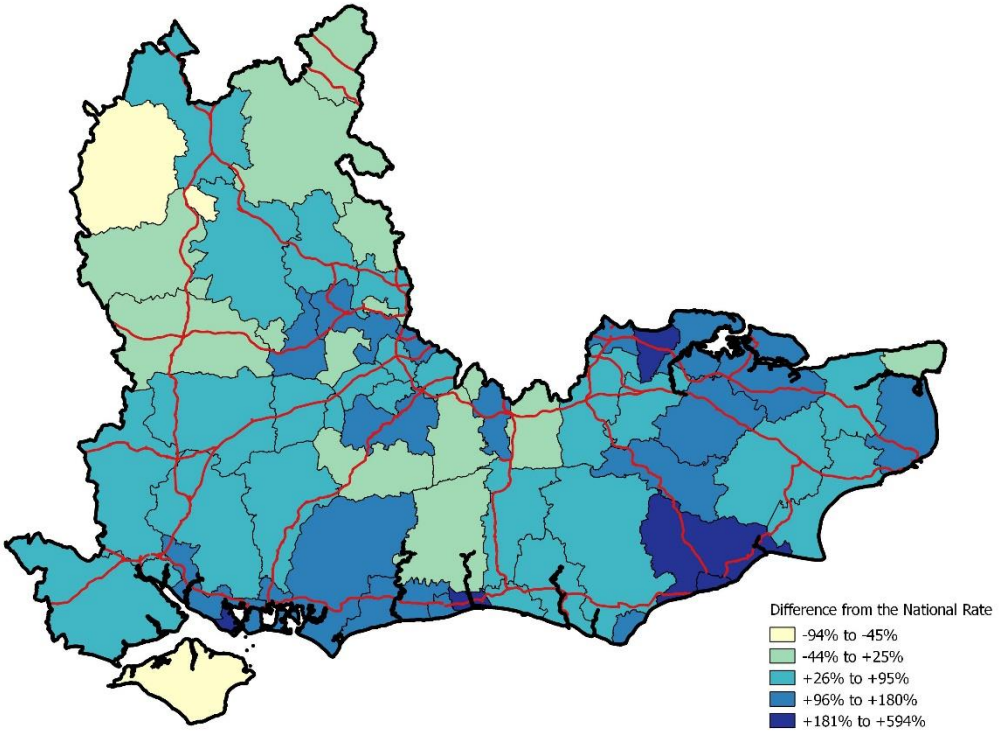


Figure 46 - Percentage difference to national rate by local authority district – South West

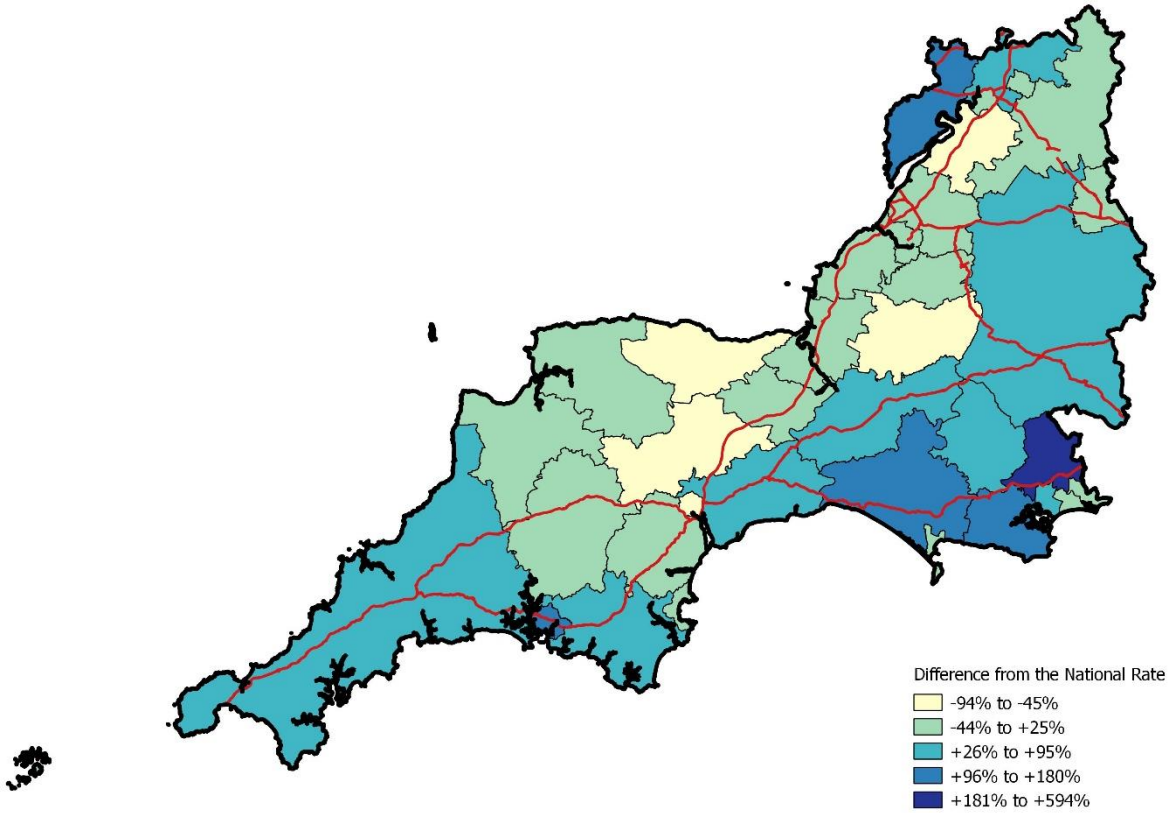
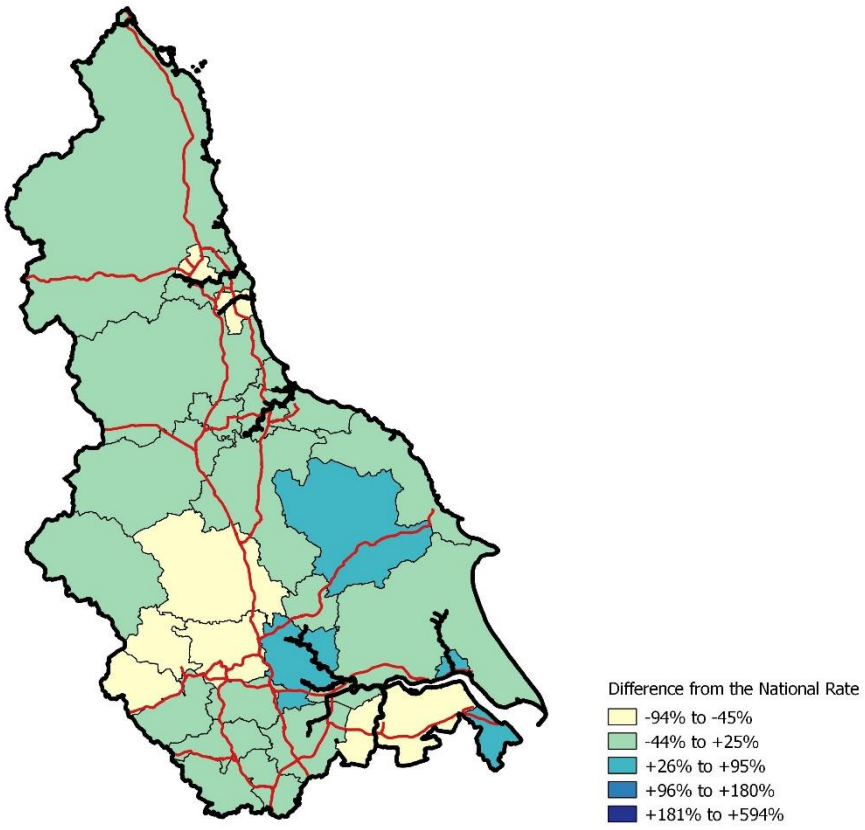


Figure 47 – Percentage difference to national rate by local authority district – Yorkshire and North East



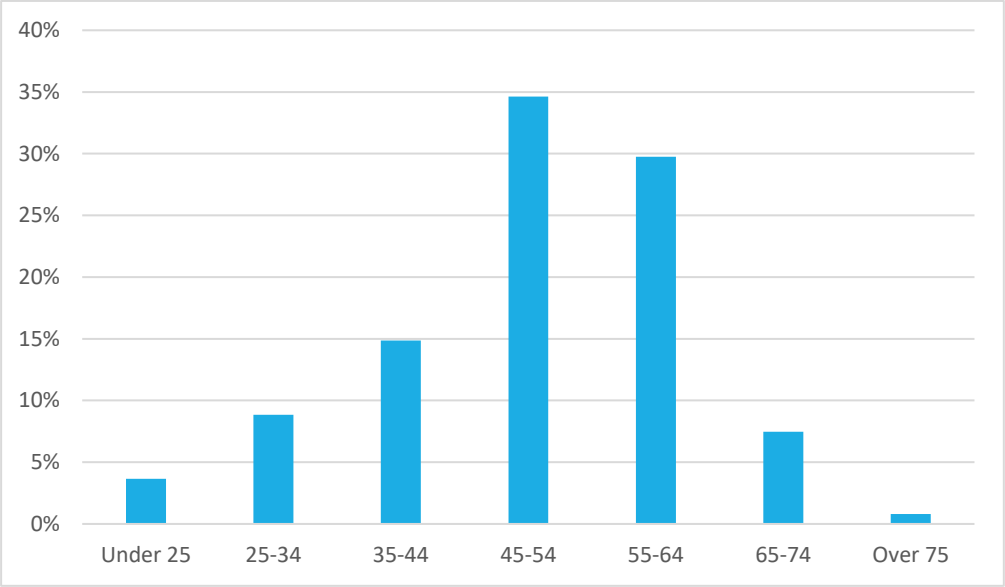
Appendix 4: Motorcycle Survey

A survey was conducted on behalf of Highways England from 11th August to 13th September 2016. The survey was disseminated via various road safety organisations and motorcycle representation groups. Many of the questions were not compulsory so there were different levels of responses to each question. Overall, approximately 3,000 motorcyclists participated in the survey.

Main Results

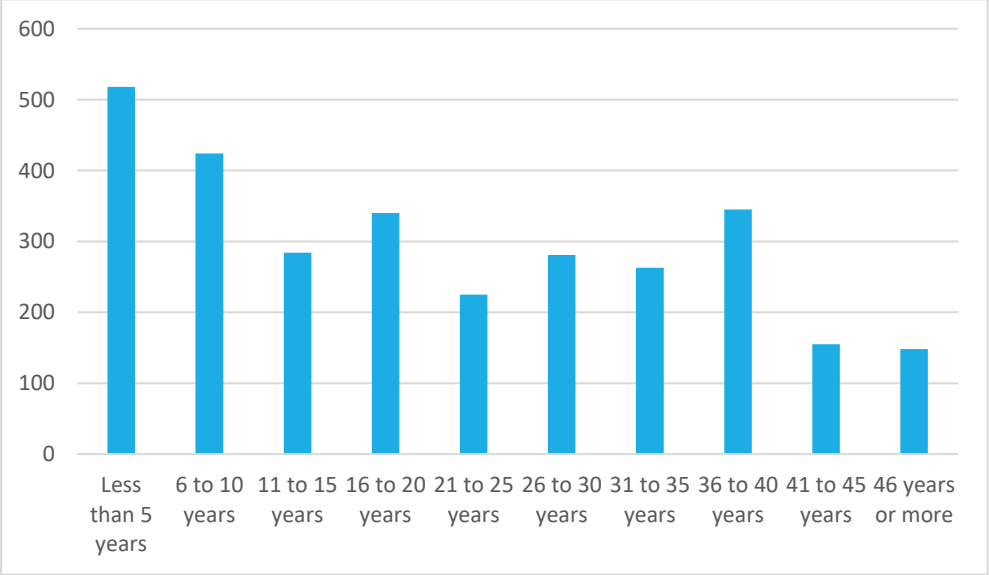
- 91% of the respondents were male
- There were a range of ages represented, with a peak in 45 to 54 year olds

Figure 48 - Age of survey respondents



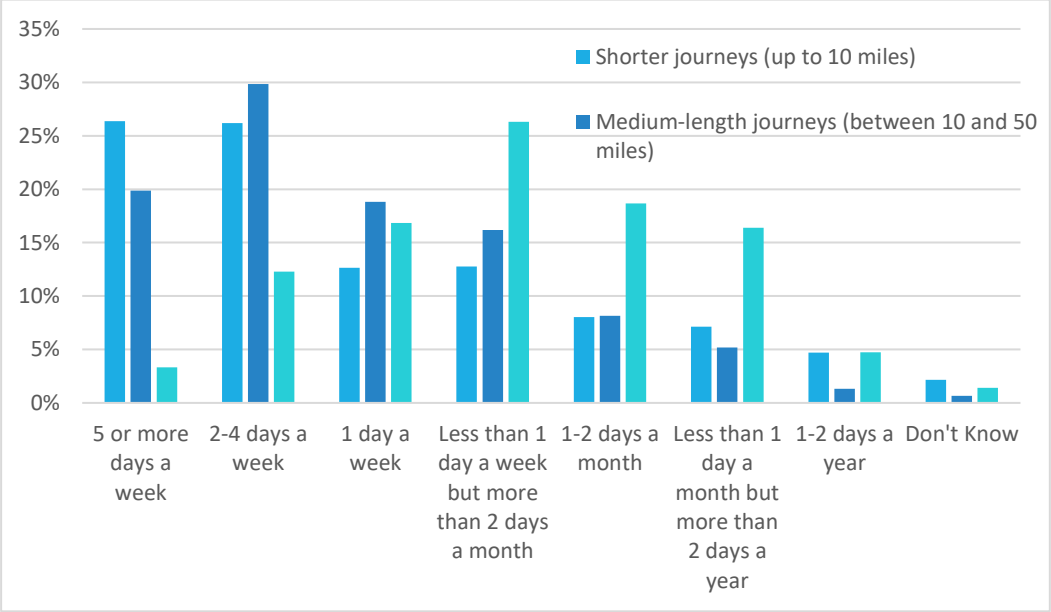
- The number of years of riding experience varied.

Figure 49 – Riding experience of survey respondents



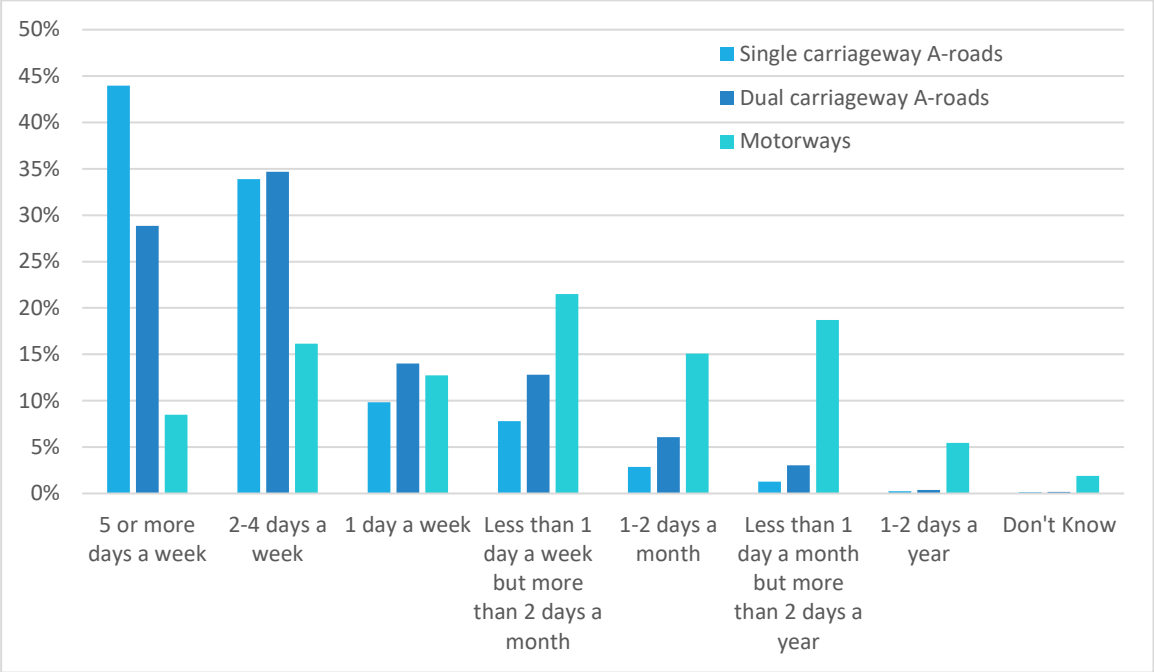
- Respondents were split between those who had undertaken post-test training and those who hadn't: 52% said they had not; 47% reported that they had; and 1% did not know.
- Respondents were asked how frequently they undertake different types of journey on the Strategic Road Network (SRN) on their motorcycle.
- It shows that 50% of the respondents undertook short and medium length journeys every day or several days a week whilst longer journeys were more infrequent at 2 to 3 times a month.

Figure 50 – Types of motorcycle journey on the SRN



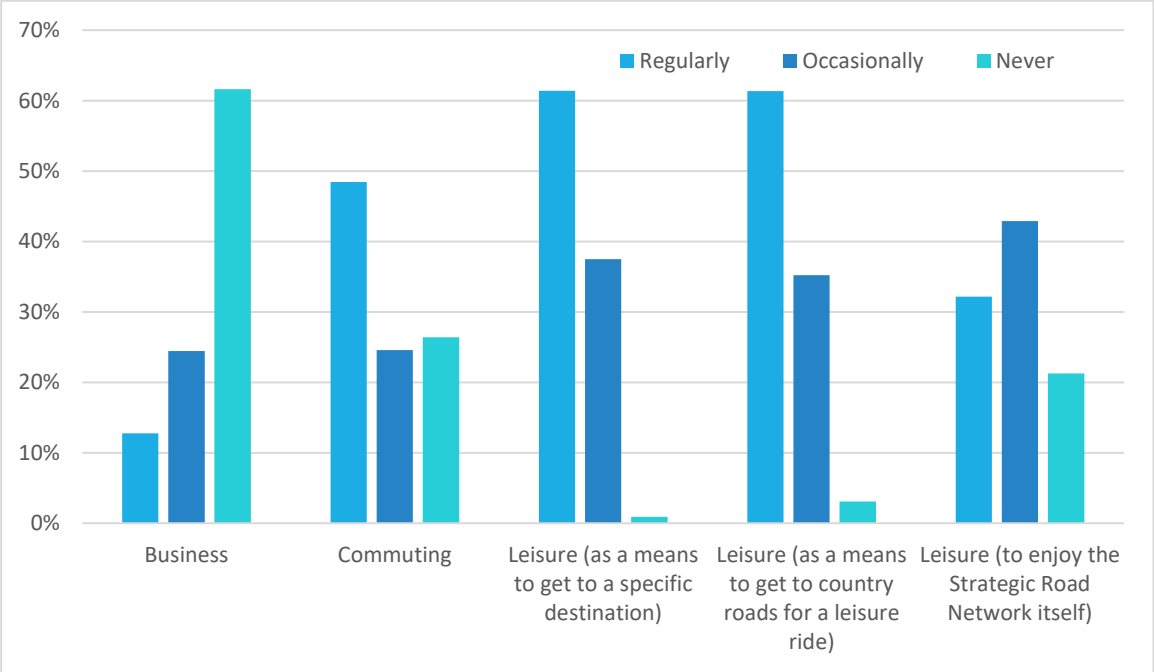
- Respondents were also asked how frequently they used the different types of SRN on their motorcycle.
- Single carriageway A-roads were more frequently ridden on their motorcycle (on multiple days each week). A slightly smaller percentage of riders also used dual carriageway A-roads at the same frequency. Motorways tended to be used less frequently.

Figure 51 – Frequency of motorcycle journeys on the different SRN roads



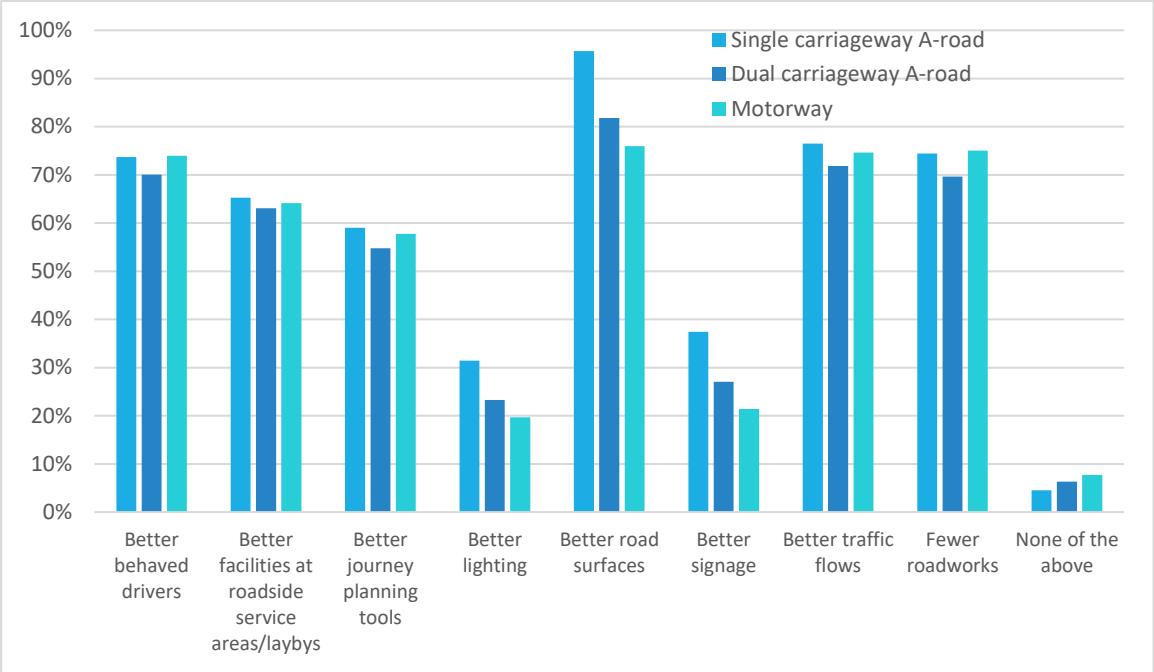
- Respondents were asked why they rode their motorcycle on the SRN.
- Motorcyclists tend not to use the SRN for business purposes (62% stated 'never') whereas 61% stated that they use the SRN for leisure purposes to get to a specific destination or to get to country roads. Forty-three percent indicated that they used the SRN occasionally for leisure to enjoy the SRN itself and 48% regularly use the SRN for commuting.

Figure 52 – Frequency of motorcycle journey purposes on SRN



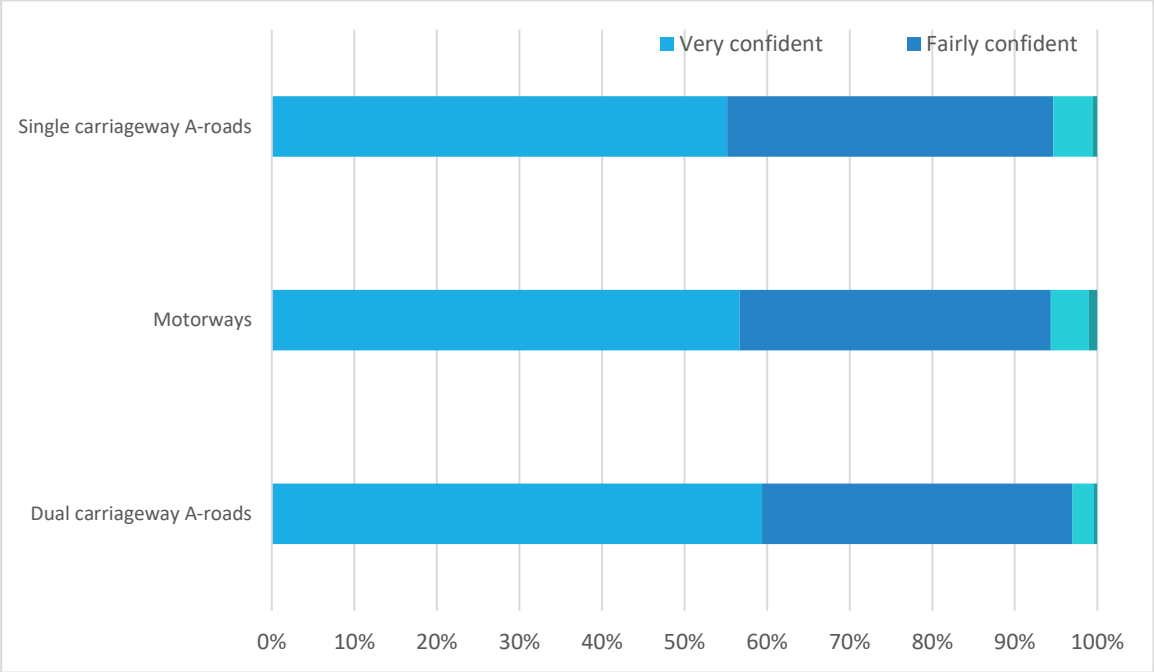
- Respondents were asked what would make them use the different types of SRN more often as a motorcyclist. The respondents were able to select as many or as few of the options as they liked.
- The highest percentage of respondents (for all SRN road types) felt that better road surfaces would make them use the SRN more. Over 70% of the motorcyclists felt that 'better behaved drivers', 'better traffic flows' and 'fewer roadworks' would all make them use the SRN more often.

Figure 53 – What would make riders use the SRN more?



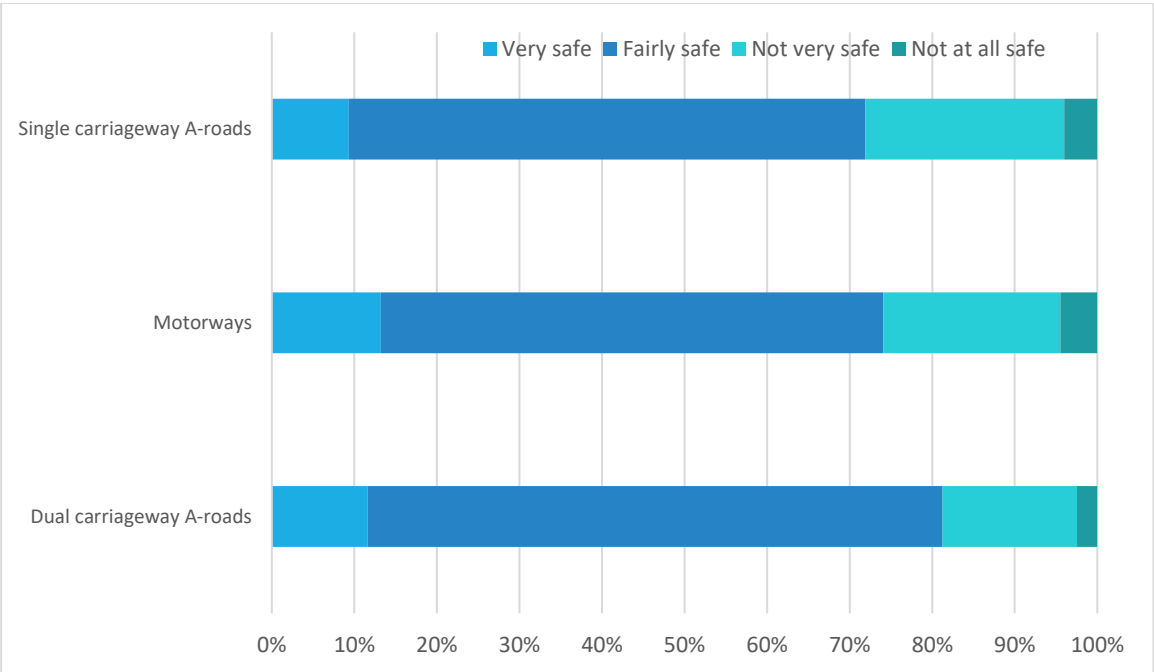
- The respondents were asked how confident they felt on their motorcycle on the SRN roads.

Figure 54 – Confidence level of different SRN roads



- Confidence levels are high on all three different types of SRN road, ranging from 93% fairly or very confident on motorways to 97% on dual carriageway A-roads.
- Respondents were also asked how safe they felt on the different types of SRN road.
- The respondents were asked how confident they felt on their motorcycle on the SRN roads.
- A majority of respondents still felt 'very safe' or 'fairly safe' on the different types of SRN road (although 'fairly safe' accounted for the majority). However, 19% did not feel safe on dual carriageway A-roads and this was also the case for 26% of respondents for motorways and 28% for single carriageway A-roads.

Figure 55 – Feelings of safety on different SRN roads



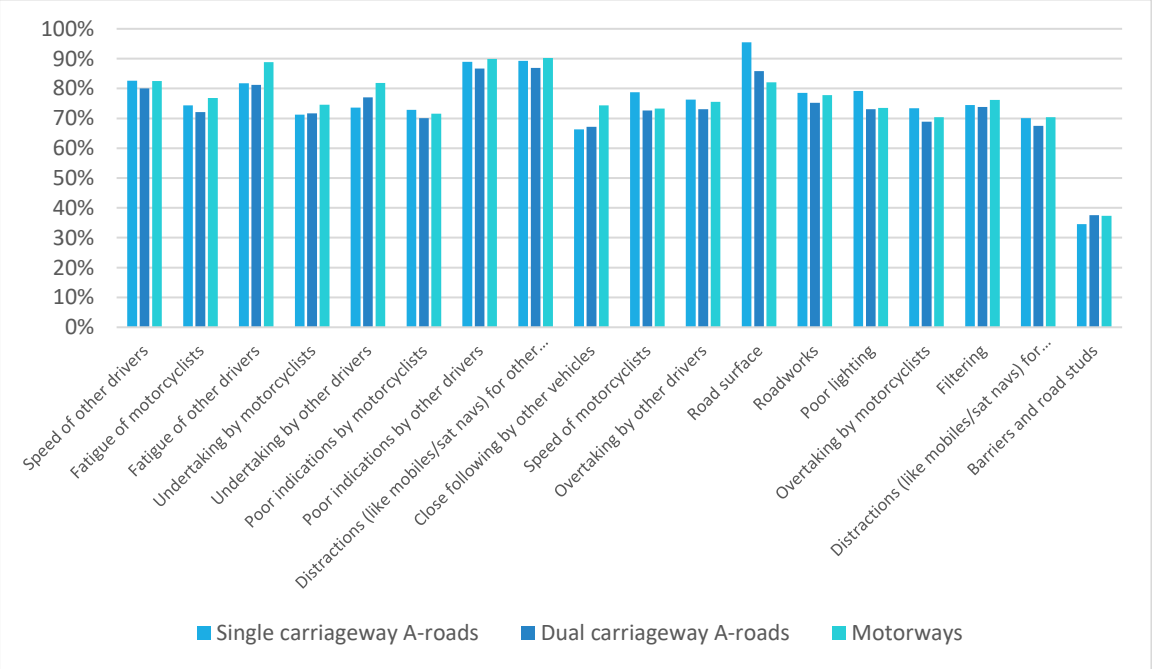
- Respondents were asked how long they travelled on the various types of SRN road before they had a break from riding. Over 80% stopped in the first two hours of a journey. This is linked to re-fuelling requirements and comfort.

Table 11 - How long before taking a break

Hours	Single carriageways	Dual carriageways	Motorways
One hour	28%	26%	23%
Two hours	56%	60%	61%
Other	16%	14%	16%

- Respondents were asked what they think are the most important safety issues facing motorcyclists on the different types of SRN road. They could select as many as they liked.
- Road surface was the top safety issue for them on single carriageway A-roads and this was also in the top 3 for dual carriageway A-roads. For all road types, 'poor indications by other drivers' and 'distractions (like mobiles/sat navs) for other drivers' were in the top 3. 'Fatigue for other drivers' was 3rd most important safety issue for motorcyclists on motorways.
- Most of the safety issues were considered important by the respondents, apart from 'barriers and road studs'.

Figure 56 – Most important safety issues on SRN



- A free text question was asked: “What would you say are the main safety issues facing motorcyclists on the Strategic Road Network?” Some respondents provided more than one safety issue that concerned them, resulting in 3,340 individual comments.
- 62% of the comments related to the actions of ‘Other Drivers’; 32% related to the ‘Road Environment’; 5% related to the actions of ‘Motorcyclists’ and 1% were ‘Other’ comments.

Table 12 – Main safety issues on the SRN		
Safety Issue	Category	Percentage of all comments
Potholes	Road Environment	17.1%
Observation/Awareness	Other Drivers	15.5%
Bad Driving	Other Drivers	13.6%
Concentration/Distraction	Other Drivers	10.9%
Mobile phone use	Other Drivers	8.7%
Lane Discipline/Indications	Other Drivers	4.1%
Chippings/Road Surface	Road Environment	3.2%
Spillages/Debris	Road Environment	2.1%
Close Following	Other Drivers	2.0%
Lane Separation Furniture/Crash Barriers	Road Environment	2.0%
Training/Inexperience	Other Drivers	1.7%
Manhole Covers	Road Environment	1.6%
Being Seen	Motorcyclists	1.5%
Congestion	Road Environment	1.4%
Overconfidence/Riding Ability	Motorcyclists	1.3%
Exiting/Entering Junctions	Other Drivers	1.1%
Aggression	Other Drivers	1.0%
Lining/Road Markings	Road Environment	0.9%
Not Understanding Filtering	Other Drivers	0.9%
Junction Visibility/Junction Design	Road Environment	0.9%
Speeding	Motorcyclists	0.9%
Behaviour	Motorcyclists	0.7%
Speeding	Other Drivers	0.7%

Signage Issues	Road Environment	0.7%
HGV Behaviour	Other Drivers	0.7%
Lighting	Road Environment	0.6%
No Enforcement	Other	0.5%
Overbanding	Road Environment	0.4%

The following are sample comments from the top 10 issues:

Potholes	"Condition of roads – potholes everywhere, decaying road surfaces, gravel in the middle of the roads due to not being swept."
Observation/Awareness	"An appreciation that we exist!" "Drivers/riders not using their eyes. It's all about observation, nothing else."
Bad Driving	"Everyone is in a hurry - nobody takes 'time' to look properly, indicate their intentions and respect others on the road. I am constantly 'bullied' by car drivers behind me to go faster than the speed limit. Car drivers seems to expect motorcyclists to go fast and overtake them ...they move to the left at stupid places and could incite a motorcyclist to pass at a bad time. But they don't move aside when a motorcyclist filters !!"
Concentration/Distraction	"Bored, complacent poorly trained motorists unaware of what's around them."
Mobile phone use	"Blatant use of mobiles on ALL roads" "Driver distractions, texting, playing with SatNav, tweeting etc."
Lane Discipline/Indications	"Deviations without signals of intent are at best discourteous and at worst very dangerous."
Chippings/Road Surface	"Road surface is critical, polished drain covers and spray patching is dangerous to motorcyclists." "Poor road quality on many A roads especially the use of stone chip on road surfaces. This often breaks up causing a hazard for motorcyclists."
Spillages/Debris	"Diesel/fuel spillage/ debris on road"
Close Following	"Aggressive speeding tailgating drivers!" "Cars getting too close to the rear of a motorbike"
Lane Separation Furniture/Crash Barriers	"Any crash barrier systems are designed for cars etc and not a bike rider" "Barrier supports gap too big, if a rider comes off they can get killed by the support" "Hazardous road furniture ie..... armadillos, orcas etc .....and road narrowing schemes that reduce the amount of space"

- Respondents were also asked what they would like the SRN to be for them. The following are a selection:
- “Worry free safe riding”
- “1st world roads not 3rd world”
- “A governing body for ALL road networks, to provide guidelines for local authorities”
- “A more courteous place”
- “A pleasure to use.... a shame it's a nightmare.”
- “Better bike parking signage at service stations to save having to use car bays unnecessarily; I'd really like to see matrix signs used to warn of bikes in heavy traffic”
- “Better repaired roads, laws concerning 'middle lane hogs' enforced, undergrowth cleared so signposts (and speed limit signs!) could be seen.”
- “Calmer, not slower, but a more relaxed approach rather than constantly avoiding others who are always rushing around”
- “Clean smooth well maintained roads, with compulsory education for car drivers on looking for, and understanding the actions of motorcycles”
- “Clear signage that states filtering is legal. In traffic jams drivers to move to extreme right to allow safe filtering on motorways. No drain covers on corners”
- “Dedicated motorbike lane next to central reservation on motorways for filtering would help safety. Encourage more bike riders.”
- “Empty! ;-)”
- “Everyone following the rules of the road, e.g. using lanes 2&3 for overtaking only.”
- “Get me there safely which means a serviceable network not what seems to be the current plan of a managed deterioration ....and information about issues so alternatives can be planned”
- “Good surfaces, manhole covers in sensible (off the line) places, removal of stupid and unnecessarily extended speed restrictions, changing of countdown to speed limits (300m, 200m, etc) so that the red edge is black until actual speed limit starts”
- “Heavier penalties for SMIDSY offenders. Improve A road surfaces. Slow idiots who do crazy speeds on motorways, prohibit trucks from side by side overtaking.”
- “I would like a well maintained road surface with adequate lighting, with safe barriers and wide enough lanes to safely filter in slow traffic to reduce congestion and avoid inhalation of fumes and the risks of being rear ended (30% higher if filtering prevented). I would also like a dedicated area for motorcycle parking at services to prevent cars driving into my bike when they think it's an empty space. These areas should have apparatus to lock the bike to (ground anchors or metal loops) for security”
- “I would like to know the road surface is safe to ride on and other motorists are not able to use mobile phones while driving.”
- “If all road surfaces were applied with motorcyclists in mind the roads would be far safer the only remaining threat would be ignorant drivers.”
- “Joined up planning, eg linked traffic lights, filter lanes at junctions, peak period traffic lights, speed limits set where they apply and not to allow for slowing or accelerating beyond/before the limit. Motorway warning gantries with relevant information, not left on when not applicable, etc.”
- “Less paint. There is a temptation to use more paint on dangerous parts of the road so there are more road markings etc. to warn motorists. The effect this has on motorcyclists is to

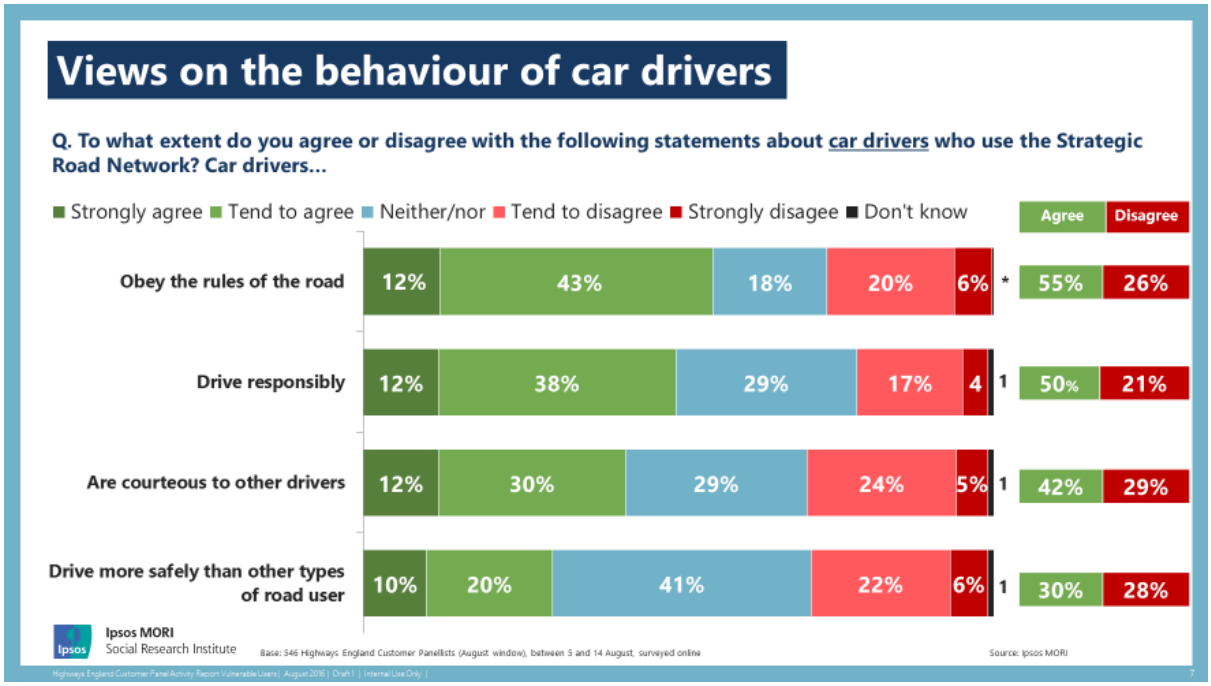
remove all grip on the parts of the road network where you most need it. Paint, drain covers and potholes are a motorcyclist's worst enemy.”

Appendix 5: Panel Survey

The Highways England Customer Panel website hosted a range of activities between 5th and 14th August 2016, including a survey about attitudes towards vulnerable road users. There were 552 responses to the survey, where panellists were asked about their views of driver behaviour and about safety for motorcyclists, with the aim of understanding and addressing issues related to motorcyclists (who are known to be the main casualty group on the SRN).

Main Results

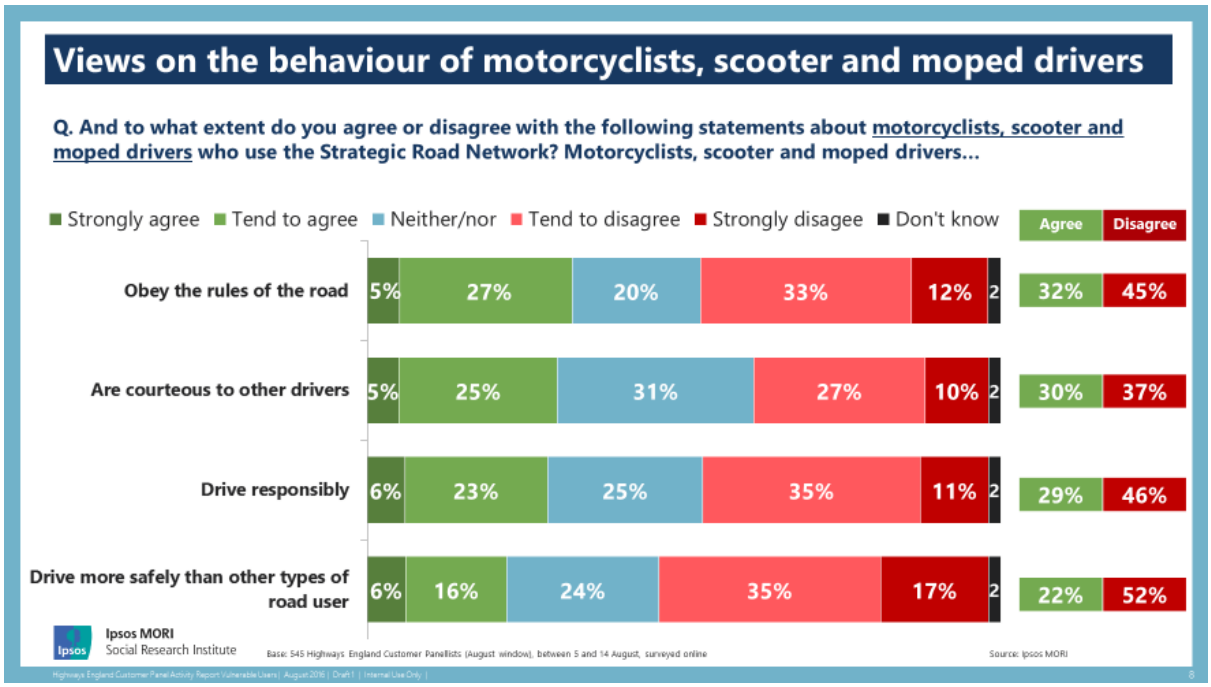
- Of the Panellists who took part in this survey (who we note drive a range of vehicle types, though most – 88% - say their main vehicle is a car), over half (55%) feel that car drivers **obey the rules of the road**, half (50%) say that car drivers **drive responsibly** and 42% feel that car drivers are **courteous to other drivers.**

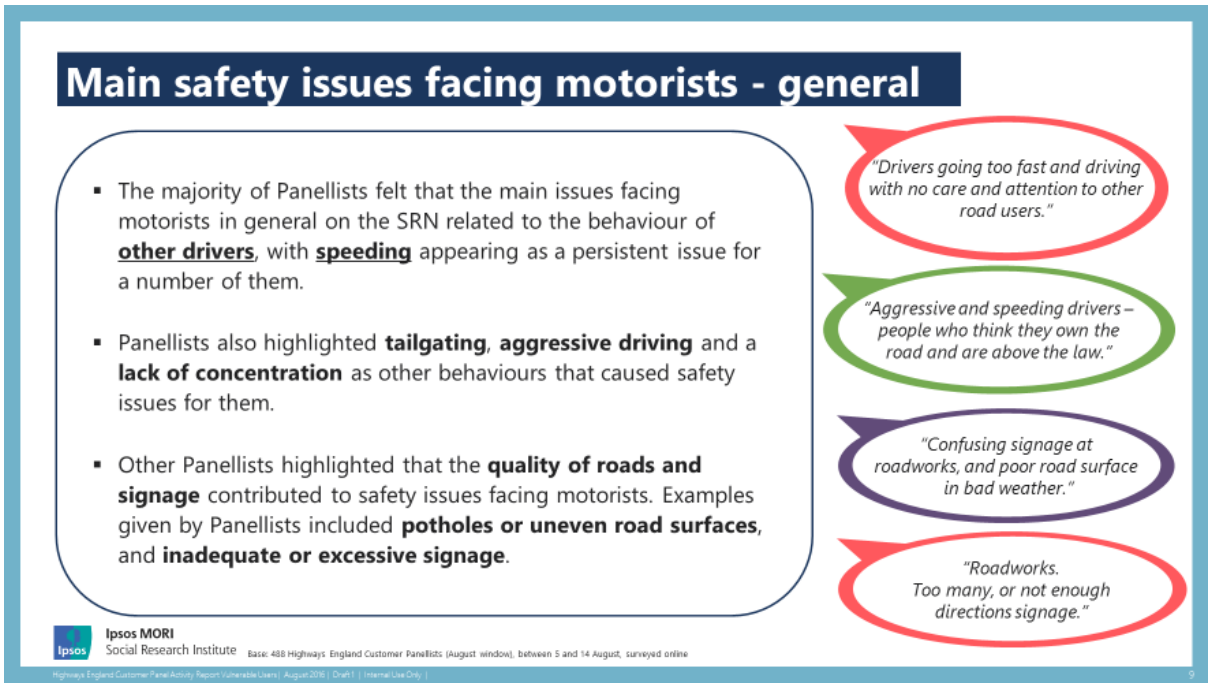


- This compares to around a third of Panellists who say that motorcyclists, scooter and moped drivers **obey the rules of the road** (32%), are **courteous to other drivers** (30%) and feel they **drive responsibly** (29%).

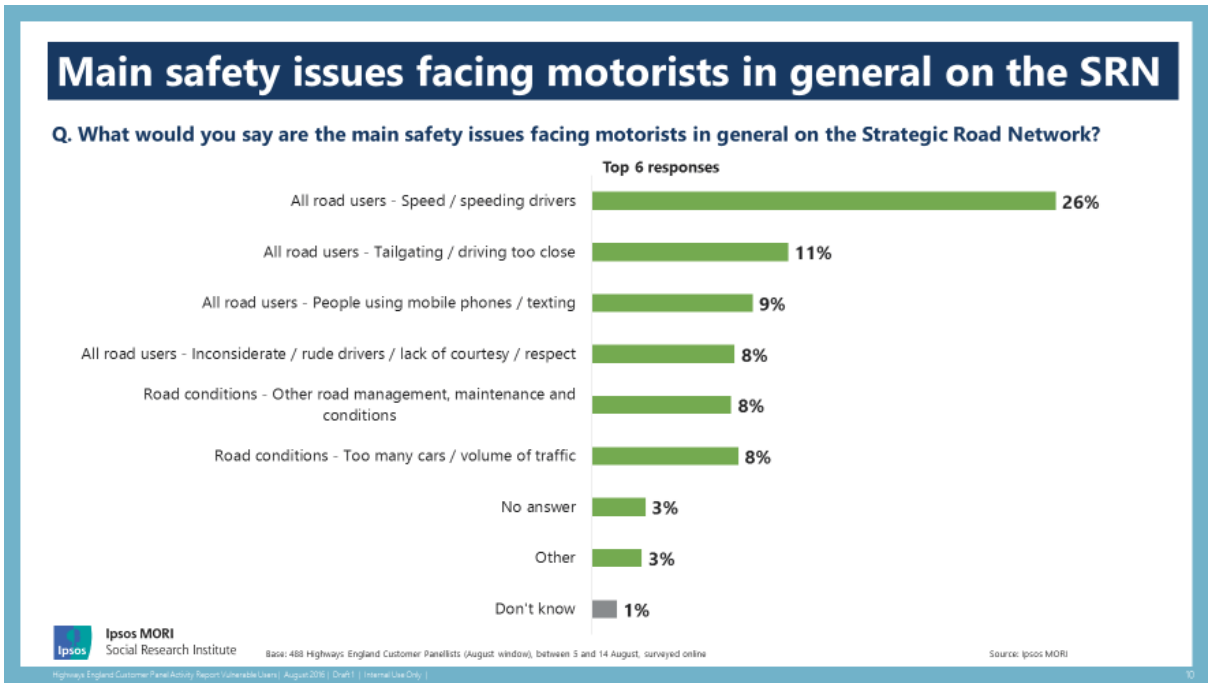
- Panellists are also more likely to *disagree* than agree that motorcyclists, scooter and moped drivers **drive more safely than other drivers** (52% vs. 22% who agree this is the case). Agreement is also low for car drivers, but the contrast is less significant (28% disagree this is the case compared to 30% who agree).

- This demonstrates the **different perceptions among Panellists about driving behaviour**, and more specifically *others'* driving behaviour (noting most of the respondents to this survey are car drivers). This is something that has been found from previous research by Transport Focus[1], which found that 'other drivers' tend to be seen as responsible for bad behaviour on the roads.

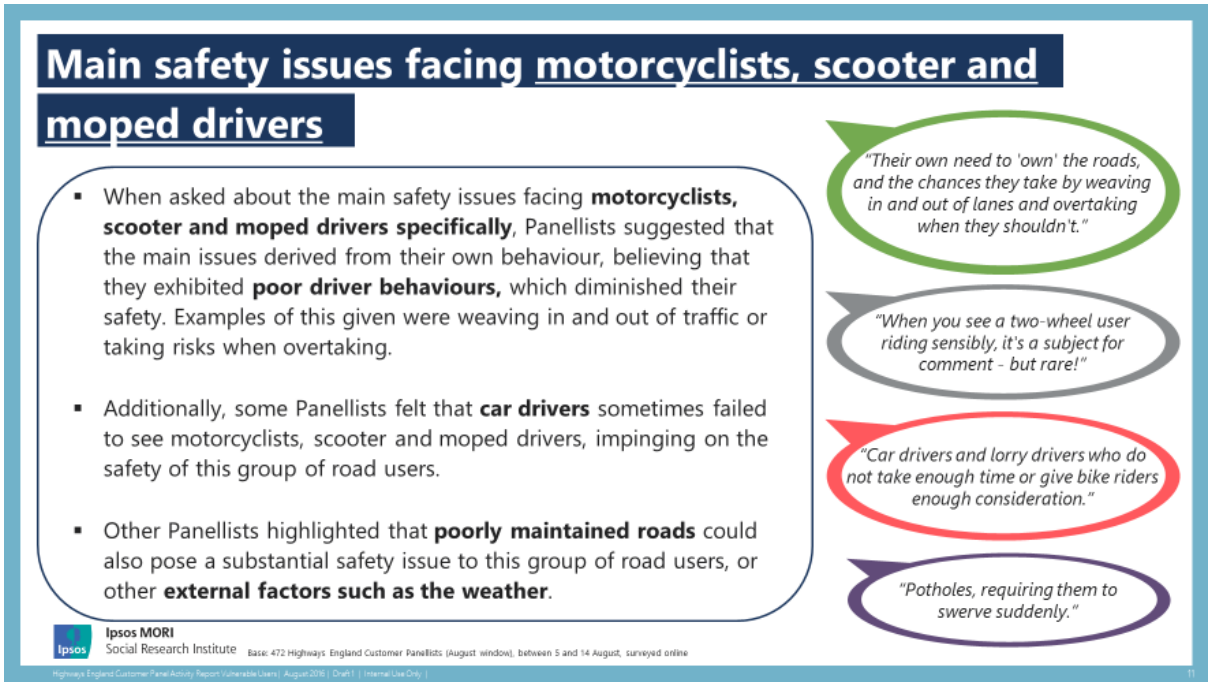


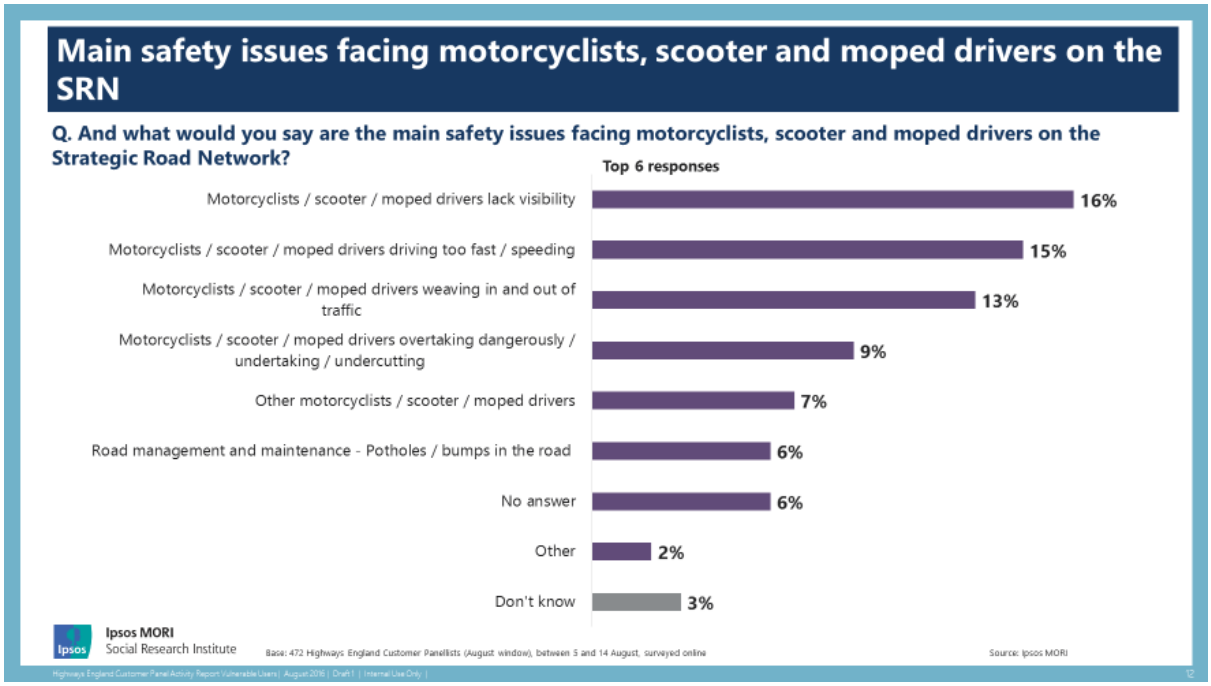


- As with the motorcycle survey, tailgating, aggressive driving, lack of concentration and the quality of roads are the main safety issues facing **all** motorists. This suggests that motorcyclists and all road users are more similar than might be thought.
- The two surveys disagreed about speeding drivers being the main issue facing the all motorists verses motorcyclists – 0.7% of the comments received by motorcyclists were about speeding drivers, compared to 26% of the respondents in the panel survey.

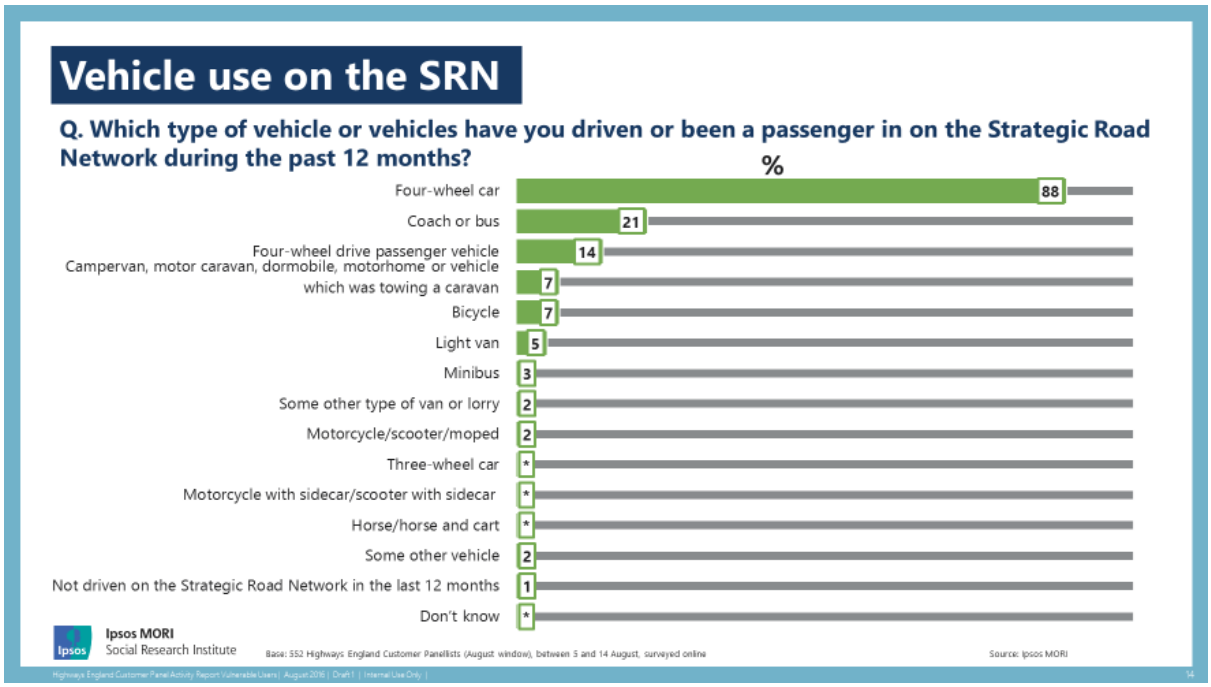


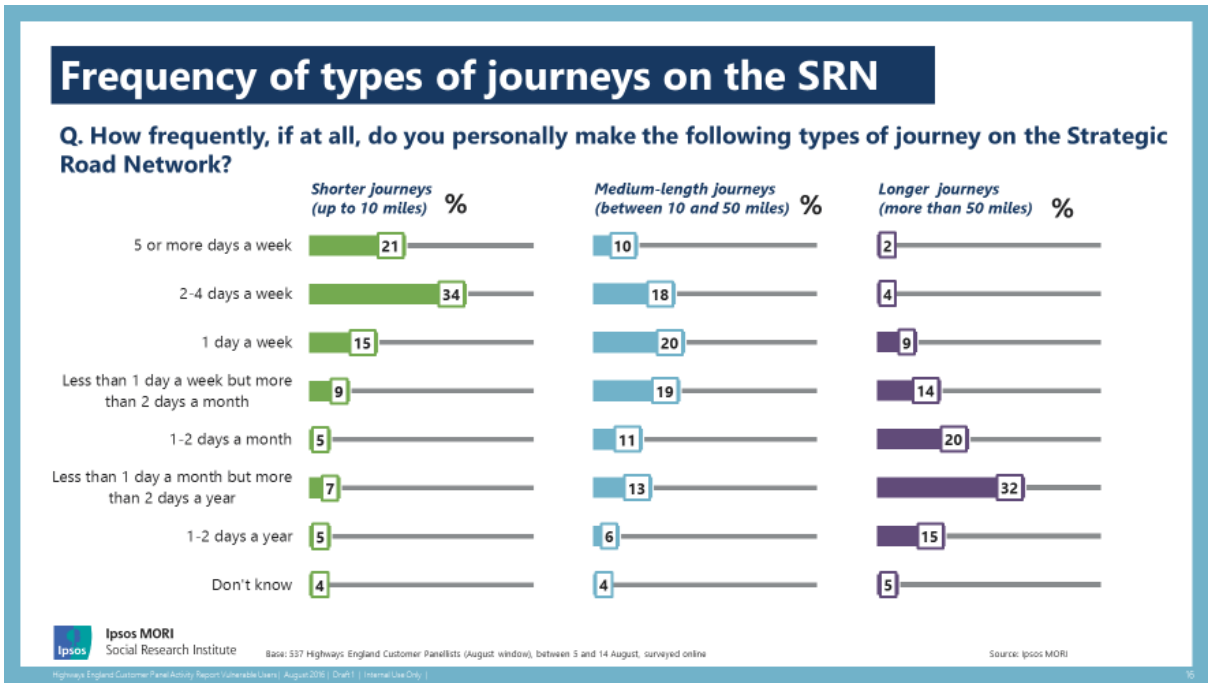
- The panel survey found that motorists believed that motorcyclists themselves were responsible for their own safety issues, generally due to their bad behaviour.
- For the motorcycle survey, 1.5% of the comments were related to motorcyclists lacking visibility/not being seen. This compared to 16% in the panel survey.
- Whilst 17% of the motorcycle survey comments about their safety related to pot holes, only 6% of those in the panel survey felt this was the main safety issue facing motorcyclists.





- This panel survey is a useful insight into how other motorists view motorcyclists on the SRN. Only 2% of the respondents were motorcyclists. This survey sits alongside the motorcycle survey to show the differences in views between motorcyclists and non-motorcyclists where motorcycle safety is concerned.



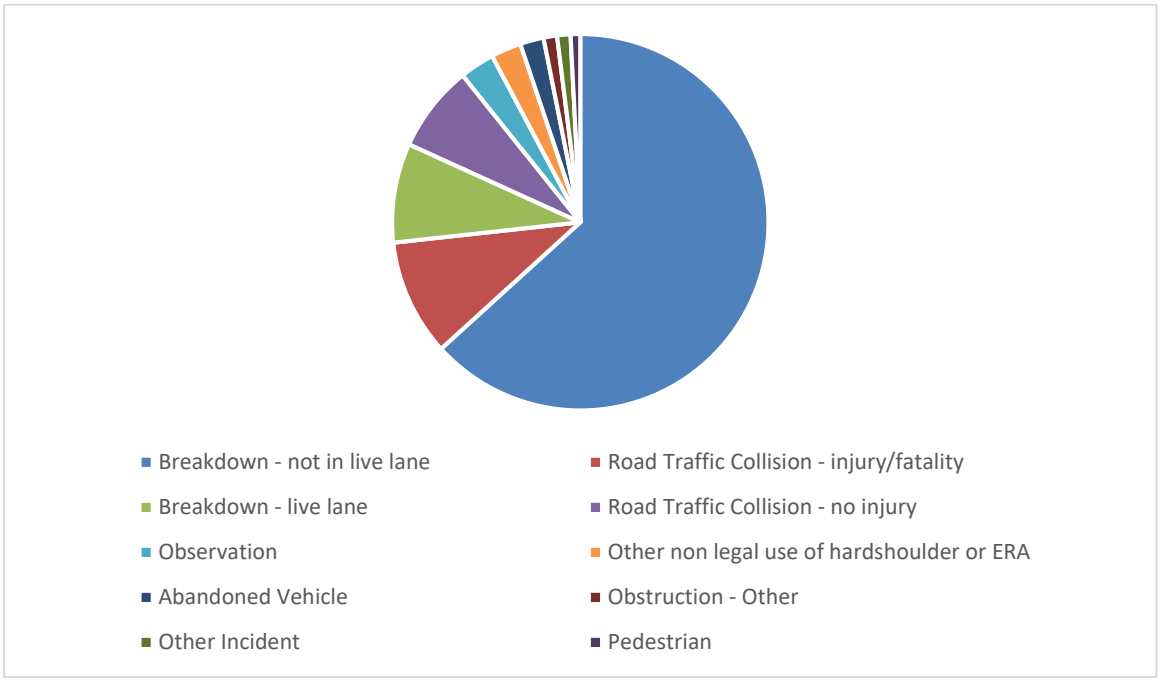

Frequency of types of journeys on the SRN
Q. How frequently, if at all, do you personally make the following types of journey on the Strategic Road Network?
Shorter journeys (up to 10 miles) %
Medium-length journeys (between 10 and 50 miles) %
Longer journeys (more than 50 miles) %
5 or more days a week 21 10 2
2-4 days a week 34 18 4
1 day a week 15 20 9
Less than 1 day a week but more than 2 days a month 9 19 14
1-2 days a month 5 11 20
Less than 1 day a month but more than 2 days a year 7 13 32
1-2 days a year 5 6 15
Don't know 4 4 5
Ipsos MORI
Social Research Institute
Base: 537 Highways England Customer Panellists (August window), between 5 and 14 August, surveyed online
Source: Ipsos MORI

Appendix 6: Incident Data

Data were extracted from Highways England's incident database from 1st January 2011 to 29th June 2016, where motorcycles were involved. This resulted in 18,762 incidents.

Main Results

Figure 57 – Overall incident breakdown



- There were 11,613 breakdowns involving motorcyclists which were not in the live lane. This represented 62% of the incidents.
- There is a concentration of non-live lane breakdowns involving motorcycles on and around the M25:
    - M25 between Junction 25 and Junction 24 (30 incidents)
    - M25 between Junction 5 and Junction 6 (28 incidents)
    - A282 between A282 and M25 Junction1A (24 incidents)
    - A282 between M25 Junction1A and A282 (22 incidents)
    - M25 between Junction 6 and Junction 5 (28 incidents)
- There were 1,838 recorded injury collisions involving motorcyclists, representing 10% of the incidents and a further 1,369 non-injury collisions representing 7% of the incidents.
- There were certain links which had higher numbers of motorcycle collisions and these tended to be in the south:
    - M3 between Junction 3 and Junction 2 (24 incidents)
    - A282 between M25 Junction 1A and A282 (19 incidents)
    - M25 between Junction 13 and Junction 12 (19 incidents)
    - A2 between A2018 and M25 Junction 2 (18 incidents)
    - M25 between Junction 9 and Junction 10 (16 incidents)
    - M25 between Junction 13 and Junction 14 (16 incidents)
    - M4 between Junction 3 and Junction 2 (16 incidents)

- A2 between A227 and M2 Junction 1 (15 incidents)
- A282 between A282 and M25 Junction 1A (15 incidents)
- M4 between M4 Junction 4 and M25 Junction 15 (15 incidents)