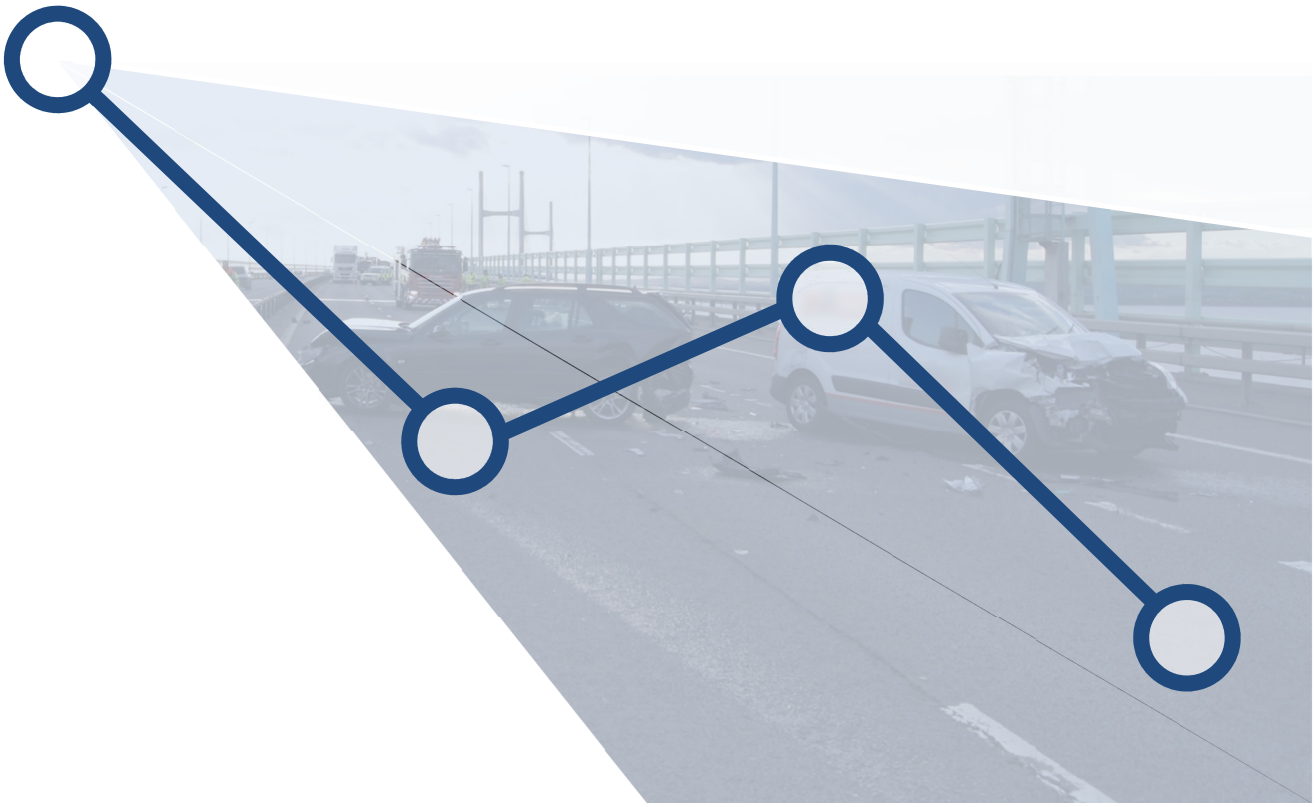
HIGHWAYS AGENCY

Safe roads, reliable journeys, informed travellers

Reported Road Casualties on the Strategic Network 2013



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Summary Sheet of 2013 SRN Casualties and Collisions

Collisions	10,145	↓ 3.6% since 2012

Casualties	244 Fatalities	1,709 KSI casualties	16,094 Total casualties
% since 2012	↑ 12.4%	↑ 0.8%	↓ 3.5%

Selected fatalities 2013 and percentage changes	2013	
Car occupants	133	↑ 9.0%
Involving PTWs (motorcycles)	37	↑ 60.9%
Pedal cyclists	6	↓ 25.0%
Involving young motorists	45	↑ 45.2%
From hitting a near or offside crash barrier	29	↑ 70.6%
On motorways	87	↑ 11.5%
On motorways with no lights during darkness	28	↑ 21.7%
Exceeding speed limit	22	↑ 144.4%
Impaired by alcohol	22	↑ 120.0%
Distraction in vehicle	16	↑ 60.0%
Between Friday 6pm to Saturday 6am	29	↑ 70.6%
Selected casualties 2013 and percentage changes	2013	
Involving motorway hardshoulders	121	↑ 8.0%
At roadworks	492	↑ 3.8%
Poor or defective road surface	39	↓ 40.0%
Slippery roads	1,315	↓ 20.4%
On motorways during snowfall	180	↑ 168.7%
On roads where lighting was unlit during darkness	144	↑ 13.4%
Pedestrians	183	↑ 23.6%

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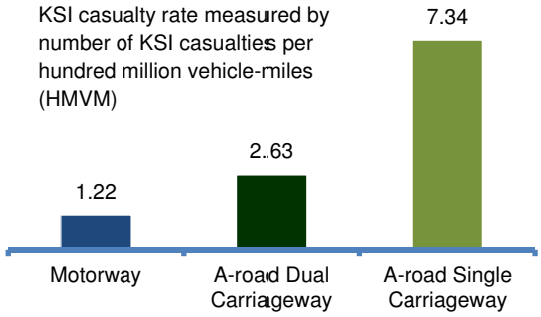
	KSI Casualties	Traffic (HMVM)
Motorway M & A(M)	683	561.00
	↑ 4.3%	↑ 1.0%
A-road Dual Carriageway	626	238.46
	↓ 8.9%	↑ 0.4%
A-road Single Carriageway	399	54.33
	↑ 12.7%	↑ 0.2%

KSI Casualty Rates

A-road single carriageway most dangerous

KSI casualty rate measured by number of KSI casualties per hundred million vehicle-miles (HMVM)



Selected KSI casualties 2013 and percentage changes	2013	
Children aged 0 - 15	38	↓ 36.7%
Young aged 16 - 19	103	↑ 30.4%
Older aged 60 - 69	149	↓ 1.3%
Elderly aged 70 and over	188	↑ 33.3%
Pedestrians	90	↑ 9.8%
Pedal cyclists	34	↓ 37.0%
PTW (motorcycle) occupants	314	↑ 6.4%
Car occupants	1,064	↓ 2.5%
HGV occupants	80	↓ 3.6%
Other goods vehicle occupants	64	↓ 17.9%
Driver using mobile phone	24	↑ 9.1%
Driver fatigued	149	↓ 5.1%
Involving a vehicle with defects	47	↓ 33.8%
At a slip road	151	↑ 16.2%
Road environment* contributed on motorways	66	↓ 12.0%
Road environment contributed on A-road ***dual*** c'way	78	↓ 23.5%
Road environment contributed on A-road ***single*** c'way	41	↑ 36.7%
Resulting from hitting objects off the carriageway	564	↓ 8.0%

** involving contributory factors deemed controllable by Highways Agency intervention*

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Document Map

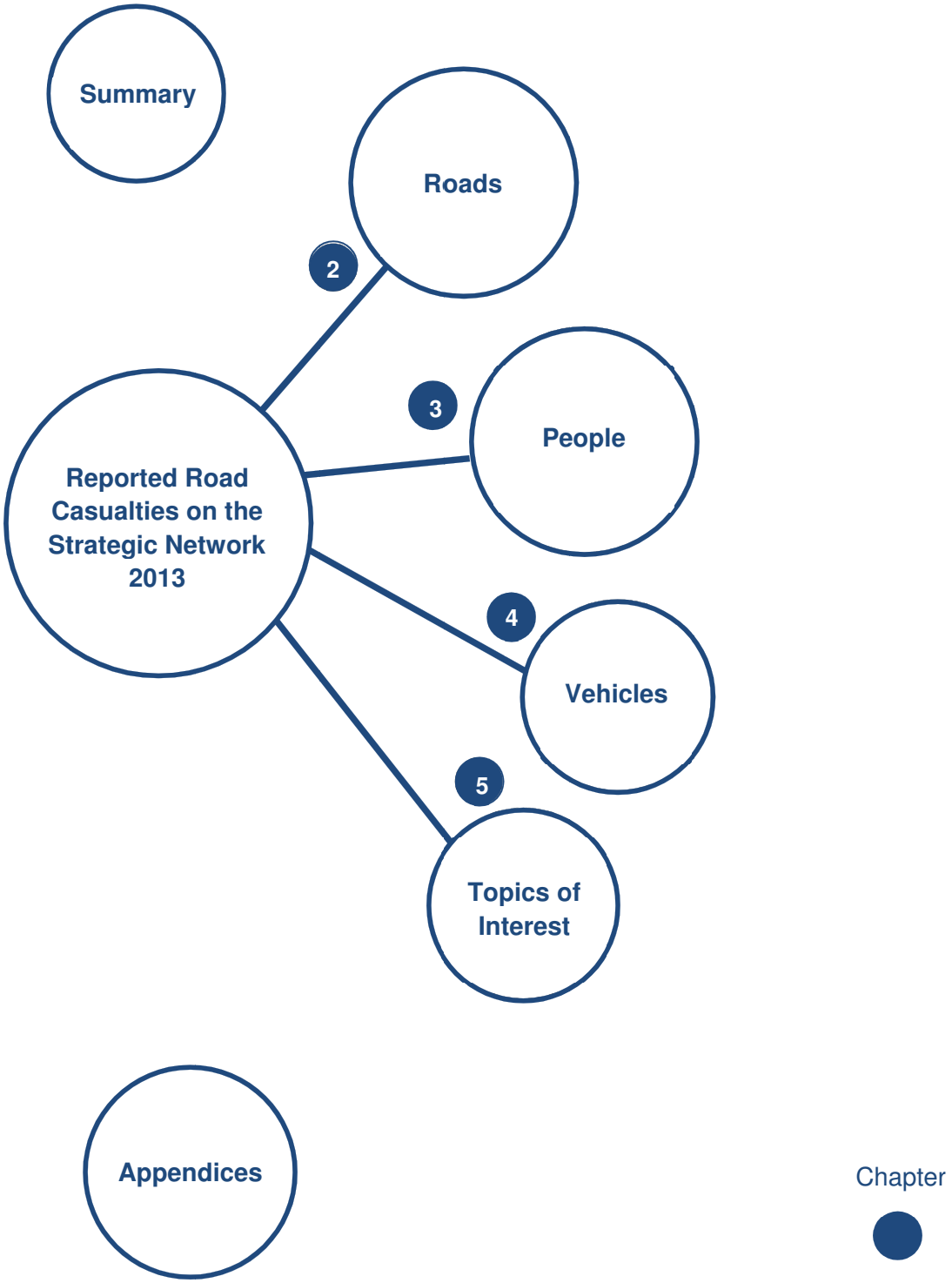


Table of Contents

1 Introduction

1.1 Background

The '*Safety Framework for the Strategic Road Network*' sets out the approach the Highways Agency will take in support of the Department for Transport's '*Strategic Framework for Road Safety*', published in May 2011.

The safety framework establishes how the Highways Agency will work with partners, suppliers and stakeholders from the safety community to target investment in safety related interventions/campaigns to target 'at risk' road user groups; specific causes of collisions; and interventions on the strategic road network with the aim of reducing the number of casualties now and in the future.

It is the Highways Agency's intention to continue monitor and address the trends in casualties that have occurred over the recent years. The Highways Agency Board has recently endorsed the Vision for Road Safety, which will be rolled out across the business during the transformation to NewCo, so that it is embedded within the culture of the organisation from day one. Further information regarding the Vision and its implementation can be obtained via the ***Highways Agency's Strategic Safety Team***[1].

The Department for Transport's '*Action for Roads – A network for the 21st century*', published in July 2013 following the spending review, further emphasises the need for the continuous improvement of road user safety.

[1] For enquiries to the Strategic Safety Team, contact Elizabeth Girvan (elizabeth.girvan@highways.gsi.gov.uk).

1.2 Purpose of Document

This document is intended for use by the Highways Agency staff and those in the public arena with an interest. This document '*Reported Road Casualties on the Strategic Network 2013*' follows on from the series of '*Accidents on the trunk road*' and '*Reported Casualties on the HA network*' documents which have been published annually since 1999. They provide quantified road safety information and guidance that describes the current state of the Highways Agency's reportable network in terms of collisions and casualties.

This information is designed to enable the Highways Agency to:

- answer safety queries from the Government, colleagues and the public;
- make sound strategic and budgeting decisions concerning the future management and safety of the strategic road network (SRN);
- provide a national safety perspective for balancing needs across the SRN;
- monitor changes in safety on the network year on year and against baseline;
- assist in developing and monitoring the safety statements prepared by service providers; and
- assist in the provision of requirements of the EU Directive on Road Infrastructure Safety Management.

1.3 Structure of Document

The structure of the rest of the document is as follows:

Chapter	Description
2 Roads	• Overview of the SRN and its unique properties. • Assessment of road safety performance of different road types on the SRN. • Understanding the impact of contributory factors related directly to the road environment on the number and severity of casualties.
3 People	• Analysis of past, present and potential future casualty trends • Snapshot of the types of drivers and riders involved in collisions • Understanding the impact of contributory factors influenced by road users on the number and severity of casualties.
4 Vehicles	• Estimation of the type and amount of vehicles using the SRN. • Analysis of the number of casualties resulting from different vehicle interactions • Understanding the impact of contributory factors linked to vehicle defects on the number and severity of casualties.
5 Topics of Interest	Evaluation of topics of interest, including: • Fatalities • Seriously Injured Casualties • Young Motorists • Smart Motorway Data • Lighting on the SRN • Weather Effects on the SRN • Roadworks • Objects Hit On and Off carriageways • Junctions • Tyres • Goods Vehicles: HGVs and LGVs • Motorcycles • Hardshoulders and Lay-bys
A to T Appendices	• Appendix A – Glossary of terms • Appendix B – Collisions. • Appendix C – Casualties • Appendix D – Traffic and casualty rates • Appendix E – Vehicles • Appendix F – Contributory factors • Appendix G – GB Comparison • Appendix H to T – Additional topic of interest statistics.

2 Roads

In Chapter 2, an assessment of how the strategic road network influences casualties and collisions on the SRN has been undertaken. The main focus of the assessment is the differing characteristics of motorways, A-road dual carriageways and A-road single carriageways and their respective road safety performance.

2.1 The Strategic Road Network

Figure 2-1 provides a brief overview of the SRN and its properties.

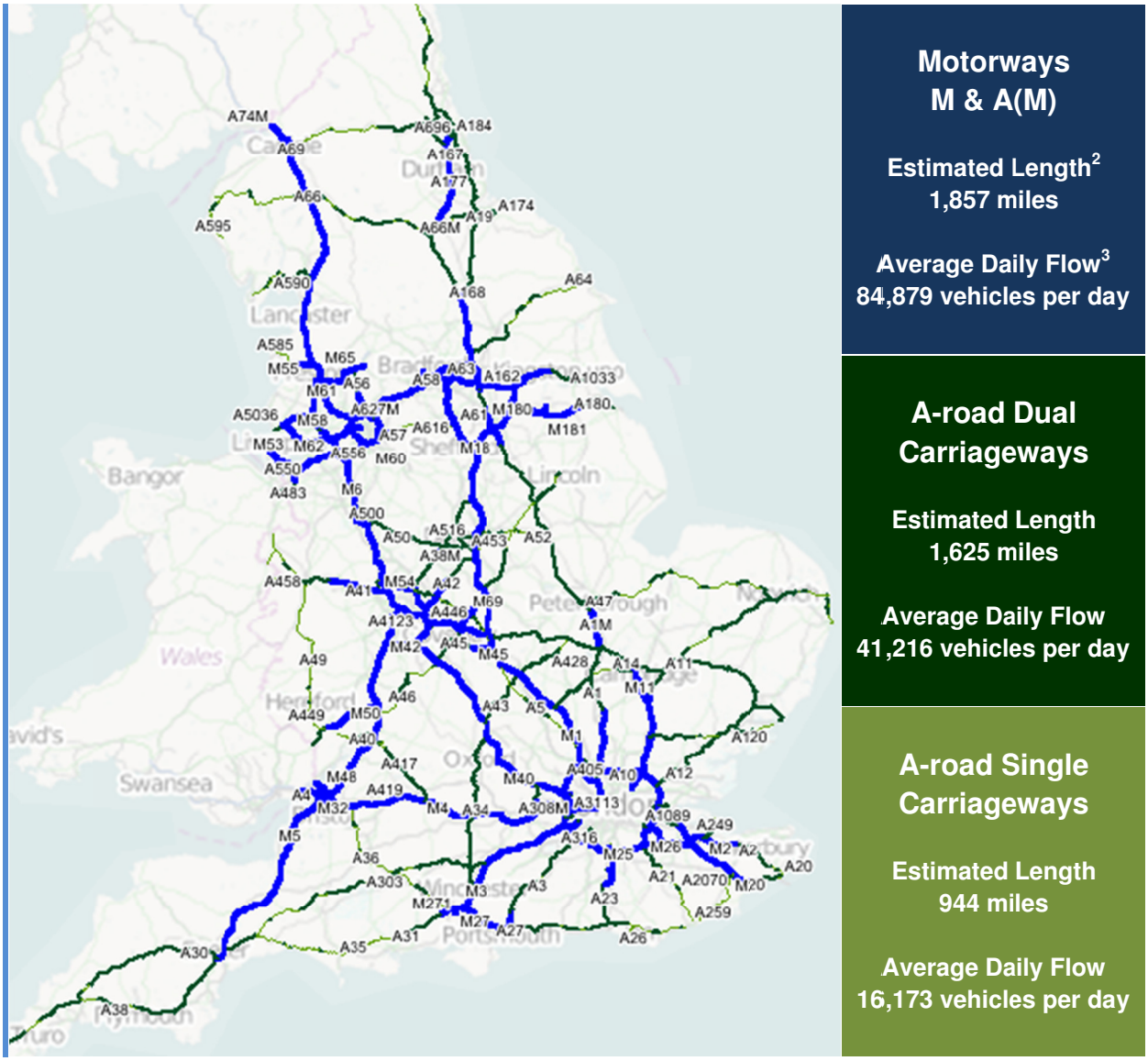


Figure 2-1 Highways Agency Strategic Road Network

Based on the 2010 SRN used as a static reference network to analyse collisions and casualties between 2005 and 2013
Source: OpenStreetMap 2011 Contributors CC-BY-SA

To enable a like-for-like comparison of annual trends, all of the Highways Agency's collision and casualty data recorded between 2005 and 2013 has been referenced to the Highways Agency's 2010 strategic road network. This is instead of using the ever changing 'live' network. The reference network is updated periodically with the next update planned for 2015. Prior to 2010, all collision and casualty data was referenced to the 2006 network.

[2] Based on summation of length from DfT countpoints identified as part of the 2010 SRN.
[3] Based on 2013 AADF values obtained from DfT countpoints identified as part of the 2010 SRN.

2.2 SRN Traffic Estimates

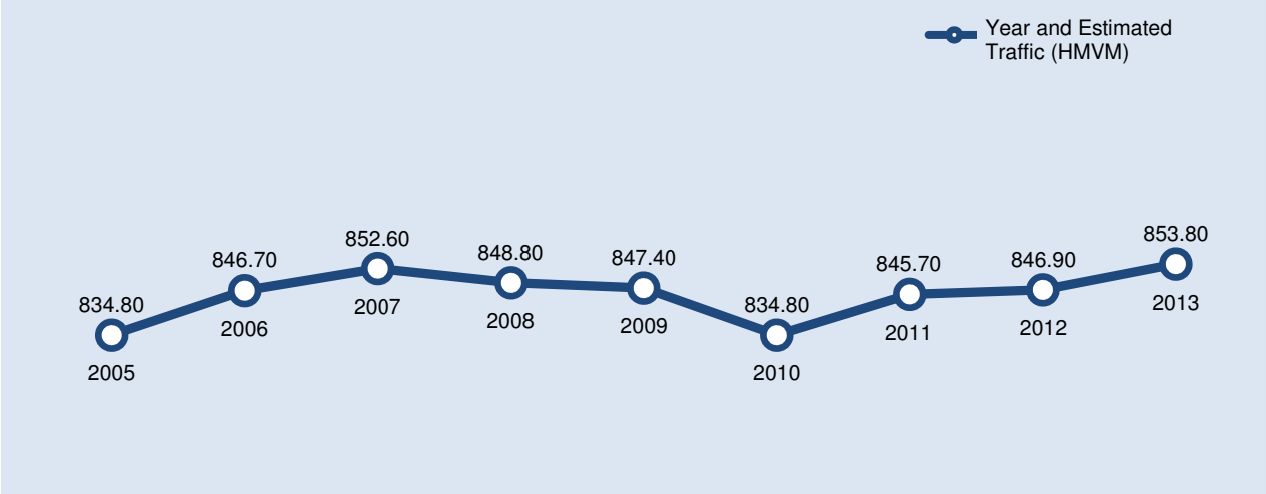


Figure 2-2 Historic Traffic Levels on the SRN

Figure 2-2 shows that between 2007 and 2010, the SRN witnessed a decline in overall usage with headline traffic levels decreasing by 2.1 per cent from 852.60 hundred million vehicle-miles (HMVM) to 834.80 HMVM.

Between 2010 and 2013, traffic levels increased 2.3 per cent from 834.80 HMVM to 853.80 HMVM, with the largest percentage traffic growth within this period (1.3 per cent) occurring between 2010 and 2011. In the same period, traffic for the Great Britain network (excluding estimates for the SRN) actually decreased 0.5 per cent from 2,197.20 HMVM to 2,186.10 HMVM.

The traffic increase since 2010 on the SRN correlates strongly with improving economic performance, as shown in **Figure 2-3**; particularly during the recovery after the 2007 to 2009 recession.

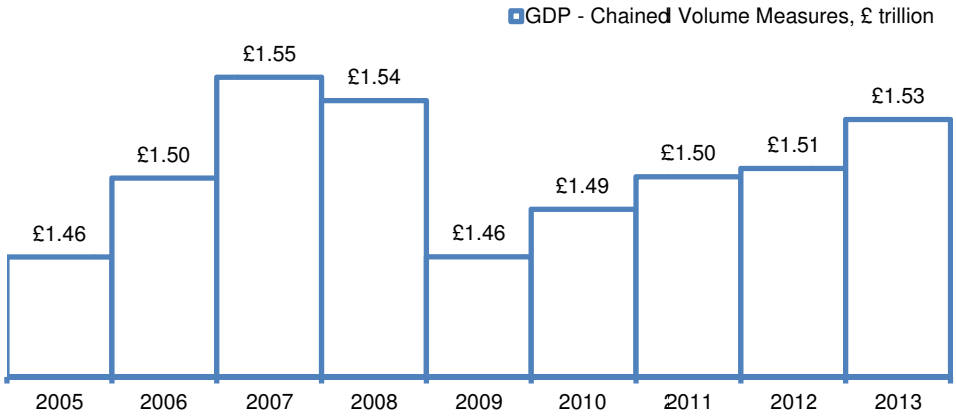


Figure 2-3 UK Gross Domestic Product between 2005 and 2013

2.3 SRN Traffic Estimates by Road Classification

Estimates of traffic (measured in hundred million vehicle-miles, HMVM) by road classification are provided in **Table 2-1**. Between 2010 and 2013, there has been a 2.6 per cent increase in both motorway and A-road dual carriageway traffic on the SRN (based on the 2010 reference network). In contrast, traffic on A-road single carriageways has decreased by 2.5 per cent. The majority of the fall in single carriageway traffic results from the transfer of traffic to new purpose-built sections beside the original alignment as part of the upgrade to the route. The new sections are currently not part of the 2010 reference network.

Table 2-1 Traffic levels on the strategic road network by road classification

Year	2010	2011	2012	2013
Road Classification	**Traffic (HMVM)** +/- Annual percentage change from previous year			
Motorway M & A(M)	**546.59** -	**552.92** +1.2%	**555.19** +0.4%	**561.00** +1.0%
A-road Dual Carriageway	**232.50** -	**236.74** +1.8%	**237.55** +0.3%	**238.46** +0.4%
A-road Single Carriageway	**55.73** -	**56.06** +0.6%	**54.21** -3.3%	**54.33** +0.2%

2.4 Casualties by Road Classification and Severity

Section 2.4 provides an overview of the casualty rates by road classification, severity and year based on the number of casualties per hundred million vehicle-miles (HMVM). The rates discussed in this section provide an indication on the likelihood of being injured.

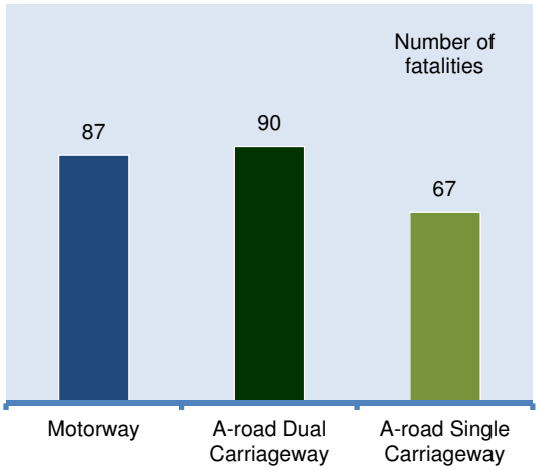
Figure 2-4 (a) to (f) illustrates a graphical distribution of motorway and A-road (single and dual carriageway) casualties in terms of the number of casualties and casualty rate. From comparing road classifications in the figure, in can be shown that for 2013:

- the largest proportion of KSI casualties (40.0 per cent) and total casualties (48.7 per cent) occurred on motorways;
- the most fatalities (90 out of 244) occurred on A-road dual carriageways;
- the likelihood of being injured on motorways was in fact the lowest of all three road classifications across all severities; and
- the likelihood of being injured on A-road single carriageways was the highest of all three road classifications across all severities, followed by A-road dual carriageways.

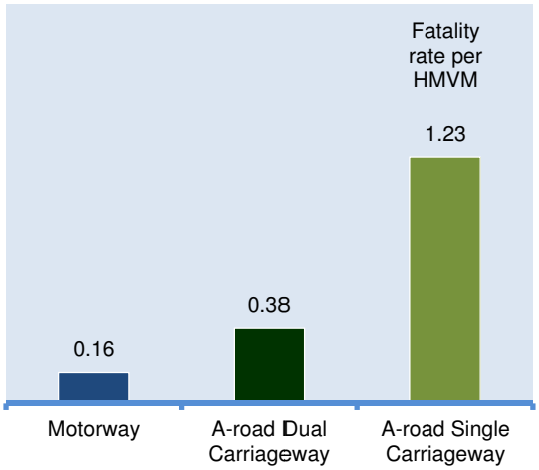
For 2013, the ratio (based on casualty rate) between the likelihood of an injury occurring on a motorway, dual carriageway or single carriageway is highlighted in **Table 2-2**.

Table 2-2 Likelihood of injury ratio between road classifications, 2013

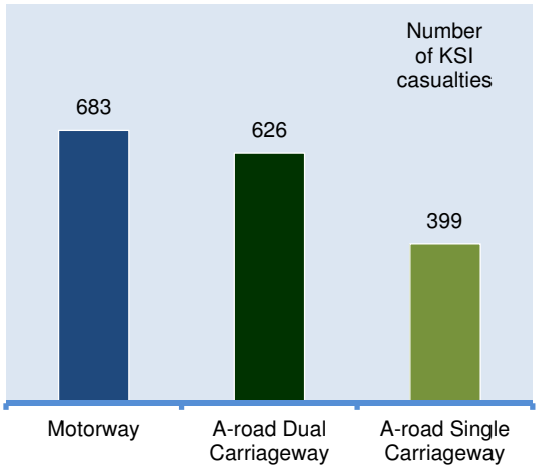
	If the likelihood of being injured on a motorway is set at an arbitrary "1", then based on casualty rates, the likelihood of being injured on other road classifications are as follows:		
Road classification / Severity	*Motorway*	*A-road dual carriageways*	*A-road single carriageways*
Total casualties	**1**	**2**	**3**
KSI casualties	**1**	**2**	**6**
Fatalities	**1**	**2**	**8**



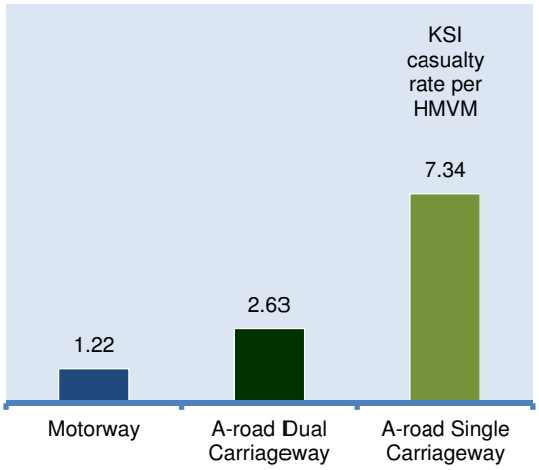
(a) Number of fatalities



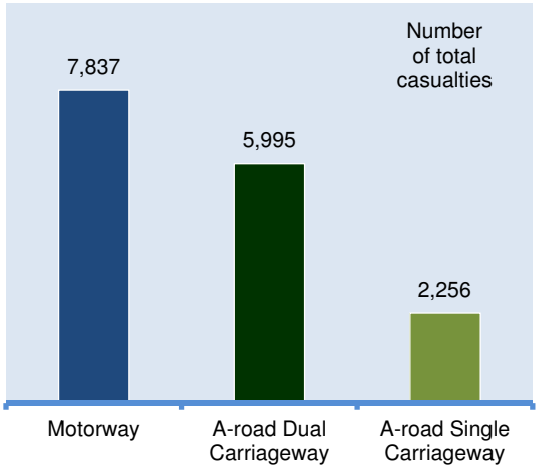
(b) Fatality rate per HMVM



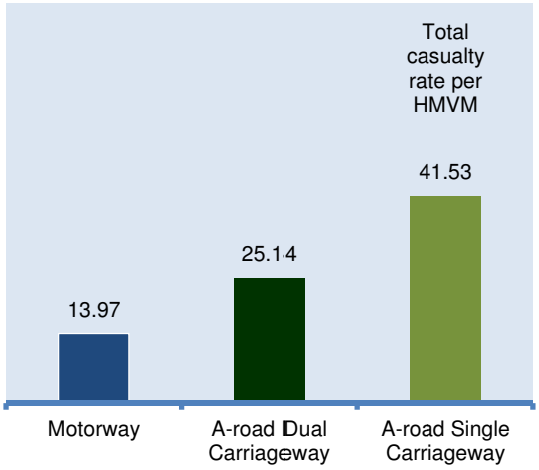
(c) Number of KSI casualties



(d) KSI casualty rate per HMVM



(e) Number of total[4] casualties



(f) Total casualty rate per HMVM

Figure 2-4 Casualties and casualty rates by road classification, 2013

[4] Does not include casualties where the road classification was B or below.

2.5 Motorway Casualties and Casualty Rates by Year

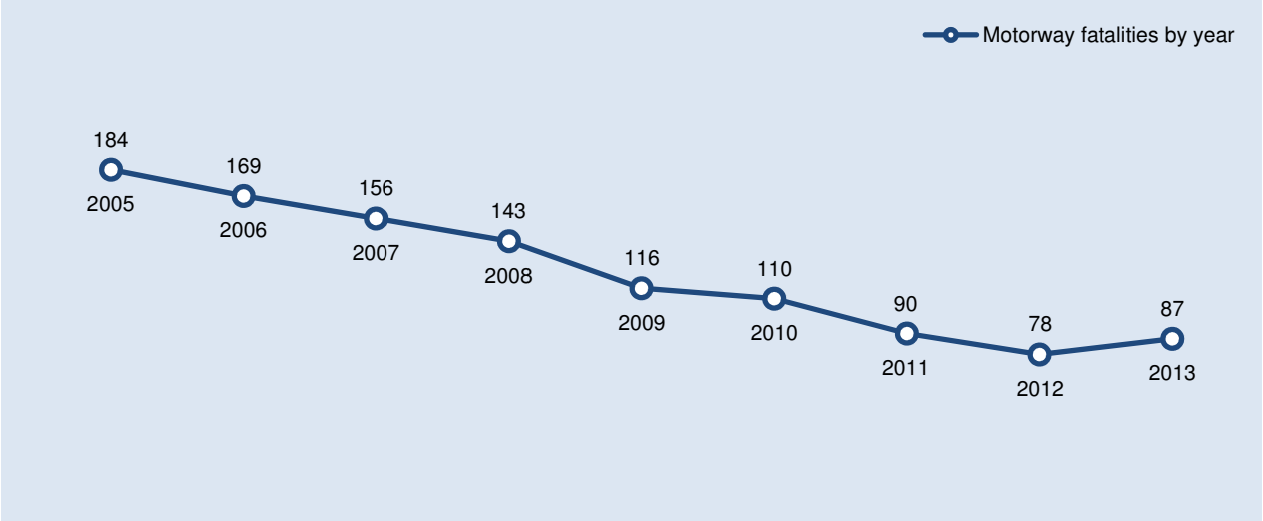


Figure 2-5 Historic motorway fatalities by year

The number of historic motorway fatalities that occurred on the SRN between 2005 and 2013 are illustrated in **Figure 2-5**. The figure highlights that the increase of 11.5 per cent in fatalities from 78 in 2012 to 87 in 2013 is the first increase since 2005.

In addition, the overall motorway casualties and casualty rates by severity and year between 2010 and 2013 are provided in **Table 2-3**. The table shows that the number of total motorway casualties reduced by 4.6 per cent to 7,837 in 2013 from 8,211 in 2013. The majority of the reduction resulting from fewer (402) slightly injured casualties. In contrast, KSI casualties increased across all KSI severities.

Table 2-3 Motorway casualties and casualty rates by severity and year

Casualties / Rate (Cas' per HMVM)	2010	2011	2012	2013	2013 per cent change from 2012
Killed	110	90	78	87	11.5
Seriously Injured	716	654	577	596	3.3
KSI	826	744	655	683	4.3
Slightly Injured	8,552	8,008	7,556	7,154	-5.3
Total	9,378	8,752	8,211	7,837	-4.6
Traffic (HMVM)	546.59	552.92	555.19	561.00	1.0
Killed rate	0.20	0.16	0.14	0.16	10.4
Serious rate	1.31	1.18	1.04	1.06	2.2
KSI rate	1.51	1.35	1.18	1.22	3.2
Slight rate	15.65	14.48	13.61	12.75	-6.3
Total rate	17.16	15.83	14.79	13.97	-5.5

Further assessment of the table highlights contrasting changes in casualty rates between the severities against a backdrop of a one per cent increase in traffic levels on motorways as outlined in **Table 2-3**. The overall casualty rate decreased from 14.79 casualties per HMVM to 13.97 casualties per HMVM between 2012 and 2013; continuing the downward trend observed in previous years whilst traffic levels were increasing. However the KSI casually rate increased from 1.18 casualties per HMVM to 1.22 casualties per HMVM in the same period.

Overall, the above trends suggest that the increase in motorway traffic has affected the frequency of the most severe collisions. A more detailed analysis of fatalities and seriously injured casualties, including those occurring on motorways, are discussed in the fatalities and seriously injured casualties Topic of Interests sections respectively (**Section 5.1** and **5.2**) with supporting data found in **Appendix H** and **Appendix I**.

2.6 A-road Dual Carriageway Casualties and Casualty Rates by Year

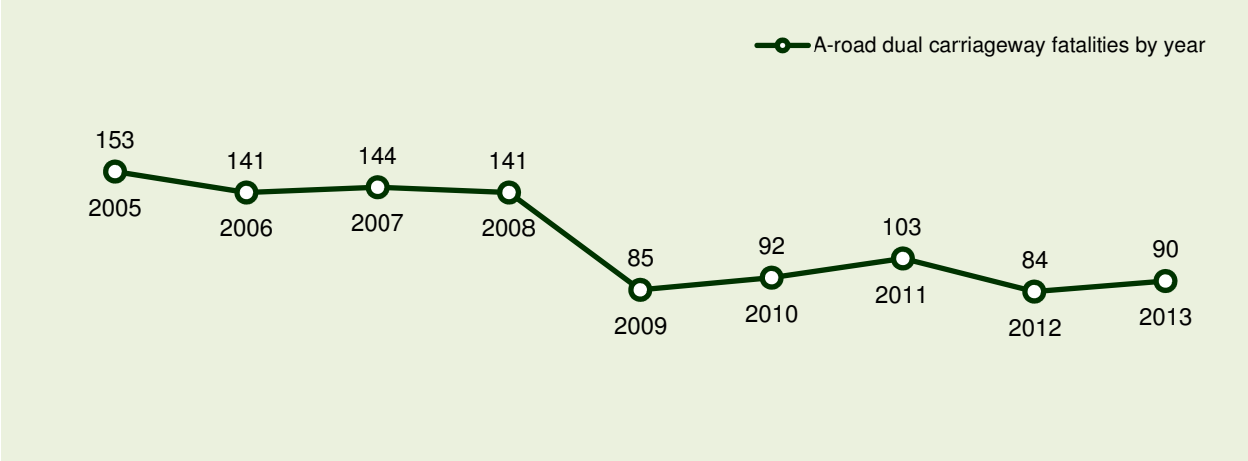


Figure 2-6 Historic A-road dual carriageway fatalities by year

Figure 2-6 shows the historic number of fatalities on A-road dual carriageways between 2005 and 2013. This figure is accompanied by **Table 2-4**, which highlights the number of casualties and casualty rates by severity and year between 2010 and 2013.

Similarly to motorways, **Figure 2-6** shows that the number of fatalities on A-road dual carriageways increased between 2012 and 2013 from 84 to 90; an increase of 7.1 per cent.

Lower severity casualties show a downward trend in absolute numbers and rates (apart from 2009). Further breakdowns of dual carriageway casualties where the road was either built-up (40mph or less) or non-built-up (50mph or greater) are provided in **Appendix C Table C-1**.

Table 2-4 A-road dual carriageway casualties and casualty rates by severity and year

Casualties / Rate (Cas' per HMVM)	2010	2011	2012	2013	2013 per cent change from 2012
Killed	92	103	84	90	7.1
Seriously Injured	632	622	603	536	-11.1
KSI	724	725	687	626	-8.9
Slightly Injured	5,539	5,908	5,445	5,369	-1.4
Total	6,263	6,633	6,132	5,995	-2.2
Traffic (HMVM)	232.50	236.74	237.55	238.46	0.4
Killed rate	0.40	0.44	0.35	0.38	6.7
Serious rate	2.72	2.63	2.54	2.25	-11.5
KSI rate	3.11	3.06	2.89	2.63	-9.2
Slight rate	23.82	24.96	22.92	22.52	-1.8
Total rate	26.94	28.02	25.81	25.14	-2.6

2.7 A-road Single Carriageway Casualties and Casualty Rates by Year

Figure 2-7 Historic A-road single carriageway fatalities by year

Figure 2-7 shows the number of fatalities occurring on A-road single carriageways by year between 2005 and 2013. In 2013, the number of fatalities (67) exceeded the number of fatalities in 2008 (66).

In addition, the number of casualties and casualty rates by severity and year between 2010 and 2013 are provided in **Table 2-5**. Assessment of the table shows that although traffic levels on single carriageways have decreased by 3.2 per cent from 56.06 HMVM to 54.33 HMWM between 2011 and 2013, during the same period the number of the most severely injured casualties increased. As a result, the KSI casualty rate has increased by 21.8 per cent from 6.03 casualties per HMVM to 7.34 casualties per HMVM between 2010 and 2013.

Table 2-5 A-road single carriageway casualties and casualty rates by severity and year

Casualties / Rate (Cas' per HMVM)	2010	2011	2012	2013	2013 per cent change from 2012
Killed	47	58	55	67	21.8
Seriously Injured	289	302	299	332	11.0
KSI	336	360	354	399	12.7
Slightly Injured	2,045	1,975	1,976	1,857	-6.0
Total	2,381	2,335	2,330	2,256	-3.2
Traffic (HMVM)	55.73	56.06	54.21	54.33	0.2
Killed rate	0.84	1.03	1.01	1.23	21.5
Serious rate	5.19	5.39	5.52	6.11	10.8
KSI rate	6.03	6.42	6.53	7.34	12.5
Slight rate	36.69	35.23	36.45	34.18	-6.2
Total rate	42.72	41.65	42.98	41.53	-3.4

As highlighted in **Table 2-5**, the number of KSI casualties has increased by 45 from 354 to 399 between 2012 and 2013. Analysis of **Appendix C Table C-1** shows that the net increase in KSI casualties occurred solely on non-built-up A-road single carriageways (47) where the speed limit can be 50mph or greater. In contrast, there was a reduction of 2 KSI casualties on built-up roads.

2.8 Casualties where the Road Environment Contributed

This section evaluates the number of casualties involving at least one contributory factor categorised as where the road environment contributed. Assessment of these factors gives an indication of how the SRN could be enhanced to mitigate against further casualties where the road is a contributing factor. In 2013, the number of KSI casualties involving road environment factors (185) was equivalent to 10.8 per cent of the respective total KSI casualties (1,709). The factors include:

Figure 2-8 outlines the historic number of KSI casualties involving at least one factor associated with the road environment between 2005 and 2013. The figure highlights that between 2005 and 2013, the trend in KSI casualties involving road environment factors is volatile across all road classifications; particularly on motorways.

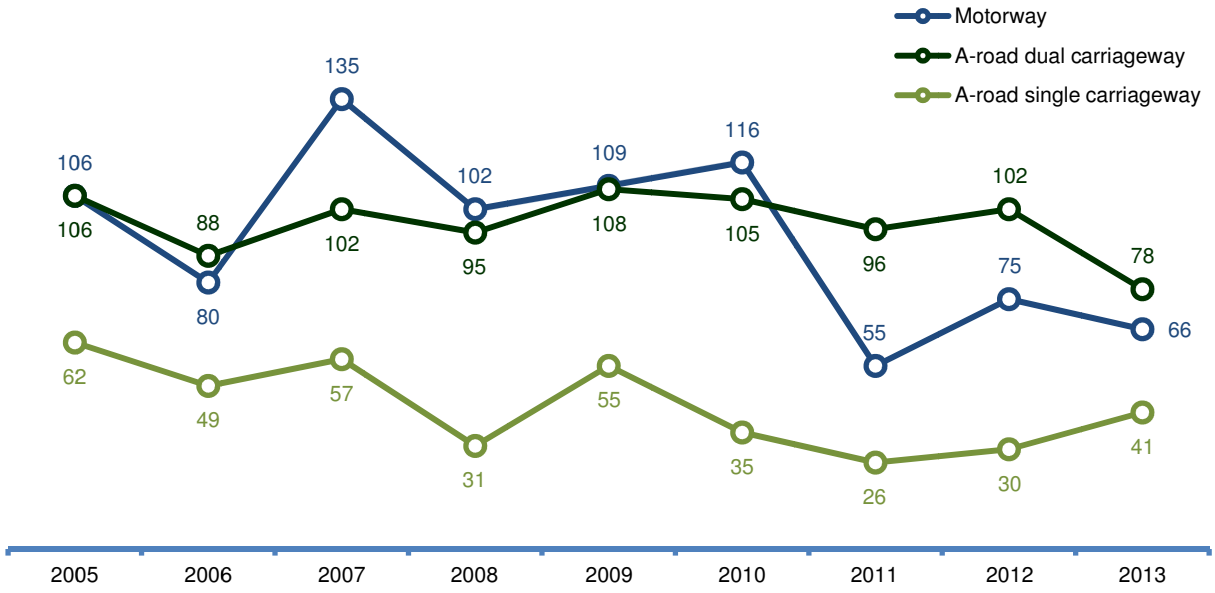


Figure 2-8 Historic KSI casualties involving at least one "Road Environment Contributed" contributory factor by road classification and year

Table 2-6 provides a breakdown of casualties involving each of the contributory factors associated with road environment against severity for 2013.

Table 2-6 Number of casualties involving at least one "Road Environment Contributed" contributory factor by factor and severity, 2013

Casualty severity / Contributory factor	Killed	Seriously Injured	KSI	Slightly Injured	Total
Slippery road (due to weather)	16	103	119	1,196	1,315
Road layout (eg. bend, hill, narrow carriageway)	2	19	21	174	195
Animal or object in carriageway	1	18	19	174	193
Deposit on road (eg. oil, mud, chippings)	3	14	17	75	92
Temporary road layout (eg. contraflow)	1	7	8	52	60
Poor or defective road surface	0	12	12	27	39
Inadequate or masked signs or road markings	0	2	2	22	24
Defective traffic signals	0	1	1	14	15
Traffic calming (eg. speed cushions, road humps, chicanes)	0	1	1	2	3
Slippery inspection cover or road marking	0	1	1	0	1

Notes:

(a) Values in the table report the number of casualties by severity where at least one of the specified contributory factors above was recorded in the collision.

(b) As up to six contributory factors can be recorded per collision, the table should not be summed between two or more factors.

As shown in **Table 2-6**, the primary contributory factor for road environment was "Slippery road (due to weather)" and contributed to 119 KSI casualties and 1,315 total casualties in 2013. Other significant factors include "Road layout" contributing to 195 casualties and "Animal or object in carriageway" contributing to 193 casualties.

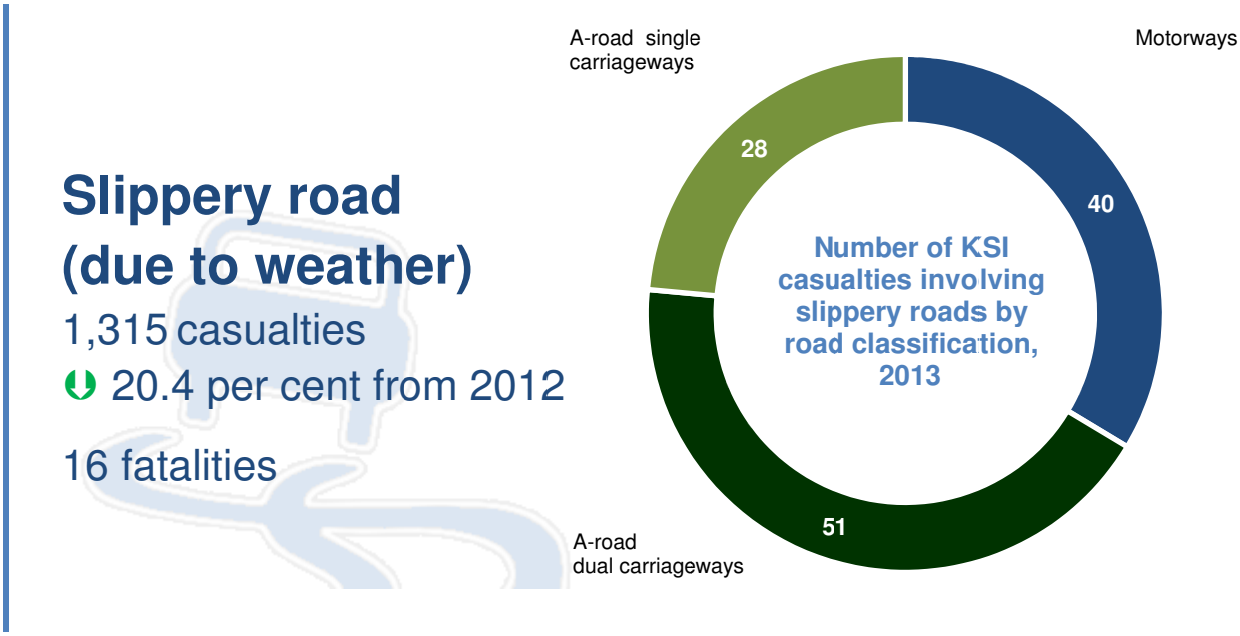


Figure 2-9 Casualty summary involving slippery road by road classification, 2013

Further analysis of the primary contributory factor "Slippery road (due to weather)" reveals that, although since 2012, the number of total casualties involving slippery roads has reduced by 20.4 per cent to 1,315; the factor was still recorded in 16 fatalities in 2013. Seven of the fatalities also involved motorist travelling too fast for conditions.

From the casualty summary provided in **Figure 2-9** it can be seen that the percentage of KSI casualties in 2013 occurring on both type of A-roads combined equalled 66.4 per cent. In comparison the percentage occurring on motorways equalled 33.6 per cent.

A further analysis of the number of casualties involving a poor or defective road surfacing on the SRN is provided in **Figure 2-10**. This provides context on the potential human cost of defects in surfacing such as potholes. From 2008 to 2011, England experienced a number of harsh winters, with December 2010 being one of the coldest on record[5]. As a result, the occurrence of potholes during and after this period became a significant concern for all stakeholders.

[5] http://assets.dft.gov.uk/publications/potholes-review-progress-report/potholes-review-progress-report.pdf

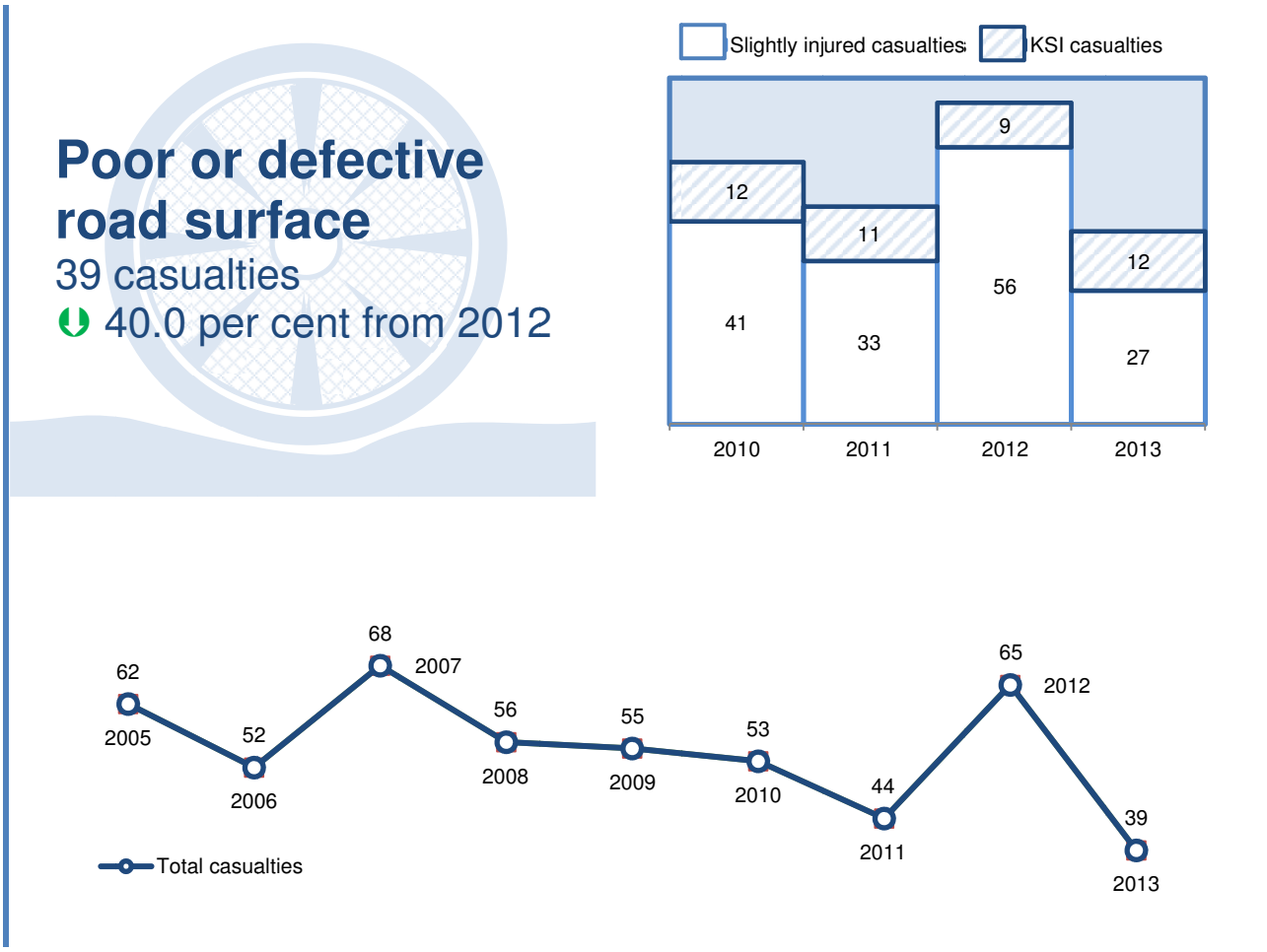


Figure 2-10 Casualty summary involving a poor or defective road surface by year

Figure 2-10 shows that the number of casualties in 2012 spiked by 47.7 per cent from 44 in 2011 to 65 in 2012. This increase was then followed by a 40.0 per cent decrease in 2013. However, when assessing the overall impact of this contributory factor against total casualties for all years, the typical contribution is less than one per cent per annum.

Between 2006 and 2010, there were 8 fatalities involving poor or defective surfacing; 5 of these fatalities occurred on motorways. However, the number of KSI casualties has been increasing, albeit slowly, from 5 in 2005 to 12 in 2013. PTW occupants[6] appear particularly vulnerable when a casualty in a collision involving a poor or defective surface. The proportion of PTW occupants who were seriously injured typically ranged from 30 to 65 per cent of all casualties involving a poor or defective surface in the past five years.

[6] A driver or passenger of a powered two wheeler (PTW) commonly referred to as a motorcycle. See glossary for definition.

3 People

In Chapter 3, an assessment of the casualties injured on the strategic road network has been undertaken. This includes analysis of historic and future trends, casualty types and assessment of the drivers and riders including the human factors involved in collisions.

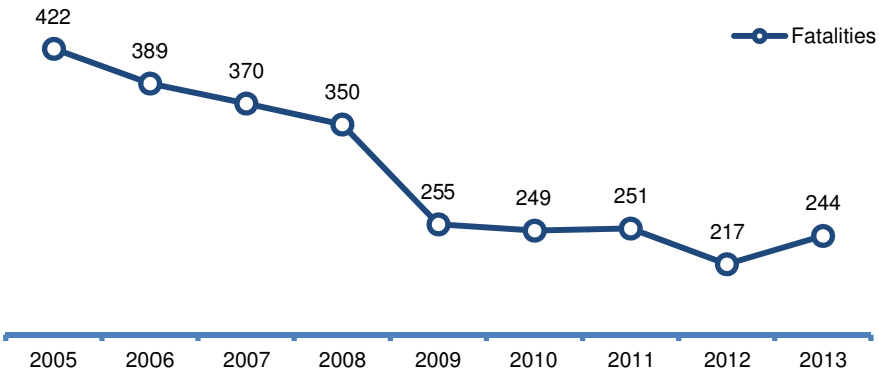
3.1 Casualty Trends

This section identifies underlying trends in the number of casualties occurring each year by severity between 2005 and 2013.

Figure 3-1 provides an outline of historic casualty trends for fatalities, KSI casualties and total casualties between 2005 and 2013.

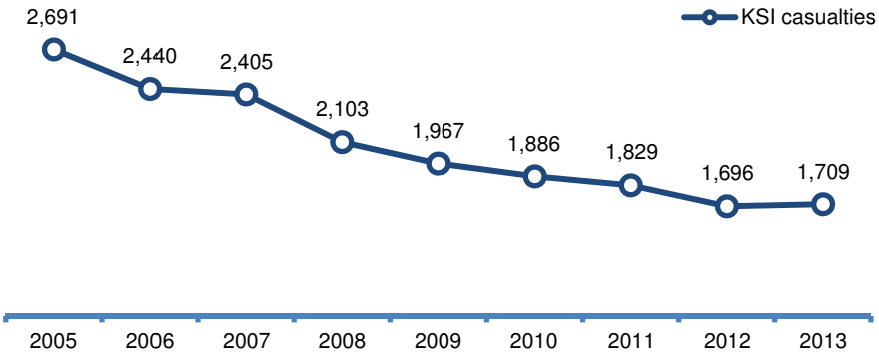
Fatalities

12.4 per cent between 2012 and 2013



KSI casualties

0.8 per cent between 2012 and 2013



Total casualties

3.5 per cent between 2012 and 2013

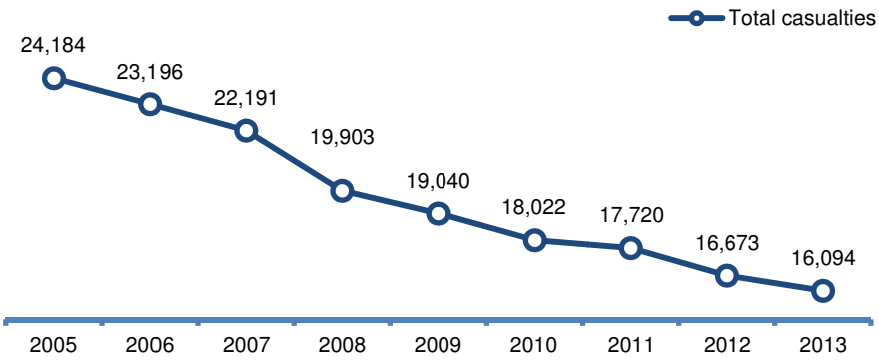


Figure 3-1 Historic casualty trends by severity between 2005 and 2013

Summarising **Figure 3-1**, the largest percentage change between severities since 2012 was the number of fatalities. Fatalities increased by 12.4 per cent; compared to 0.8 per cent for KSI casualties and a decrease of 3.5 per cent for total casualties.

Figure 3-2 indexes all severities against a base value of 100.0 in 2005 (the base year) in order to directly compare changes in casualty numbers across severities by year. As shown by the figure, the change in total casualties over time has been relatively steady and decreased on average by 4.2 index points per annum. The largest fall, of nearly nine index points, occurred between 2007 and 2008. In contrast, the fatalities profile varies significantly post 2008. In this period values plateaued at approximately 60.0 index points until 2011 and returning to 57.8 index points in 2013, after being distorted by a relatively safe year in 2012. Furthermore, the largest fall in index points for fatalities (22.5 index points) occurred in 2009, a year later than for total casualties.

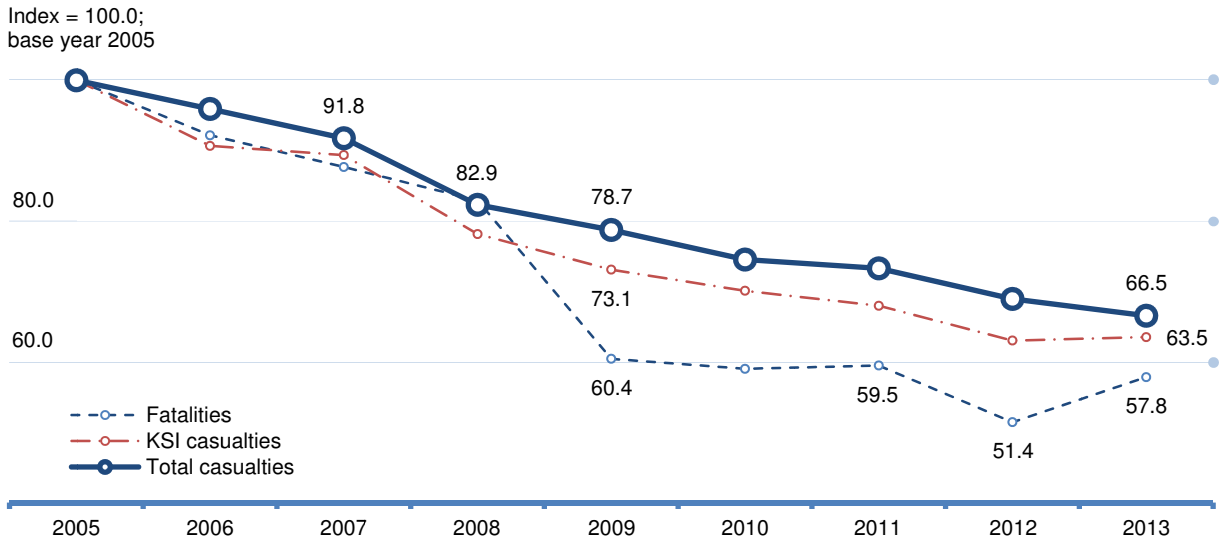


Figure 3-2 Index of changes in historic casualties by severity between 2005 and 2013

3.2 Future Casualty Trends

In this section, forecasts of future casualties across severities have been produced using simplified models based on either:

- line of best fit – an exponential trendline is fitted to the historic data and then used to project forward past 2013; or
- fixed casualty rate against traffic growth – an average casualty rate is determined and multiplied by each year's anticipated traffic levels post 2013.

Both forecast types assume that future casualty trends are based on current investment by the Highways Agency already influencing safety on the SRN.

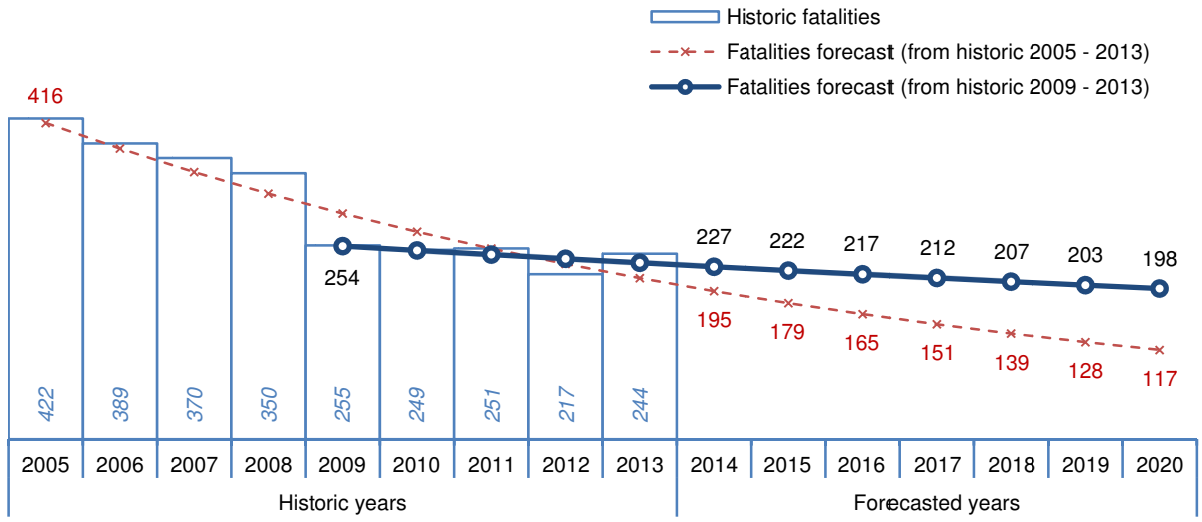


Figure 3-3 Forecasted fatalities calculated by exponential line of best fit between 2014 and 2020

Forecasted fatalities by 2020

260 fatalities[7]

6.4 per cent from 2013

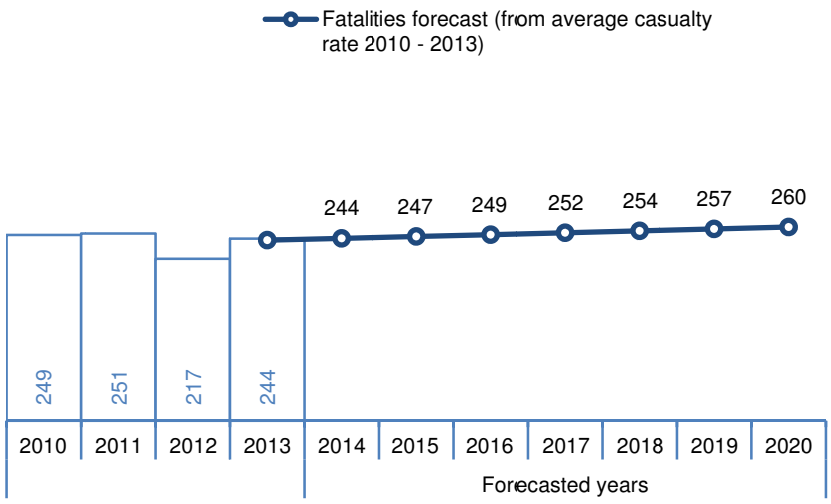


Figure 3-4 Forecasted fatalities calculated by fixed casualty rate against anticipated traffic growth between 2014 and 2020

Forecasts for fatalities based on the line of best fit and a fixed casualty rate are depicted in **Figure 3-3** and **Figure 3-4** respectively. From the two figures, the most optimistic forecast of future fatalities (117 in 2020) was found in the first figure. This forecast derives from a line of best fit incorporating all of the data between 2005 and 2013.

[7] Based on the 2010 to 2013 average fatality rate of 0.286 fatalities per HMVM. Traffic growth based on assessment of historic trends provided in the National Road Traffic Survey of year-on-year motor vehicle traffic since 1949. This report assumes that the forecasts for traffic growth between 2014 and 2020 will be 1.0 per cent growth per annum.

However as discussed in the previous section, the plateauing of fatalities occurring between 2009 and 2011 creates uncertainty in this forecast as the correlation between the values and the best line of fit weaken after this point. Therefore as shown in **Figure 3-3**, a second forecast based on data after 2008 has also been calculated leading to a stronger correlation. This has resulted in a more conservative value of 198 fatalities in 2020.

Since 2010, traffic levels have begun to increase following the decline in overall volumes caused by the 2008 recession as discussed in **Section 2.2** and shown in **Figure 2-2**. The increase in traffic coupled with an increasingly static fatality rate leads to the most conservative estimate of fatality reduction as highlighted in **Figure 3-4**. Based on this approach it can be calculated that by 2020, fatalities would have in fact increased by 6.4 per cent to 260 (259.54 to 2.d.p) from 244 in 2013.

Figure 3-5 and **Figure 3-6** show an analysis of trends similar to fatalities reported above, however replicated for KSI casualties instead.

Using similar lines of best fit employed for fatalities, the two forecasts in **Figure 3-5** show that in 2020, the number of KSI casualties could potentially range from 1,069 to 1,280. The upper bound of the forecast is based on the last five years of historic data whilst the lower bound takes into account all of the historic data between 2005 and 2013.

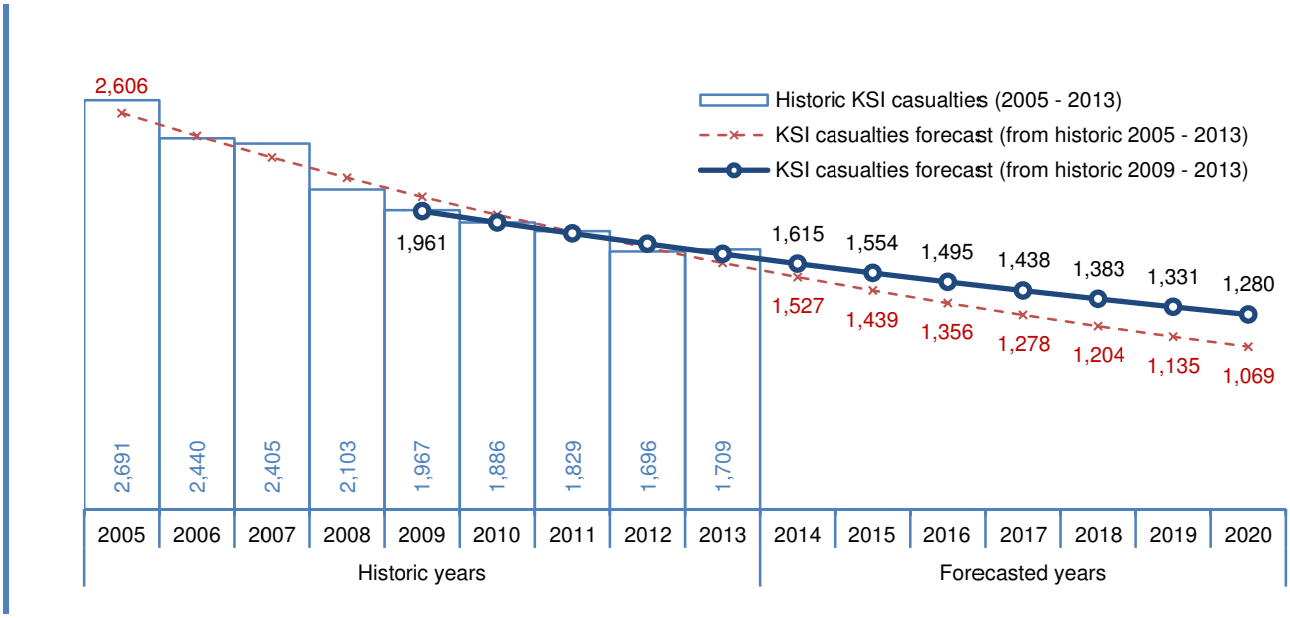


Figure 3-5 Forecasted KSI casualties calculated by exponential line of best fit between 2014 and 2020

Similar to **Figure 3-4**, **Figure 3-6** forecasts based on increasing traffic levels (1.0 per cent growth per annum) and a constant KSI casualty rate. The figure shows that the

number of KSI casualties is forecasted to be 1,923 by 2020, which will be 12.5 per cent higher than the 2013 value of 1,709.

Forecasted KSI casualties by 2020

1,923 KSI casualties[8]

↑ 12.5 per cent from 2013

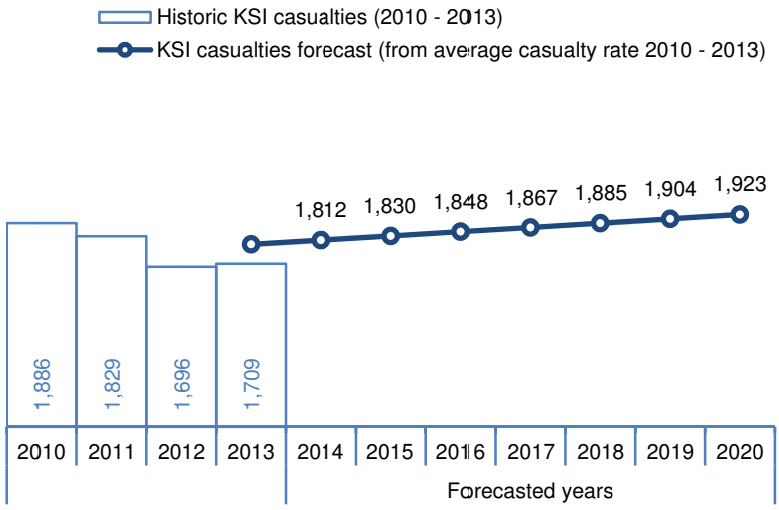


Figure 3-6 Forecasted KSI casualties calculated by fixed casualty rate against anticipated traffic growth between 2014 and 2020

[8] Based on the 2010 to 2013 average KSI casualty rate of 2.108 KSI casualties per HMVM. Please refer to note 7 for further information.

3.3 Casualties by Type and Age

This section provides an overview of casualty types and ages involved in collisions on the SRN. **Figure 3-7** illustrates all 244 fatalities in 2013 by type, gender and age.

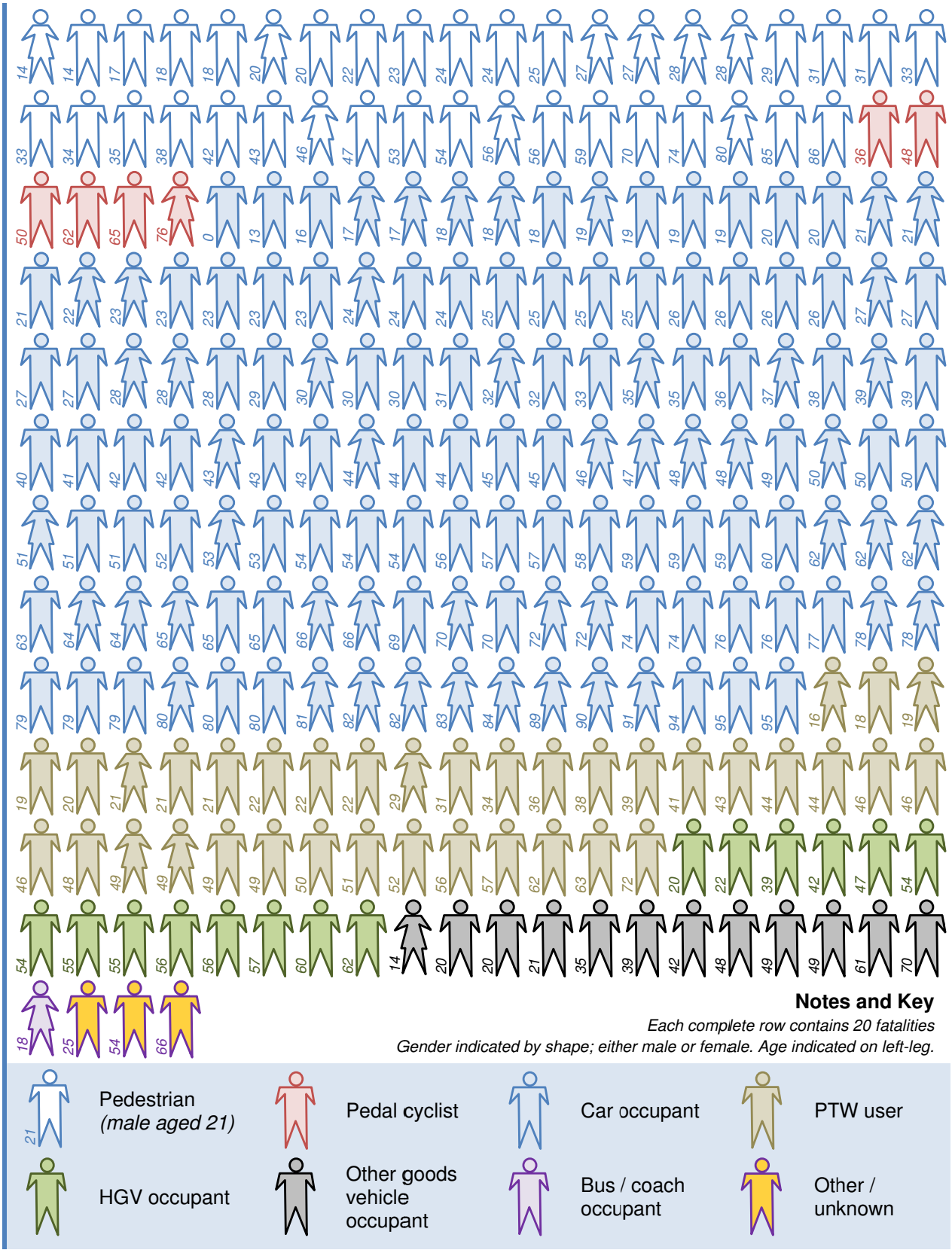


Figure 3-7 Pictogram of all SRN fatalities by casualty type, gender and age, 2013

It can be seen in **Figure 3-7** that road users of all ages and user types were killed on the SRN in 2013; including an infant aged less than one years old who was a car occupant. The fatalities in the pictogram are summarised in **Table 3-1** by casualty type and age banding.

Table 3-1 Summary of fatalities by casualty type and age banding, 2013

Casualty age banding / casualty type	Children (0-15)	Young (16-19)	Other (20-59)	Older (60-69)	Elderly (70+)	Total
Pedestrian	2	3	28	0	5	38
Pedal cyclist	0	0	3	2	1	6
Car occupant	2	10	80	13	28	133
PTW user	0	4	30	2	1	37
HGV occupant	0	0	12	2	0	14
Other goods vehicle occupant	1	0	9	1	1	12
Bus / coach occupant	0	1	0	0	0	1
Other / unknown	0	0	2	1	0	3
Total	5	18	164	21	36	244

Analysing historic changes in casualty type as detailed in **Appendix C Table C-3**; the biggest increases in fatalities in 2013 from 2012 occurred in car occupants (by 9.0 per cent from 122 to 133) and PTW users (by 60.9 per cent from 23 to 37).

Similarly, observing historic changes in casualty age bands as detailed in **Appendix C Table C-2** highlights a relatively large increase in young fatalities by 3.5 times from 4 in 2012 to 18 in 2013. However, the large increase is primarily due to 2012 being the safest year on record (in terms of young fatalities) and lays outside of the expected bounds; therefore the increase in 2013 represents a return to trend as outlined in **Figure 3-8**. The increase in young fatalities, particularly involving young motorists is discussed further in **Section 5.1**, the fatalities topic of interest and **Section 5.3**, the young motorist topic of interest.

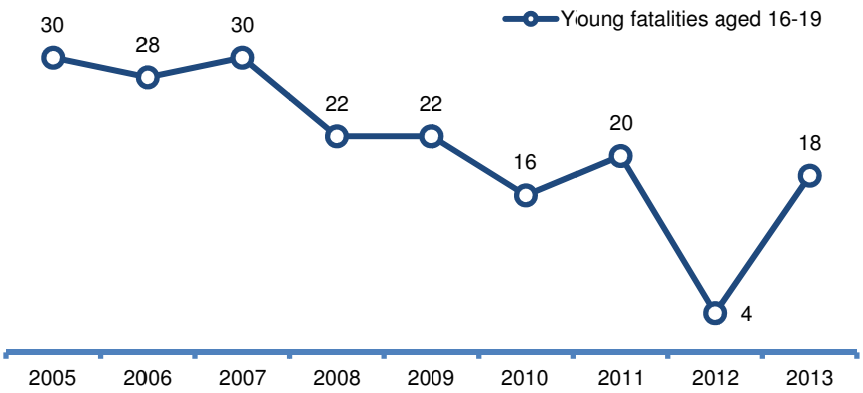


Figure 3-8 Historic young fatalities aged 16 to 19 by year

Other changes in casualty types and ages between 2012 and 2013 for KSI and total casualties are shown below in **Table 3-2**.

Table 3-2 Selected changes in KSI and total casualties by casualty type and age banding between 2012 and 2013

	KSI casualties
Young (16-19) 103 KSI casualties ↑ 30.4 per cent from 2012	• Increase of 24 KSI casualties from 79 in 2012. • Equivalent to 30.4 per cent. • 13 out of the 24 KSI casualty increase was a PTW user (54.2 per cent). • 8 out of the 24 KSI casualty increase was a car occupant (33.3 per cent).
Elderly (70+) 188 KSI casualties ↑ 33.3 per cent from 2012	• Increase of 47 KSI casualties from 141 in 2012. • Equivalent to 33.3 per cent. • 39 out of the 47 KSI casualty increase was a car occupant (83.0 per cent).
Bus / coach occupants 39 KSI casualties ↑ 4.5 times 2012 value	• Increase of 32 KSI casualties from 7 in 2012. • Equivalent to 4.5 times 2012 value. • KSI collisions with multiple (20+) bus or coach occupant casualties have typically occurred every 3 years (2013, 2010, 2007) whilst intermediate years have remained relatively low between the range of 3 to 11 KSI casualties.
Pedal cyclists 34 KSI casualties ↓ 37.0 per cent from 2012	• Decrease of 20 KSI casualties from 54 in 2012. • Equivalent to 37.0 per cent. • 18 out of the 20 KSI casualty improvement was pedal cyclists aged between 20 and 59 (90.0 per cent).
	Total casualties
Pedestrians 183 Total casualties ↑ 23.6 per cent from 2012	• Increase of 35 total casualties from 148 in 2012. • Equivalent to 23.6 per cent. • 35 out of the 35 casualty increase were pedestrians aged between 20 and 59.

3.4 Casualties involving Motorists and Riders of Specific Age Groups

A summary of casualties involving at least one motorist or rider from a specific age group for 2013 is shown below in **Figure 3-9**. As shown in the key in **Figure 3-9**, the inner ring shows the distribution of casualty severity involved. Secondly, the outer ring indicates the percentage of casualties where at least one contributory factor was attributed to the motorist or rider age group specified in the collision. The second measure gives an outline approximation of how active the specified age group was in contributing to the resulting casualties.

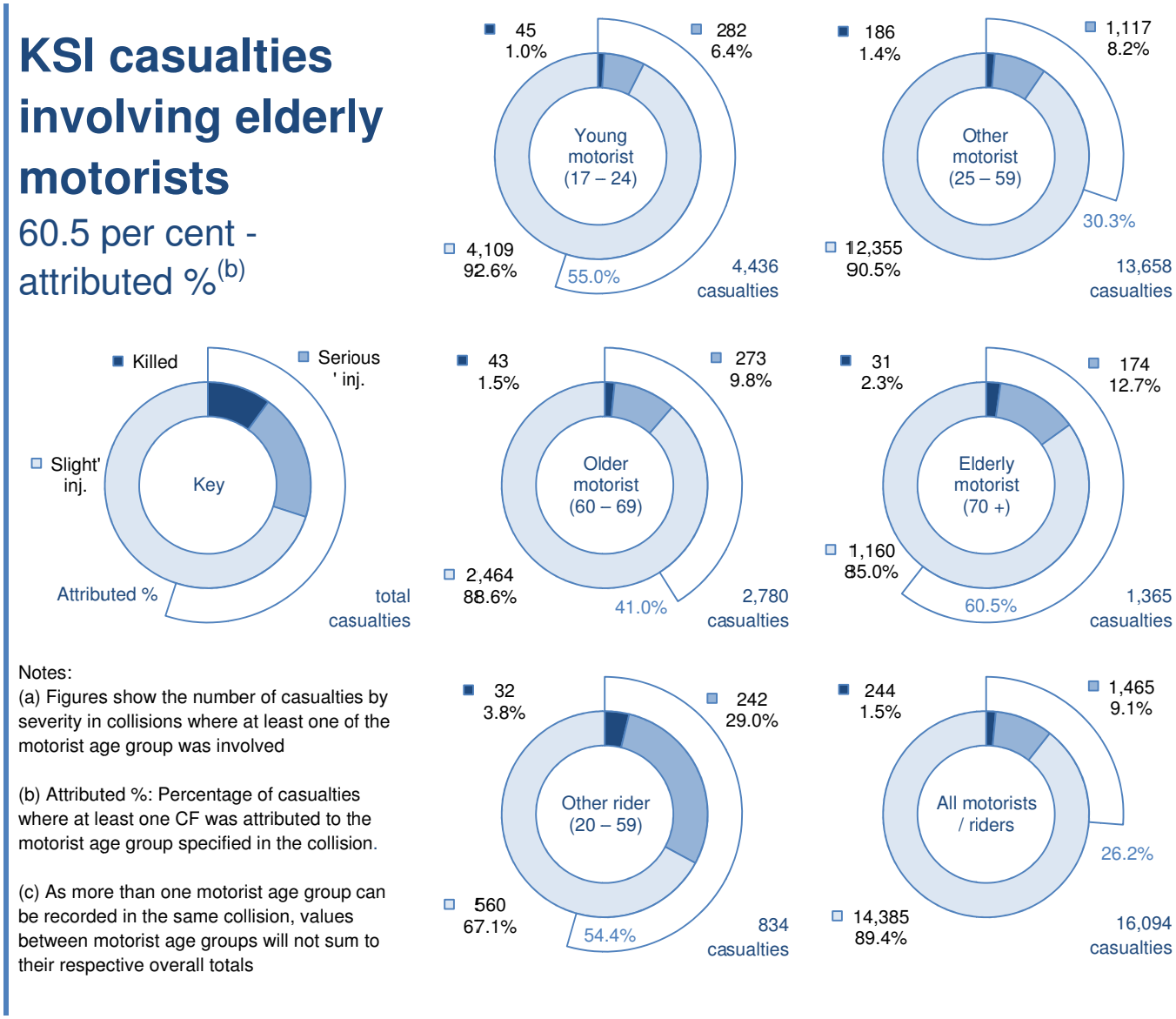


Figure 3-9 Summary of casualties involving specific motorist and rider age groups, 2013

When comparing the casualty severity distribution for each age group to all motorists and riders in **Figure 3-9**, the percentage of fatalities and seriously injured casualties

involving motorists aged 60 and over (older and elderly) and riders aged between 20 and 59 are typically higher than that of all motorists and riders. For example, in 2013 the percentage of seriously injured casualties involving other riders (29.0 per cent) was over three times the respective value for all motorists and riders (9.1 per cent).

The number of fatalities involving young motorists, as detailed in **Figure 3-9** was 45 in 2013. Cross-referencing with **Figure 5-15**, found in the young motorist topic of interest, it can be shown that the number of fatalities involving at least one young motorist increased by 45.2 per cent to 45 in 2013 from 31 in 2012. It is particularly significant as the magnitude of the increase correlates strongly with the overall increase in fatalities in 2013.

Assessing the percentage of total casualties attributed[9] to each motorist or rider age group, highlights that elderly motorists (aged 70 or over) are one of the least safest age groups using the SRN. Elderly motorists were assigned a contributory factor in over 60.5 per cent of resulting casualties. Young motorists and other riders (aged between 20 and 59) were assigned similar values, with 55.0 per cent and 54.4 per cent respectively.

[9] Refer to Figure 3-9 for definition of percentage attributed.

3.5 Casualties where Human Factors Contributed

Figure 3-10 is an assessment of the contributing human factors which result in KSI casualties on the SRN. These human factors broadly fall into 4 categories of contributory factor: driver/rider error or reaction, impairment or distraction, injudicious action, and behaviour or inexperience. Selected key factors that comprise each category are also included[10].

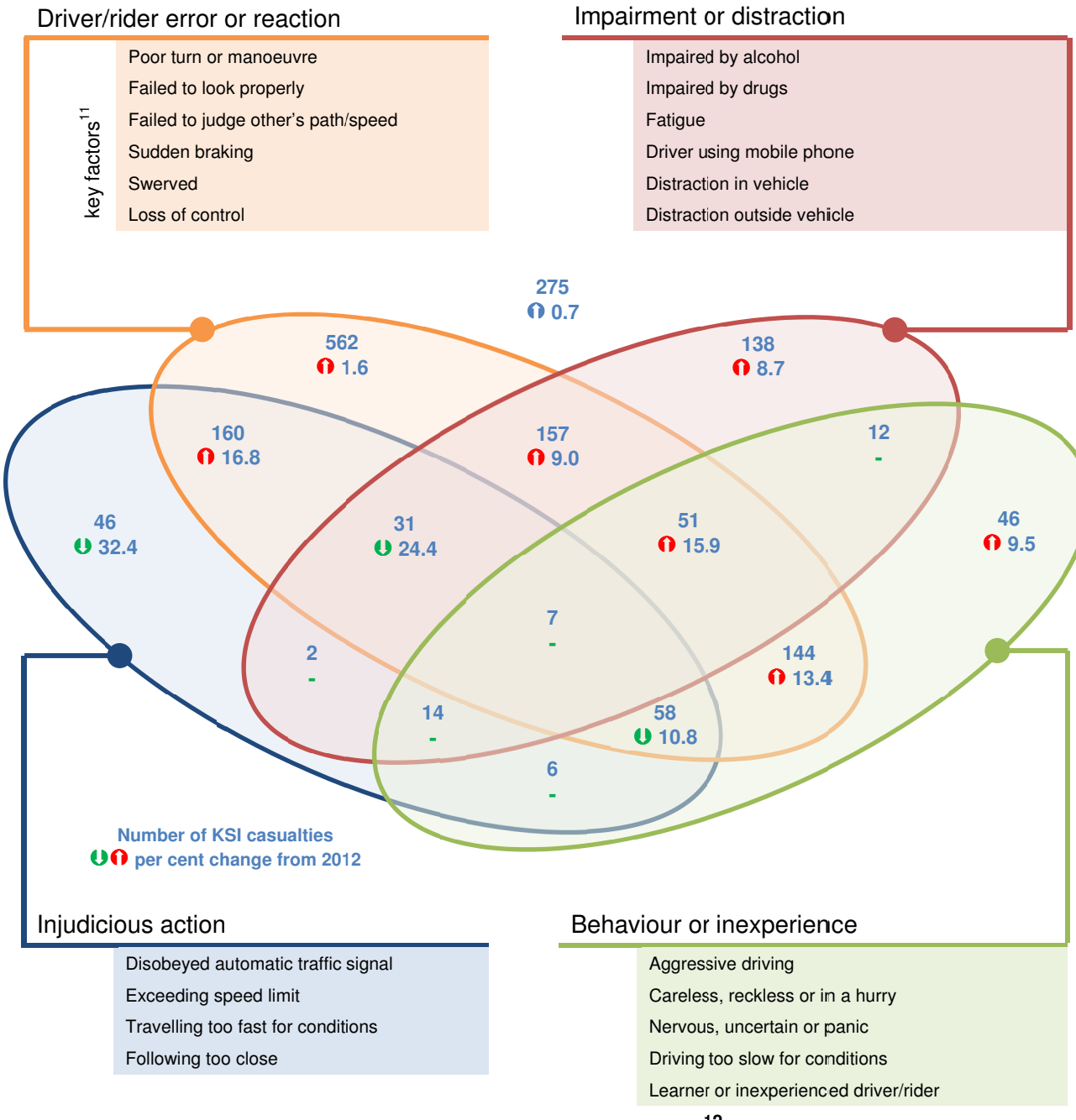


Figure 3-10 Summary Venn[12] of KSI casualties involving multiple human factors, 2013

[10] For full listings of contributory factors in these groupings please refer to **Appendix F Table F-1**
[11] Refer to the preceding note.

Figure 3-10 shows the number of KSI casualties involving at least one of the four categories of human factor can be calculated where a value lies entirely within the boundary of the connected oval. For example there were 1,170 KSI casualties[13] in 2013 involving at least one factor classed as a driver/rider error or reaction. Of note; this equated to 68.5 per cent of the 1,709 total number of KSI casualties in 2013.

Human factors remain the largest single cause of killed and seriously injured casualties on the SRN. In 2013, there were 1,434 KSI casualties involving at least one human factor representing 83.9 per cent of total KSI casualties.

In 2013, the number of KSI casualties involving injudicious actions (speeding, following too close) was 324, 10.5 per cent reduction from 362 KSI casualties in 2012.

Impairment or distraction coupled with driver/rider error or reaction contributed to a combined 246 KSI casualties in 2013. It could be assumed that within these cases the impairment or distraction was in fact the primary factor. Overall, KSI casualties involving impairment or distraction totalled 412 in 2013 as shown in the figure above in the red oval.

Investigating the impairment or distraction human factor category further, **Figure 3-11** details the number of KSI casualties involving at least one driver using a mobile phone. From the figure it can be seen that since 2010, the number of KSI casualties has increased by 50.0 per cent to 24 from 16 despite increased awareness and legislation.

Driver using mobile phone

24 KSI casualties

50.0 per cent from 2010

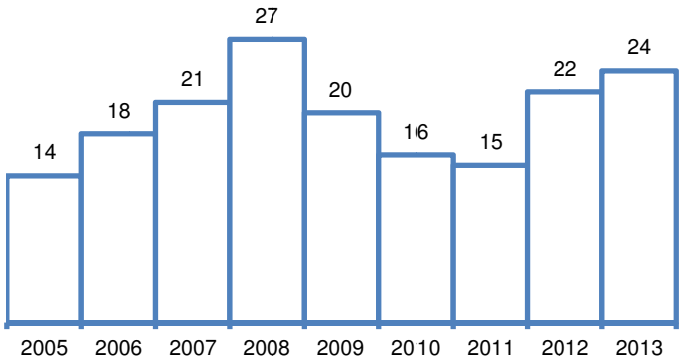


Figure 3-11 Historic KSI casualties involving mobile phones by year

[12] Four set Venn diagram adapted from John Venn (1880) "On the employment of geometrical diagrams for the sensible representations of logical propositions," Proceedings of the Cambridge Philosophical Society, 4: Page 51. Accessed via https://archive.org/stream/proceedingsofcam4188083camb#page/51/mode/1up with reference obtained using http://en.wikipedia.org/wiki/Venn_diagram#cite_note-Venn1881-11

[13] All values within the orange oval (562 + 160 +157 +31 +51 + 7 + 144 + 58) in Figure 3-10.

Finally, **Table 3-3** highlights the top 3 human contributory factors along with additional selected contributory factors resulting in casualties by severity for 2013. As indicated by the rank colour coding, which corresponds to the colour coding in **Figure 3-10**, the top 3 contributory factors involved in KSI casualties were all driver/rider error or reaction. This category features heavily in all collisions as stated previously.

Table 3-3 Top 3 human contributory factors involved in casualties by severity including additional selected contributory factors, 2013

Rank	Contributory factor	KSI	Killed	Seriously injured	Slightly injured	Total casualties
1	Failed to look properly	484	64	420	4,433	4,917
2	Loss of control	405	67	338	2,135	2,540
3	Failed to judge other person's path or speed	386	35	351	3,951	4,337
Selected other factors						
5	Careless, reckless or in a hurry	221	32	189	1,552	1,773
7	Fatigue	149	26	123	552	701
8	Following too close	125	6	119	2,127	2,252
9	Travelling too fast for conditions	124	16	108	1,045	1,169
11	Illness or disability, mental or physical	105	15	90	271	376
12	Impaired by alcohol	98	22	76	379	477
13	Distraction in vehicle	89	16	73	632	721
14	Exceeding speed limit	67	22	45	360	427
15	Aggressive driving	56	16	40	304	360
16	Learner or inexperienced driver/rider	40	4	36	361	401

Notes:
(a) table reports number of casualties.
(b) table ranked by KSI casualties.
(c) as more than one contributory factor can be recorded per collision; columns will not sum to their respective totals.
(d) colour coding on rank corresponds to human factor groupings in Figure 3-10.

Continuing with assessing the impairment or distraction human factor category, which includes fatigue, impaired by alcohol and distraction in vehicle; from the table it is still evident that these factors are major issues with 149, 98 and 89 KSI casualties respectively in 2013.

4 Vehicles

The vehicle chapter briefly assesses the impact of vehicles on casualties occurring on the SRN.

The section will primarily focus on highlighting the change in vehicle types on the network and the casualties resulting from different vehicle interactions. Finally, an overview of casualties where vehicle defects contributed is also provided.

4.1 Traffic Estimates by Vehicle Type

An estimate of vehicle traffic levels[14] on the SRN in 2013 is shown in **Figure 4-1**. As shown in the figure, the largest percentage of vehicle traffic is generated by cars (75.3 per cent) followed by other goods vehicles[15] with 13.6 per cent.

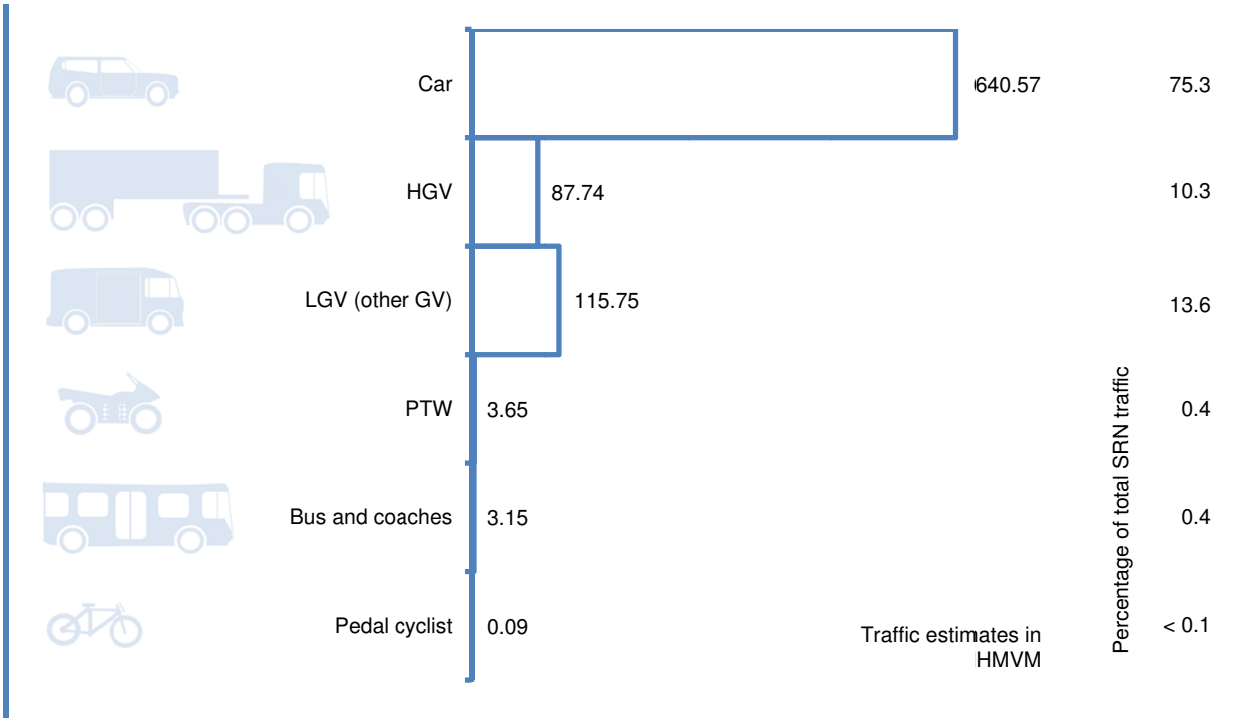


Figure 4-1 Estimated vehicle traffic by DfT vehicle type, 2013

Between 2010 and 2013, out of the three major vehicle types (car, HGV, LGVs), the largest increase was LGVs equivalent to 10.1 per cent. As shown in **Figure 4 2**, LGV traffic increased steadily from 105.12 HMVM in 2010 to 115.75 HMVM in 2013.

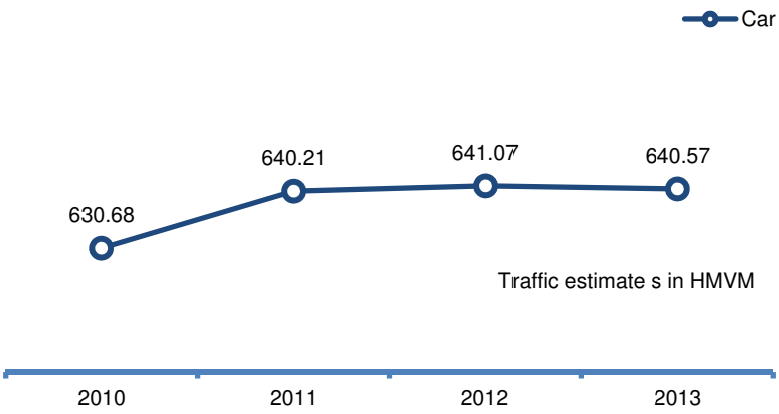
In contrast, in the same period HGV traffic decreased by 4.1 per cent and car traffic only increased by 1.6 per cent. Based on traffic estimates, car traffic has remained relatively static over the last three years ranging only between 640.21 and 641.07 HMVM.

[14] Vehicle traffic estimates were determined using countpoint vehicular data accessed from the DfT Traffic Counts website found at http://www.dft.gov.uk/traffic-counts/ along with the underlying assumptions and collection methods. Only countpoints aligned with the 2010 reference network were used in the calculation.

[15] For the purposes of reporting traffic estimates, the vehicle type "Other goods vehicles" is represented by light goods vehicles (LGV) as termed by the DfT.

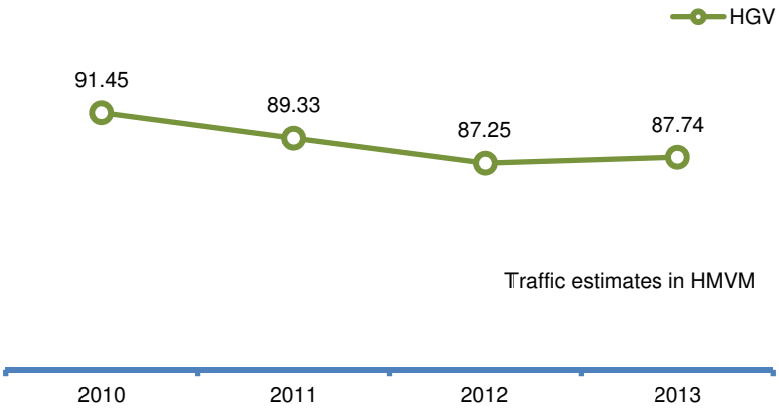
Car

1.6 per cent from 2010



HGV

4.1 per cent from 2010



LGV

10.1 per cent from 2010

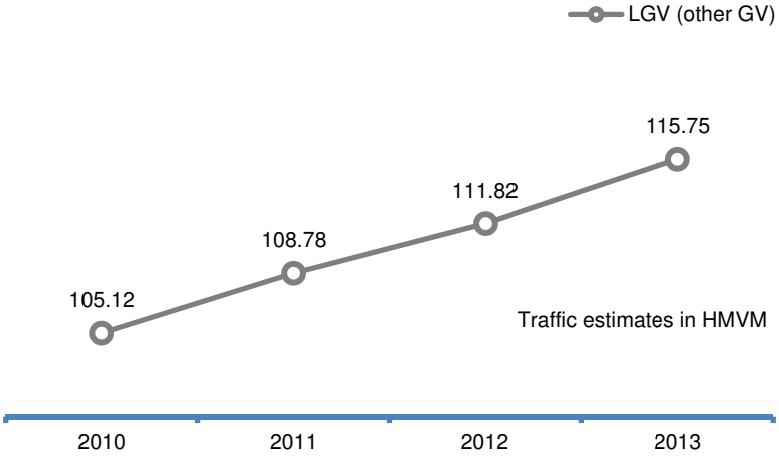


Figure 4-2 Growth of vehicle traffic between 2010 and 2013

4.2 Casualties from Vehicle Interactions

An evaluation of how specific vehicle interactions influence the numbers of casualties in 2013 by severity and type is provided in **Figure 4-3** and **Figure 4-4**. The first figure reports the resulting casualties (including pedestrians) where only one vehicle type was involved; the second figure reports where two vehicle types were involved. A full assessment of all collision types (A to AO) are reported in **Appendix E Table E-3**.

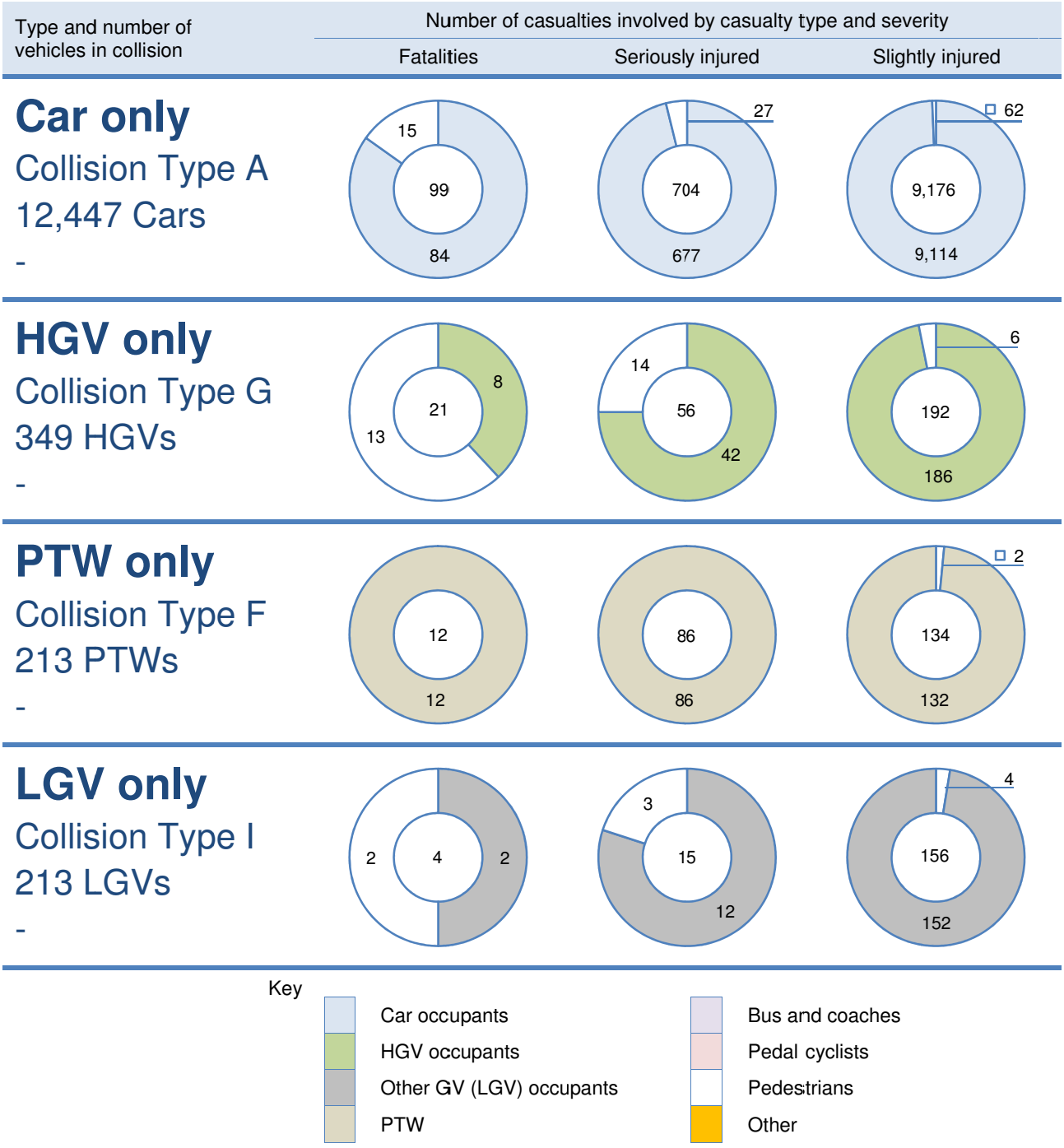


Figure 4-3 Casualties resulting from vehicle interactions involving a single vehicle type by casualty type and severity, 2013

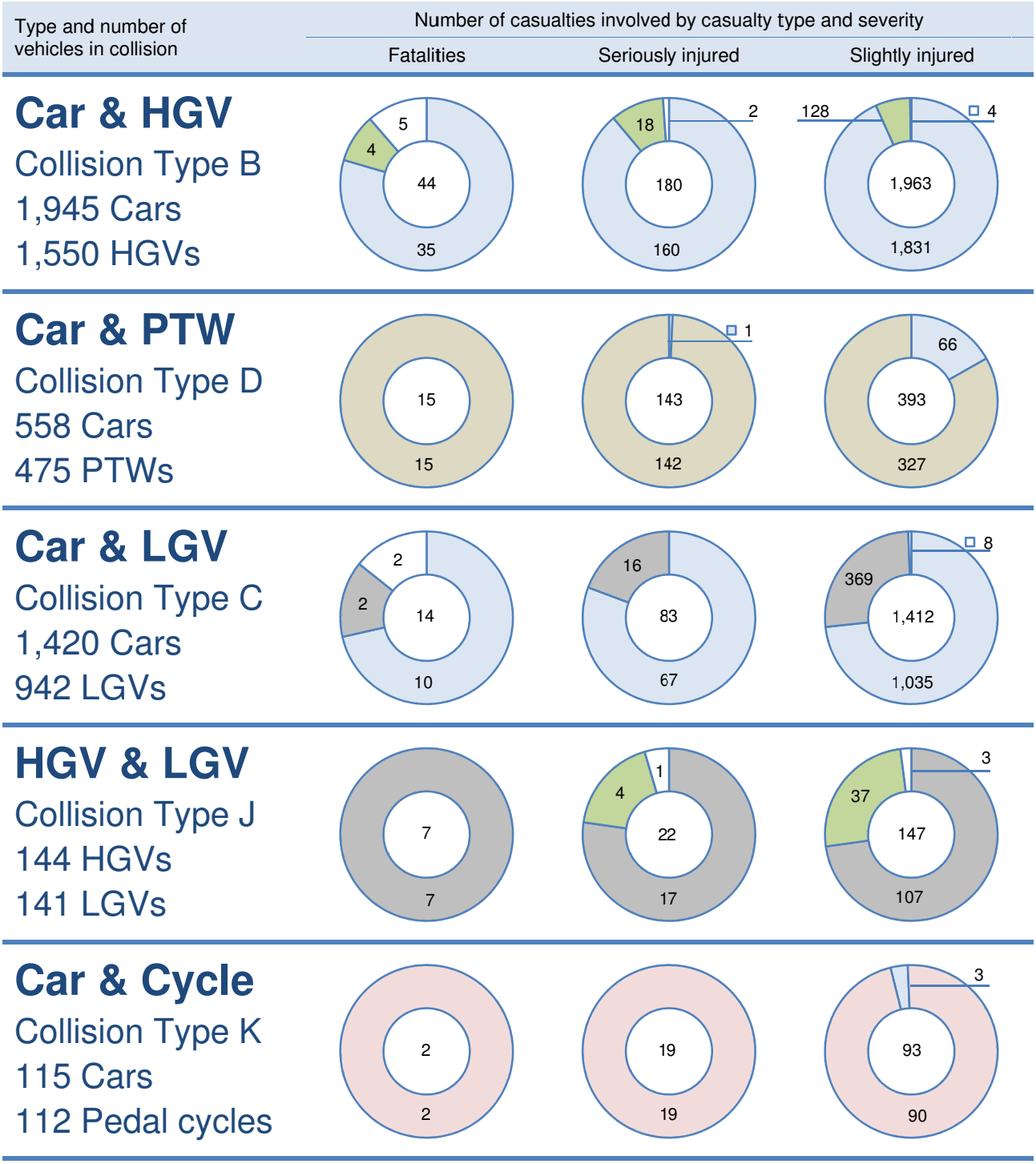


Figure 4-4 Casualties resulting from vehicle interactions involving multiple vehicle types by casualty type and severity, 2013

The most frequent interaction as shown in **Figure 4-3** was car only collisions (type A). Car only collisions resulted in 99 fatalities, equivalent to 40.6 per cent of the 244 total fatalities in 2013.

As shown by collision types A and G, 15 pedestrian fatalities in 2013 involved a car and 13 a HGV.

Where cars collide with vulnerable roads users such as PTW user and pedal cyclists as shown in collision types D and K in **Figure 4-4**, the vulnerable road users are at high risk of being fatally or seriously injured. In these collision types, 99.4 per cent of the 179 KSI casualties where vulnerable road users.

4.3 Casualties where Vehicle Defects Contributed

Section 4.3 evaluates the number of casualties where at least one vehicle within a collision had a defect which was a contributory factor. As shown previously in **Figure 2-3**, it is apparent that the economic situation is recovering and hence this section also assesses the corresponding historic trends in vehicle defects.

Figure 4-5 summarises specific factors classed as vehicle defects and their overall impact on KSI casualties for 2013. In 2013 the most common vehicle defect resulting in 29 KSI casualties was tyres that were illegal, defective or under inflated. However for further detailed analysis of the tyres contributory factor refer to the tyre topic of interest in **Section 5.10**.

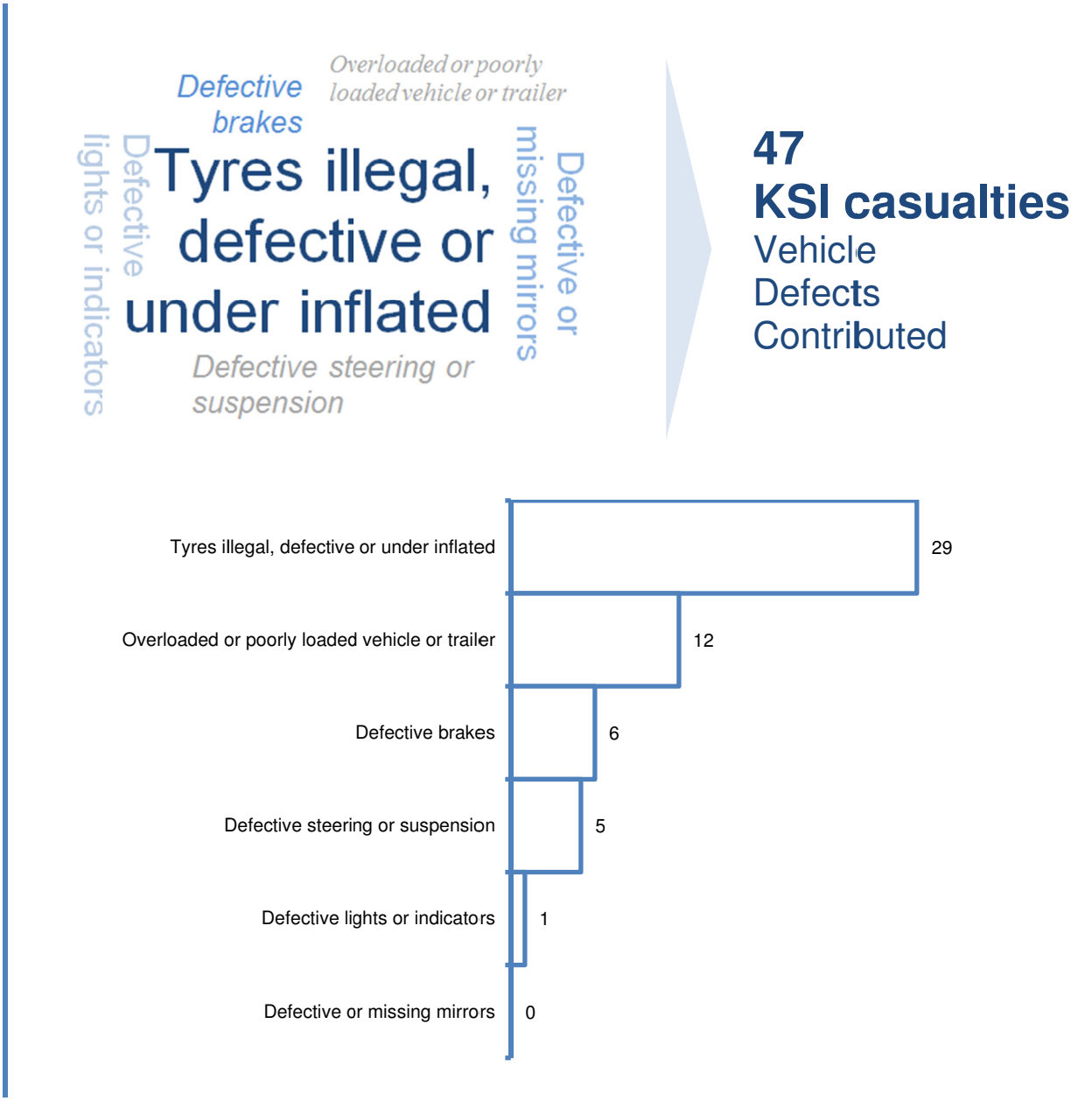


Figure 4-5 KSI casualties involving at least one vehicle defect contributory factor, 2013

Assessing the historic KSI causalities involving vehicles defects as highlighted in **Figure 4-6** shows that between 2005 and 2013 there was a total reduction of 64.4 per cent from 132 to 47. This reduction is at a faster rate than the overall KSI casualties that within the same period reduced by 36.5 per cent from 2,691 to 1,709. The most significant change over the period was between 2012 and 2013, which resulted in a reduction in KSI casualties involving vehicle defects of 33.8 per cent from 71 in 2012 to 47 in 2013.

Comparison of **Figure 4-7**, which shows the percentage of KSI casualties involving a vehicle defect to total KSI casualties and **Figure 2-3** show that there is a potential correlation between improving economic conditions and reductions in vehicle defects. Improved economic conditions have increased the number of newer vehicles[16] on the road.

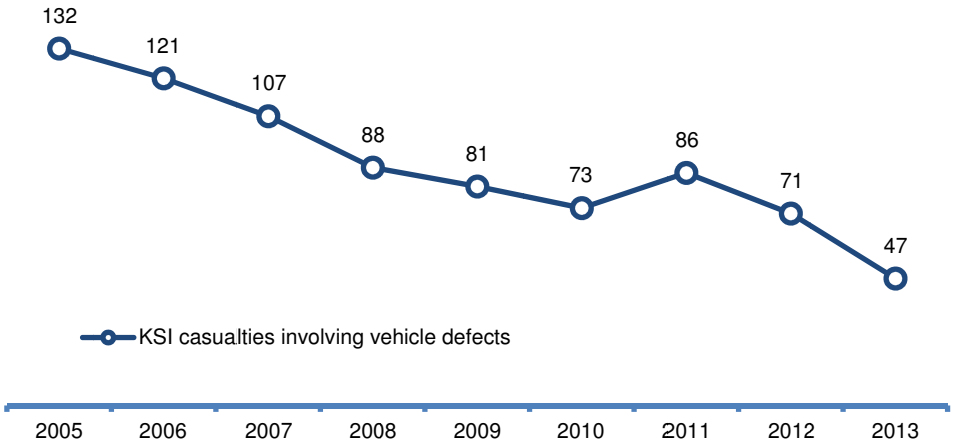


Figure 4-6 Historic KSI casualties involving at least one vehicle defect contributory factor by year

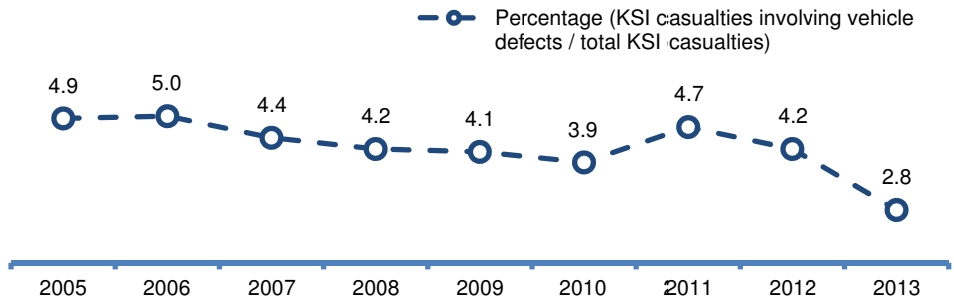


Figure 4-7 Historic KSI casualties involving at least one vehicle defect contributory factor expressed as a percentage of total KSI casualties by year

[16] UK car industry enjoys longest period of sales growth since 1959, The Guardian 5th June 2014, Accessed via http://www.theguardian.com/business/2014/jun/05/uk-car-industry-longest-period-sale-growth-1959

5 Topics of Interest

The purpose of the chapter is to provide analysis and published data for a number of topics of interest. The topics are themes that affect the SRN and hence include more detailed analysis than the overall assessment of casualty trends in the previous chapters.

The topic of interest chapter includes the following:

- fatalities;
- seriously injured casualties;
- young motorists;
- smart motorway data;
- lighting on the SRN;
- weather effects on the SRN
- roadworks;
- objects hit on and off the carriageway;
- junctions;
- tyres;
- goods vehicles;
- motorcycles (PTWs); and
- hardshoulders and lay-bys.

5.1 Fatalities

This topic of interest looks specifically at fatalities occurring on the SRN. As shown previously in **Figure 3-1** and **Table 5-1** below, the number of fatalities in 2013 has risen by over 12.4 per cent since 2012 from 217 to 244.

Table 5-1 Number of fatalities by year

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fatalities	422	389	370	350	255	249	251	217	244
Percentage change from previous year	-	7.8	4.9	5.4	27.1	2.4	0.8	13.5	12.4

In 2013, there were 244 fatalities in 226 fatal collisions involving 470 vehicles. In addition, assessing the average number of fatalities per collision shows there were 2.4 fatalities for every hundred collisions on the SRN (244 fatalities / 10,145 total collisions), up 16.6 per cent from 2.1 in 2012. This is the highest ratio since 2008.

Additional collision, casualty and contributory factor data for fatalities is available in **Appendix H** for reference.

5.1.1 Fatalities by road classification

The number of fatalities by road classification between 2010 and 2013 is shown in **Table 5-2**. Between 2012 and 2013, the number of fatalities on:

- motorways increased by 11.5 per cent from 78 to 87;
- non built-up dual carriageways has increased by 10.0 per cent from 80 to 88; and
- all single carriageways has increased by 21.8 per cent from 55 to 67.

Table 5-2 Number of fatalities by road classification and year

Year	2010	2011	2012	2013
Motorway M & A(M)	**110**	**90**	**78**	**87**
A-road Dual Carriageway	**92**	**103**	**84**	**90**
Built up	1	6	4	2
Non built up	91	97	80	88
A-road Single Carriageway	**47**	**58**	**55**	**67**
Built up	5	8	8	11
Non built up	42	50	47	56

The rise in motorway fatalities is characterised by increased PTW occupant fatalities with an increase of 11 fatalities between 2012 and 2013, albeit from a very low base value of 2 fatalities in 2012. On motorways there is little fluctuation in other casualty types. However, the rise in fatalities occurring on non-built-up single carriageways was in tandem with an absolute increase of 13 car occupant fatalities with the majority involving young motorists or motorists aged between 25 and 39.

5.1.2 Contributory factors resulting in fatal collisions

The number of fatal collisions where a particular contributory factor was reported at least once is listed in the **Table 5-3** and **Table 5-4** below. For example, in 2013 there were 59 fatal collisions where the contributory factor "Failed to look properly" was reported at least once.

Table 5-3 Number of fatal collisions where a particular CF was reported at least once, 2012 to 2013 [factors 1 – 10]

No.	Contributory Factor		2012	2013
1	405	Failed to look properly	48	59
2	410	Loss of control	50	58
3	406	Failed to judge other person's path or speed	28	32
4	602	Careless, reckless or in a hurry	24	30
5	503	Fatigue	22	24
6	403	Poor turn or manoeuvre	25	23
7	306	Exceeding speed limit	8	19
8	409	Swerved	21	19
9	501	Impaired by alcohol	9	19
10	509	Distraction in vehicle	9	16

Notes:
(a) Values in the table report the number of collisions by severity where at least one of the specified contributory factors was recorded.

Table 5-4 Number of fatal collisions where a particular CF was reported at least once, 2012 to 2013 2013 [factors 11 – 20]

No.	Contributory Factor		2012	2013
11	307	Travelling too fast for conditions	19	15
12	505	Illness or disability, mental or physical	20	15
13	601	Aggressive driving	4	14
14	103	Slippery road (due to weather)	13	13
15	806	Impaired by alcohol (Pedestrian)	8	12
16	809	Pedestrian wearing dark clothing at night	13	10
17	810	Disability or illness, mental or physical (Pedestrian)	10	10
18	408	Sudden braking	7	9
19	802	Failed to look properly (Pedestrian)	7	9
20	803	Failed to judge vehicle's path or speed (Pedestrian)	4	9

"Failed to look properly" and "loss of control" remain the most frequently occurring contributory factors involved in fatal collisions. However, the most notable changes from 2012 are that the number of fatal collisions involving speeding (increased by 11 fatal collisions), drink driving (increased by 10) or distractions inside the vehicle (increased by 7) have all approximately doubled in the last year. Aggressive driving has also increased significantly by 10 fatal collisions to 14 from 4 in 2012. There were 26 fatal collisions without any recorded contributory factor.

5.1.3 Fatalities resulting from objects hit off carriageway

In 2013, there were 89 fatalities where a vehicle hit an object off the carriageway, an increase of 17.1 per cent from 76 in 2012. All but one of the fatalities resulting from hitting an object off carriageway were on roads where the speed limit was 50mph or greater (motorways, non-built up dual and single carriageways). The split by object hit is shown in **Figure 5-1** below.

The type and frequency of objects hit has varied little in comparison to previous years; however of note, there was a 70.6 per cent increase in fatalities where a near or offside crash barrier was struck, from 17 in 2012 to 29 in 2013.

For historic fatalities between 2005 and 2013 refer to **Table H-5 in Appendix H**.

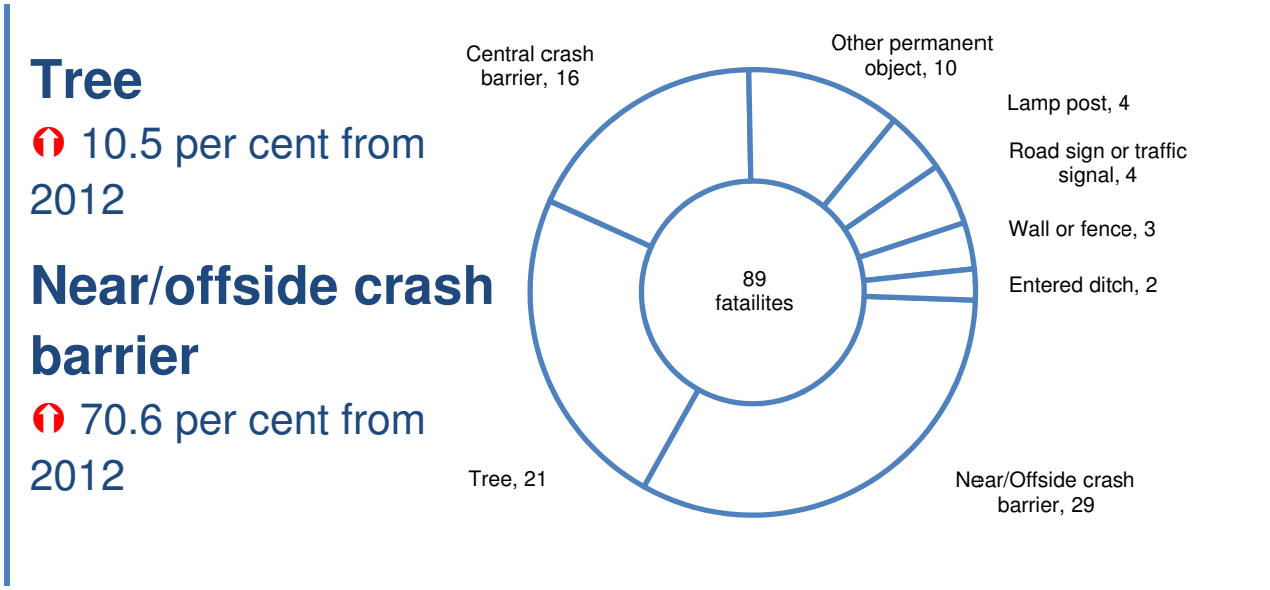


Figure 5-1 Fatalities resulting from objects hit off carriageway, 2013

5.1.4 Fatalities resulting from objects hit on carriageway

The number of fatalities occurring where a vehicle hit an object on the carriageway increased slightly to 19 from 14 in 2012. Between the 19 fatalities, there were 6 where a vehicle hit an object on the carriageway and then subsequently hit an object off carriageway. The most frequent object hit on the carriageway was a stationary vehicle resulting in 10 fatalities with 9 of these fatalities occurring on A-roads. A breakdown of

fatalities resulting from hitting objects on the carriageway can be found in **Table H-4, Appendix H**.

5.1.5 Fatalities resulting from wet skidding

Wet skidding is typically considered as a safety aspect during evaluation of pavement resurfacing schemes. The number of fatalities involving the vehicle skidding[17] in wet or damp conditions rose to 27 from 20 in 2012 (35.0 per cent). Wet or damp conditions accounted for 75 fatalities overall in 2013.

A breakdown of fatalities by road conditions and skidding can be found in **Table H-6, Appendix H**.

5.1.6 Fatalities by light conditions

As shown in **Table H-7** in **Appendix H**, 134 fatalities (54.9 per cent of the 244 total fatalities) occurred in daylight, an increase of 19.6 per cent from 112 in 2012.

As illustrated by the **Figure 5-2**, the number of fatalities on motorways with no lighting (during the hours of darkness) has increased over the period 2011 to 2013 from 20 to 28 fatalities. In contrast, the number of fatalities where the available motorway lights were lit (during darkness) has seen a decrease in the same period.

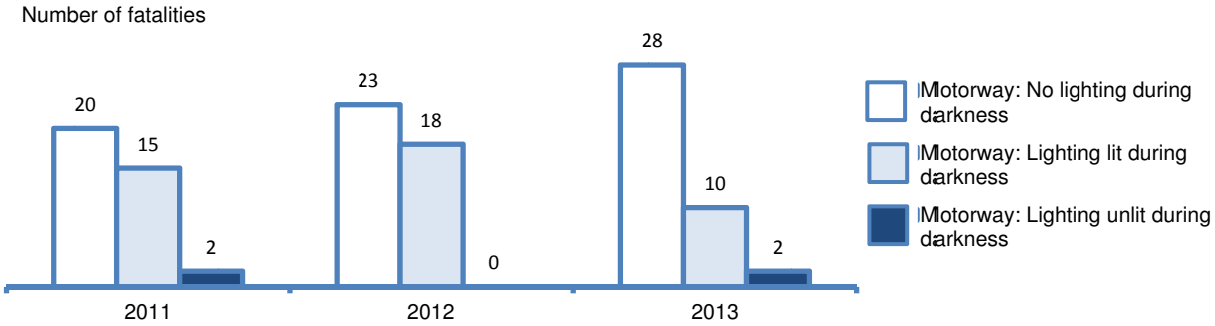


Figure 5-2 Fatalities by motorway lighting conditions between 2011 and 2013

[17] Includes fatalities that were occupants in vehicles that skidded or skidded and overturned.

5.1.7 Fatalities where a specific age group of drivers was involved

This section investigates the impact of specific age groups on the number of fatalities occurring in 2013 and previous years.

The age group with the most notable increase in involvement with fatalities between 2012 and 2013 was young motorists as shown in **Figure 5-3**. Between 2012 and 2013, the number of fatalities involving young motorists increased by 45.2 per cent from 31 to 45. From the figure it can be seen that in 2012, the number of fatalities involving young motorists was very low in comparison to the typical values occurring between 2009 to 2011, and 2013.

The involvement of motorists aged between 25 and 39 also saw an overall increase in the same period. **Figure 5-4** highlights that there was a 9.9 per cent increase in fatalities involving motorists aged 25 to 39 between 2012 (91) and 2013 (100).

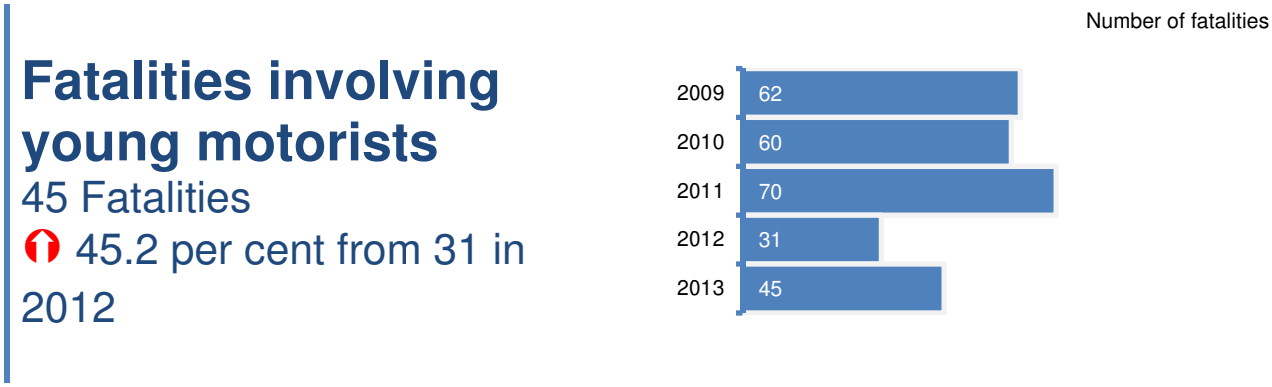


Figure 5-3 Fatalities involving young motorists between 2009 and 2013

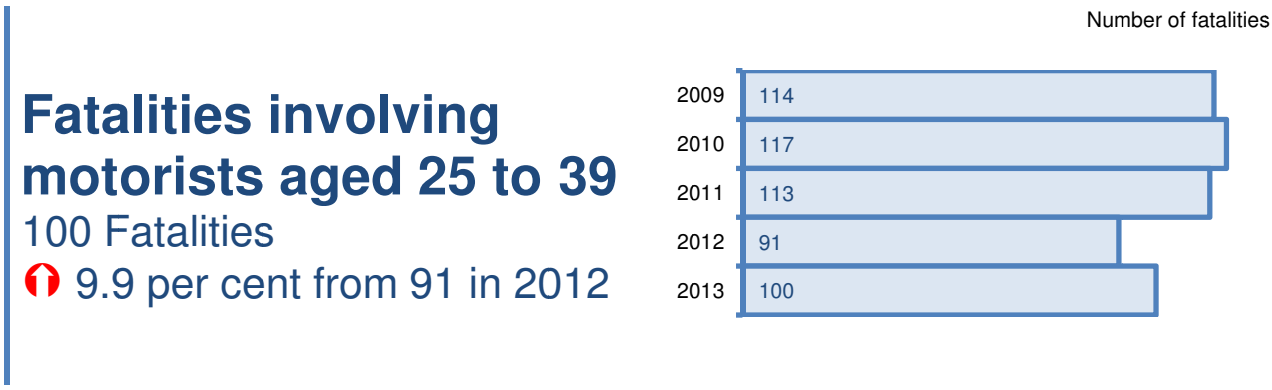


Figure 5-4 Fatalities involving motorists aged 25 to 39 between 2009 and 2013

Table 5-5 summarises all of the driver and rider age groups involved in fatalities between 2009 and 2013. The table shows that in 2012 the decrease in overall fatalities of 34 was accompanied by a fall of 39 fatalities involving young motorists. In 2013, the increase in overall fatalities of 27 was accompanied by a rise of 14 fatalities involving young motorists.

Table 5-5 Number of fatalities involving specific age groups between 2009 and 2013

Age group	2009	2010	2011	2012	2013	2013 per cent change from 2012
All fatalities	255	249	251	217	244	12.4
Young Motorist (17-24)	62	60	70	31	45	45.2
Motorist (25-39)	114	117	113	91	100	9.9
Motorist (40-59)	129	135	141	133	135	1.5
Older Motorist (60-69)	35	33	48	39	43	10.3
Elderly Motorist (70+)	27	25	38	32	31	3.1
Young Rider (16-19)	2	0	1	0	3	-
Rider (20-39)	8	9	10	8	15	-
Rider (40-59)	13	20	9	14	18	28.6
Older Rider (60-69)	4	5	3	0	2	-
Elderly Rider (70+)	1	0	3	1	1	-

Notes:

(a) Table reports the number of fatalities involving at least one motorist or rider aged as specified in the collision.
(b) The "Other" motorist and rider categories have been sub divided where motorists or riders are aged above or below 40 for this table only.
(c) As more than one driver or rider can be present in a single collision, the values in this table will not sum to their respective totals.

5.1.8 Fatalities where a specific vehicle type was involved

Tables H-11 in Appendix H shows the changes in fatalities when considering the vehicle type involved. The table shows that in 2013 the number of fatalities:

- involving at least one car increased by 11.0 per cent to 182 from 164 in 2012;
- involving at least one PTW has increased 60.9 per cent to 37 from 23 in 2012; and
- involving at least one HGV or other goods vehicles (LGV) did not vary greatly from 2012 values and were reported as 89 and 28 respectively.

5.1.9 Fatalities by reporting period

This section briefly analyses the trends in occurrence of fatalities through the year by reporting period (time, day, and month). For further statistics between 2005 and 2013, refer to **Tables H-13** to **H-15** in **Appendix H**.

Figure 5-5 illustrates the distribution of fatalities plotted on a time wheel during each day of the week (Monday to Sunday). Included on the figure are values for 2012, 2013 and in addition, the 2005 to 2009 baseline average.

From the figure, as highlighted on the left hand side of the diagram, it can be seen that the number of fatalities peaks during the late periods of the evening on Friday and

Saturday extending into the early morning the following days. This trend is true for both 2013 and the baseline average data.

In 2013, between 6pm on Friday until 6am on Saturday, there were a total of 29 fatalities, equivalent to 11.9 per cent of total fatalities. In contrast, in the same period for 2012, there were only 17 fatalities. This part of the week is typically associated with increased leisure activities possibly linked to the consumption of alcohol.

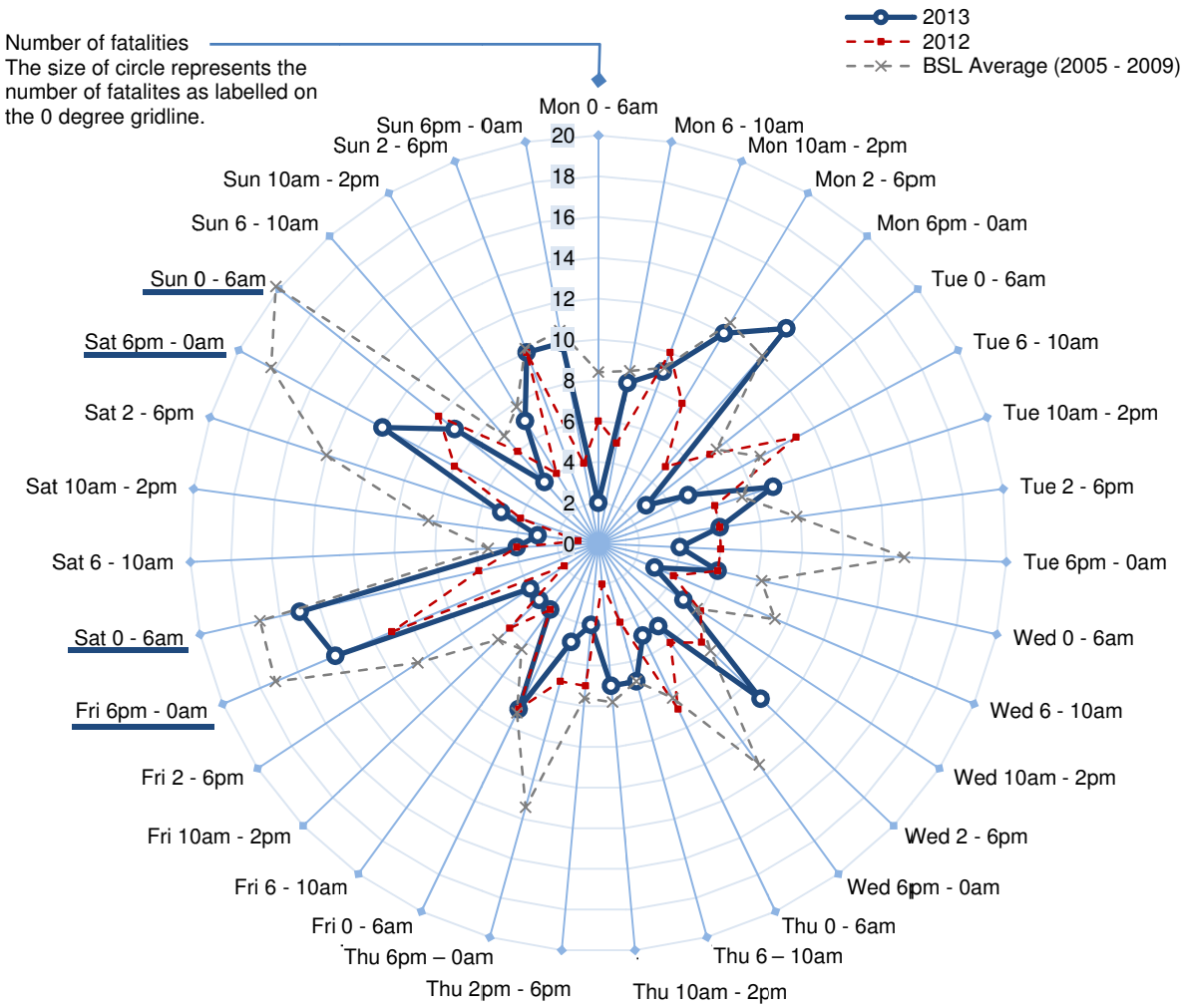


Figure 5-5 Time-wheel of fatalities by weekday and time of collision between 2012 and 2013

The number of fatalities between 2012 and 2013 by month and quarter is also included in this section as illustrated by **Figure 5-6**. As can be seen from the figure, the distribution across 2012 and 2013 is similar in most months. In quarter Q4, the months of November and December do vary significantly between 2012 and 2013. There is also a large increase of 64.7 per cent from 17 to 28 fatalities in the month of May between 2012 and 2013.

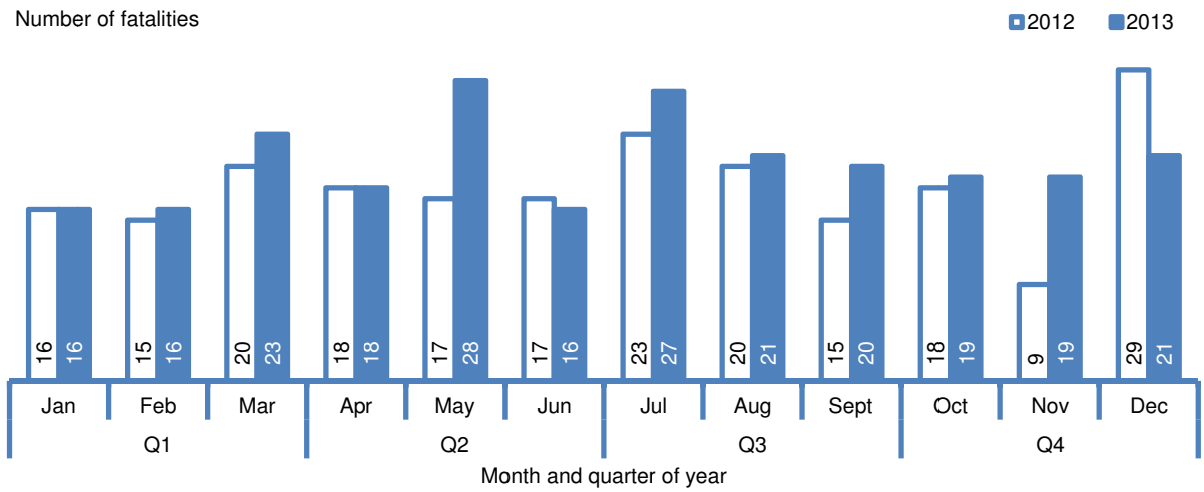


Figure 5-6 Number of fatalities by month and quarter of collision between 2012 and 2013

5.1.10 Pedestrian fatalities

The penultimate section of the fatalities topic of interest reports on the number of pedestrian fatalities on the SRN.

Key facts regarding pedestrian fatalities in 2013 include:

- overall, there were 38 pedestrian fatalities; 15.6% of all 244 fatalities;
- of which 34 (89.5 per cent) were on high speed routes (where the speed limit was 50mph or greater);
- the number of pedestrian fatalities involving HGVs was equal to 15, approximately 39.5 per cent of the 38 total pedestrian fatalities; and
- the number of pedestrian fatalities during the hours of darkness with either no lighting or unlit lighting in the vicinity of the collision equalled 22 in total. This was equivalent to 57.9 per cent of all the pedestrian fatalities in 2013.

Table 5-6 highlights the 29 fatalities where contributory factors were attributed directly to the pedestrian killed in 2013. The remaining 9 pedestrian fatalities were attributed to vehicles in 5 instances plus 4 instances where no contributory factors were recorded at all. The most common factor recorded was “impaired by alcohol”, recorded in 12 pedestrian fatalities. This was followed by “disability or illness, mental or physical” and “dark clothing” each recorded in 10 pedestrian fatalities. The table highlights the need to protect vulnerable pedestrians interacting with the SRN.

Table 5-6 Contributory factors attributed to each pedestrian fatality, 2013

Pedestrian fatality reference	Factors attributed to each pedestrian fatality: Careless, reckless or in a hurry	Dangerous action in carriageway	Disability or illness, mental or physical	Failed to judge vehicle's path or speed	Failed to look properly	Impaired by alcohol	Impaired by drugs (illicit or medicinal)	Pedestrian wearing dark clothing at night	Road name
Totals	4	7	10	9	9	12	3	10	
1				1	1				A590
2				1					A585
3	1			1	1			1	M65
5			1						M6
6			1						M62
8						1	1	1	A1(M)
9			1		1	1	1		A19
10	1			1	1			1	A64
13		1	1						A50
14						1			A5
15			1						M5
16			1					1	M42
18								1	A46
19			1						M1
20		1	1						M1
21	1	1	1	1	1	1			A14
22				1				1	A12
24	1					1			A1(M)
25						1			A1(M)
26				1	1			1	M11
27		1				1			A36
30					1	1			A2
31				1		1			A2
32					1				A27
33		1							A30
34		1				1	1	1	A30
36		1				1		1	A38
37			1	1				1	A36
38					1	1			A31

5.1.11 Map of fatalities

A map of collisions involving at least one fatality is produced below in **Figure 5-7**.

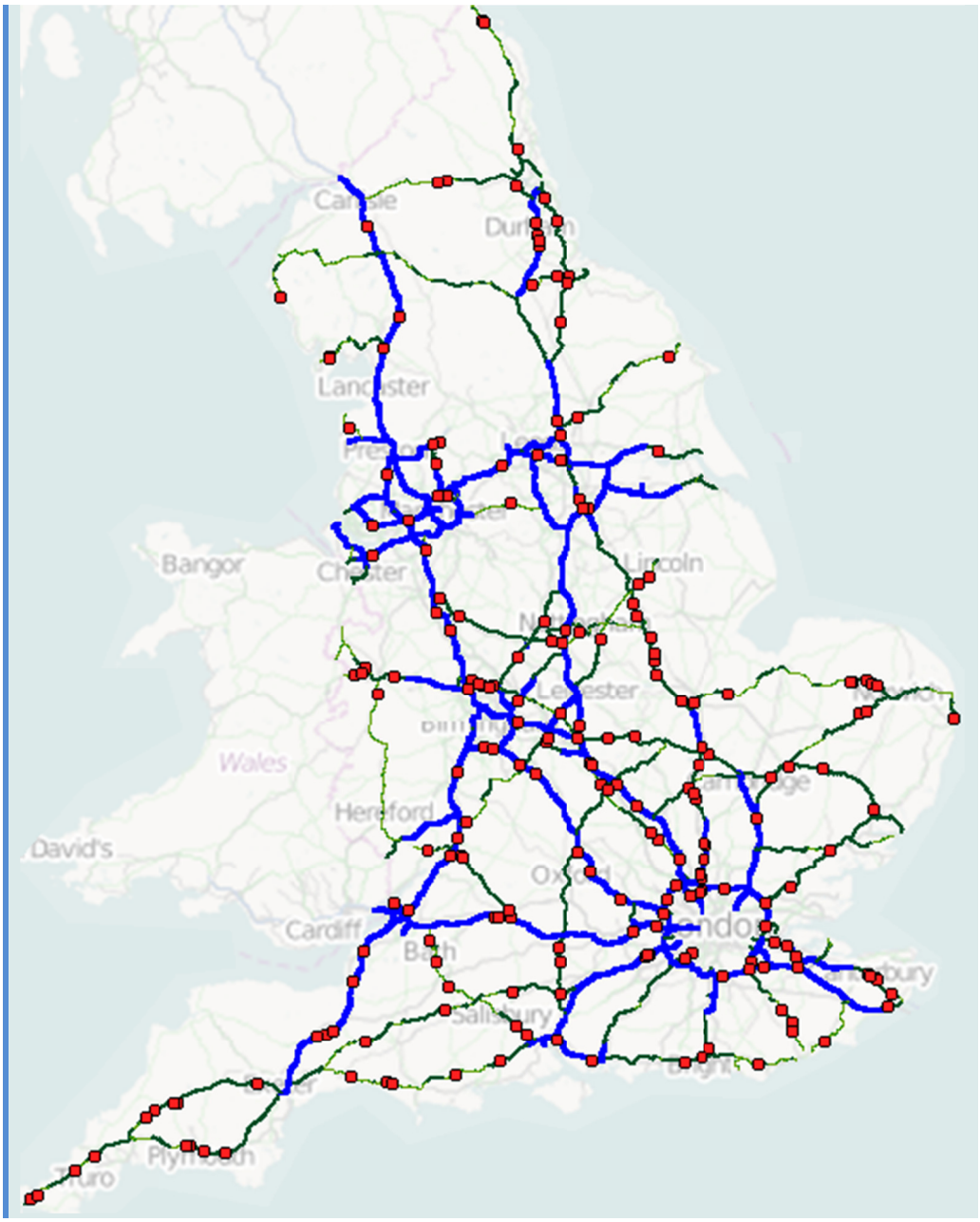


Figure 5-7 Map of collisions involving fatalities on the SRN, 2013

Based on the 2010 SRN used as a static reference network to analyse collisions and casualties between 2005 and 2013

Source: OpenStreetMap 2011 Contributors CC-BY-SA

5.2 Seriously Injured Casualties

This section reports trends in seriously injured casualties occurring on the SRN. For reference, a definition of a seriously injured casualty can be found in the glossary (Appendix A).

In 2013, there were 1,465 seriously injured (SI) casualties in 1,249 collisions involving 2,686 vehicles. There were 14.44 SI casualties for every hundred collisions on the SRN (1,465 SI casualties / 10,145 total collisions).

Table I-1 to **Table I-15** in **Appendix I** provide breakdowns of seriously injured casualties by road name, road classification, contributory factors, objects hit on/off carriageway, road condition, light condition, junction location, vehicle location, age group, vehicle type, journey purpose, time of day, day of week and month of year.

5.2.1 Historic numbers of seriously injured casualties

The number of seriously injured casualties involved in collisions between 2005 and 2013 are reported in **Figure 5-8**. Since 2005, the number of SI casualties has decreased by 35.4 per cent from 2,269 to 1,465 in 2013.

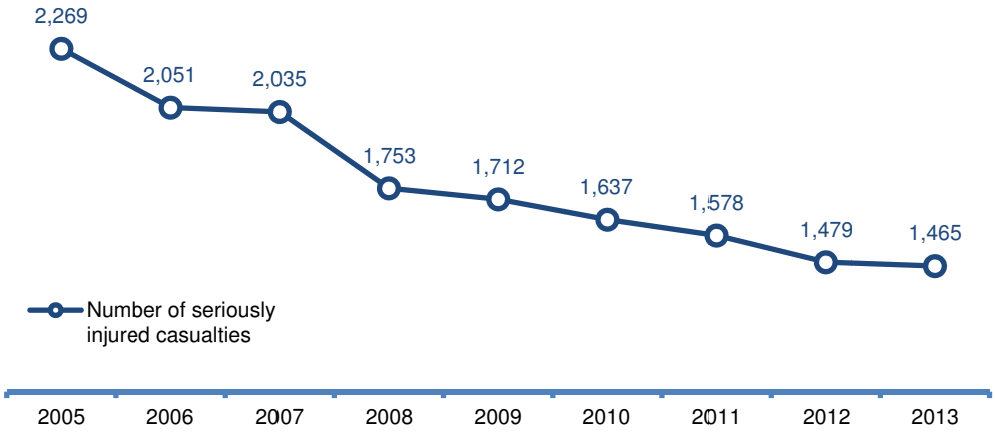


Figure 5-8 Historic number of seriously injured casualties involved in collisions between 2005 and 2013

5.2.2 Seriously injured casualties by road classification

The number of seriously injured casualties by road classification is included in **Appendix I Table I-2**. From the table, it can be shown that in 2013 from 2012, the number of SI casualties on:

- motorways increased by 3.3 per cent to 596 from 577;
- A-road dual carriageways decreased by 11.1 per cent to 536 from 603; and
- A-road single carriageways increased by 11.0 per cent to 332 from 299 with the majority of the increase occurring on non-built up sections.

The rise in SI casualties on motorways can be mostly attributed to two collisions involving buses/coaches. In 2012, for all SI casualties there were only 3 bus/coach occupants; however in 2013 there were 25.

On A-road single carriageways where the speed-limit was 50mph or greater (non-built-up), the increase can be partially explained by the increase in the number of PTWs SI casualties. Between 2010 and 2012, the typical number of PTW SI casualties was 45. In 2013, the number of PTW SI casualties rose by 57.8 per cent to 71.

5.2.3 Contributory factors of collisions involving seriously injured casualties

The top 10 contributory factors by the number of collisions involving SI casualties is listed below in **Table 5-7**. For example, in 2013 there were 369 collisions resulting in at least one SI casualty where the contributory factor "Failed to look properly" was reported at least once. The top 20 factors are provided in **Appendix I Table I-3**.

From the top 10 contributory factors in the table, it is apparent that the first four factors are linked to driver or rider errors (contributory factor codes 405, 406, 410, 403).

Table 5-7 Number of collisions involving seriously injured casualties where a particular contributory factor was reported at least once, 2013

No.	Contributory Factor		2013
1	405	Failed to look properly	369
2	406	Failed to judge other person's path or speed	299
3	410	Loss of control	274
4	403	Poor turn or manoeuvre	190
5	602	Careless, reckless or in a hurry	164
6	409	Swerved	112
7	308	Following too close	112
8	408	Sudden braking	106
9	503	Fatigue	100
10	103	Slippery road (due to weather)	97

Notes:
Values in the table report the number of collisions where at least one of the specified contributory factors was recorded in a collision involving at least one seriously injured casualty.

There were 91 collisions, involving at least one SI casualty without any recorded contributory factors (CF).

5.2.4 Seriously injured casualties resulting from objects hit off carriageway

Section 5.2.4 assesses the number of SI casualties resulting from vehicles hitting objects off the carriageway. Additional historic data is present in **Appendix I Tables I-5** for reference.

Figure 5-9 below shows the breakdown of objects hit off the carriageway by the number of seriously injured casualties for 2013. From the figure it can be seen that the highest proportion (49.3 per cent combined) of seriously injured casualties resulted from hitting either a central barrier (126) or a near/offside crash barrier (108).

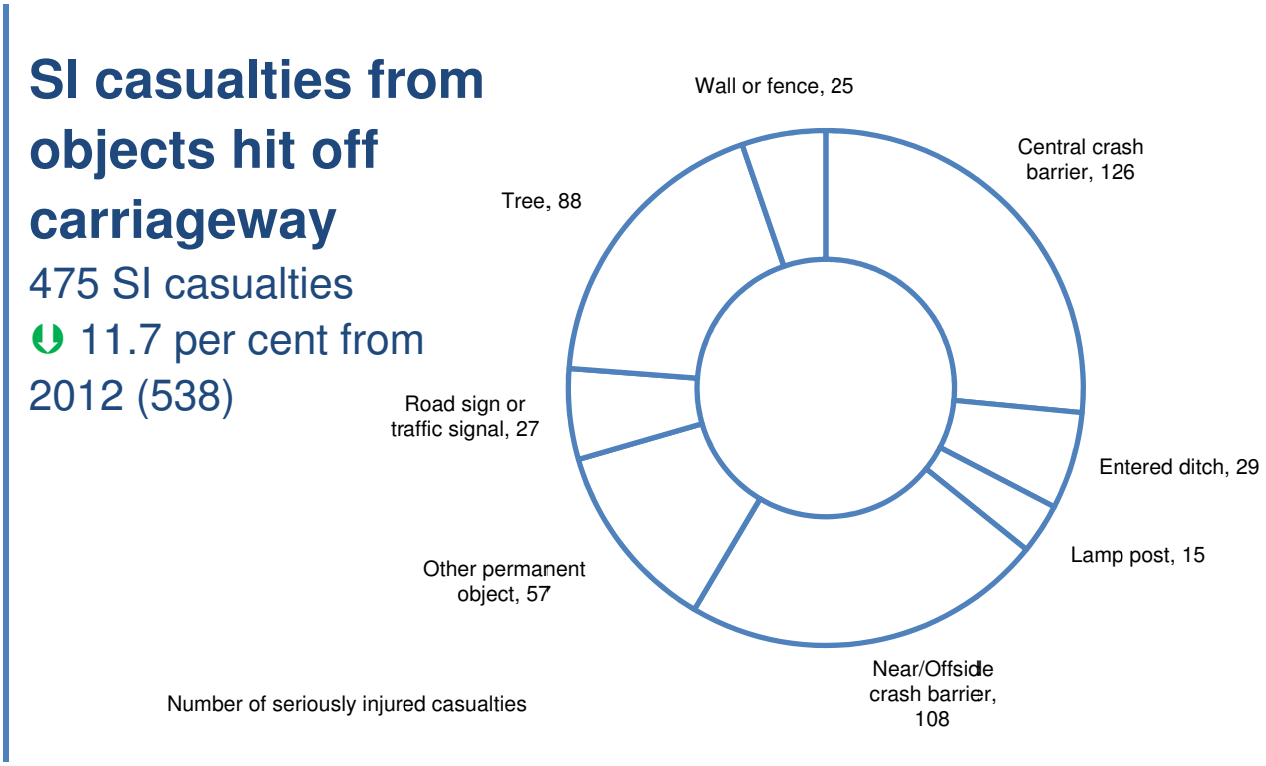


Figure 5-9 Seriously injured casualties resulting from objects hit off carriageway, 2013

As shown in **Figure 5-9** and **Appendix I Tables I-5**, there were 475 SI casualties where a vehicle hit an object off the carriageway in 2013, a decrease of 11.7 per cent from 538 in 2012.

The number of SI casualties resulting from colliding with a barrier fell between 2012 and 2013; for central crash barriers by 19 and for nearside/offside crash barriers by 20. In contrast, the number of SI casualties resulting from hitting a wall or fence has risen sharply from 6 to 25 casualties. From 2005 to 2010 there were no recorded SI casualties involving a wall or fence.

5.2.5 Seriously injured casualties resulting from objects hit on carriageway

The following section looks at the number of SI casualties resulting from hitting objects on the carriageway. A breakdown of objects hit is included in **Appendix I Table I-4**.

Between 2012 and 2013, the number of SI casualties resulting from hitting an object on carriageway reduced marginally from 102 to 98. The majority of the 2013 SI casualties resulted from either hitting: a kerb (38); a bollard or refuge (15); or a parked vehicle (16).

Of note, 6 SI casualties resulted from collisions in roadworks at the following locations:

- 3 SI casualties on the M25 Junction 25 within the M25 J23 to J27 ALR Scheme;
- 1 SI casualty on the M6 Junction 5 within the M6 J4 to J5 HSR Scheme;
- 1 SI casualty on the M6 Junction 38; and
- 1 SI casualty on the A419 near Swindon.

5.2.6 Seriously injured casualties resulting from wet skidding

This section looks at trends involving wet skidding. Wet skidding is typically considered as a safety aspect during evaluation of pavement resurfacing schemes. The number of SI casualties involving a vehicle skidding in wet or damp conditions fell to 127 in 2013 from 176 in 2012 (27.8 per cent). Overall, wet or damp conditions accounted for 351 SI casualties in 2013. For data on skidding (including jack-knifing and overturning) by weather condition relating to SI casualties refer to **Appendix I Table I-6**.

5.2.7 Seriously injured casualties by light conditions

This section looks at the impact of lighting conditions reported during a collision involving a SI casualty.

Figure 5-10 and **Figure 5-11** report the number of SI casualties by motorway and A-road lighting conditions between 2011 and 2013 respectively. For additional data, **Table I-7** is included in **Appendix I**.

Overall, 1,004 SI casualties (68.5 per cent of the 1,465 total SI casualties) occurred in daylight. The majority of the remaining SI casualties occurred on routes where the speed limit was recorded as 50mph or greater with no lights and during the hours of darkness. In 2013, there were 127, 98 and 61 SI casualties on motorways, non-built-up A-road dual carriageways and non-built-up A-road single carriageways respectively which contained no lighting.

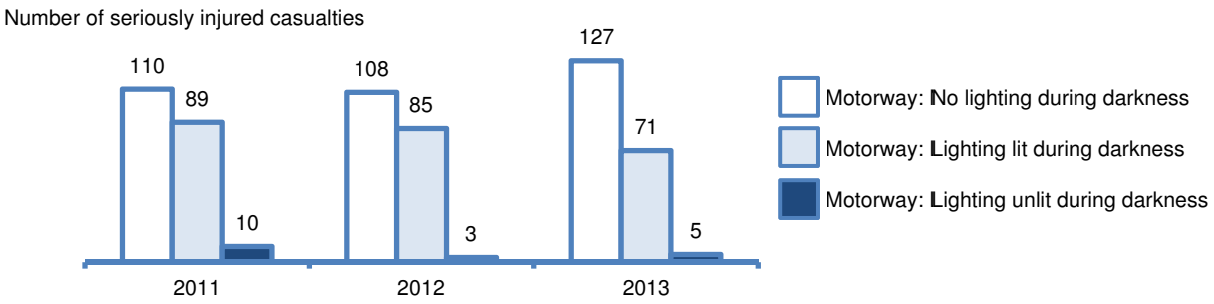


Figure 5-10 Seriously injured casualties by motorway lighting conditions between 2011 and 2013

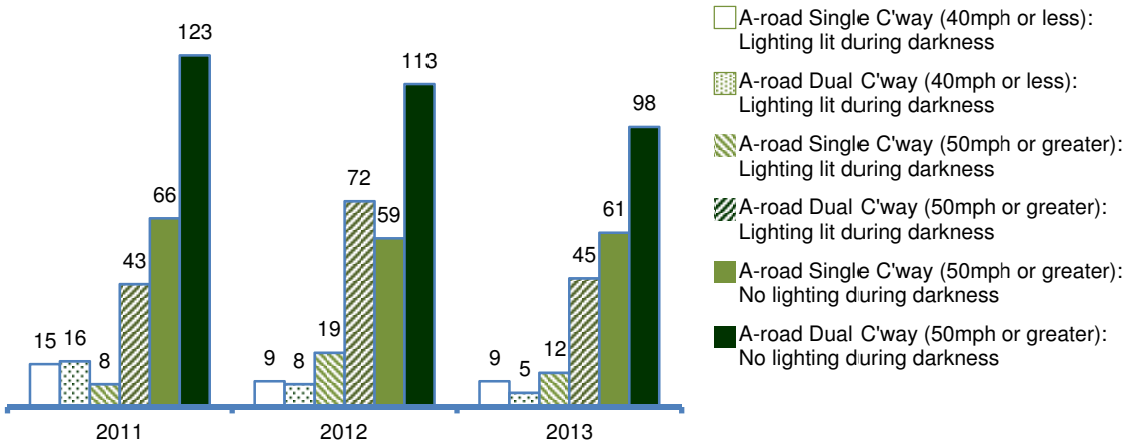


Figure 5-11 Seriously injured casualties by A-road lighting conditions between 2011 and 2013

5.2.8 Seriously injured casualties where a specific age group of drivers was involved

This section looks at the number of SI casualties where a specific age group of drivers or riders was involved. The assessment driver grouping by age can be found in **Appendix I Table I-10.**

From the appendix table, the most notable change is that the number of elderly motorists involved in SI casualties has increased significantly (41.5 per cent), albeit **Figure 5-12** below shows that there is a tendency for the values to fluctuate between years.

SI casualties involving elderly motorists

174 SI casualties

41.5 per cent from 123 in 2012

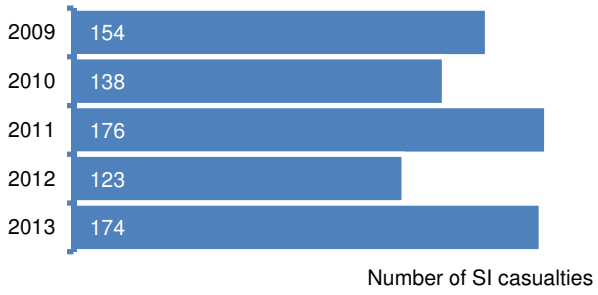


Figure 5-12 Seriously injured casualties involving elderly motorists between 2009 and 2013

5.2.9 Seriously injured pedestrian casualties

This section explores trends in SI pedestrian casualties. In 2013, the number of pedestrian SI casualties totalled 52, six more than in 2012 (46). However, the number of SI casualties in 2013 is within the typical range of 46 to 67 SI casualties between 2005 and 2013

Assessment of the contributory factors involved in pedestrian SI casualties reveals that:

- 4 SI casualties had no recorded factors;
- 21 SI casualties where all factors were assigned to the pedestrian injured;
- 19 SI casualties where all factors were assigned to the driver/rider; and
- 8 SI casualties where factors were assigned partially to both pedestrians and driver/rider.

Figure 5-13 and **Figure 5-14** highlight the number of SI pedestrian casualties involving specified contributory factors. The first figure is where factors were assigned to only pedestrians and conversely the second figure is where factors were only assigned to driver/rider. Note, the below figures may add up to greater than the 52 SI pedestrian casualties as six contributory factors can be recorded per collision.

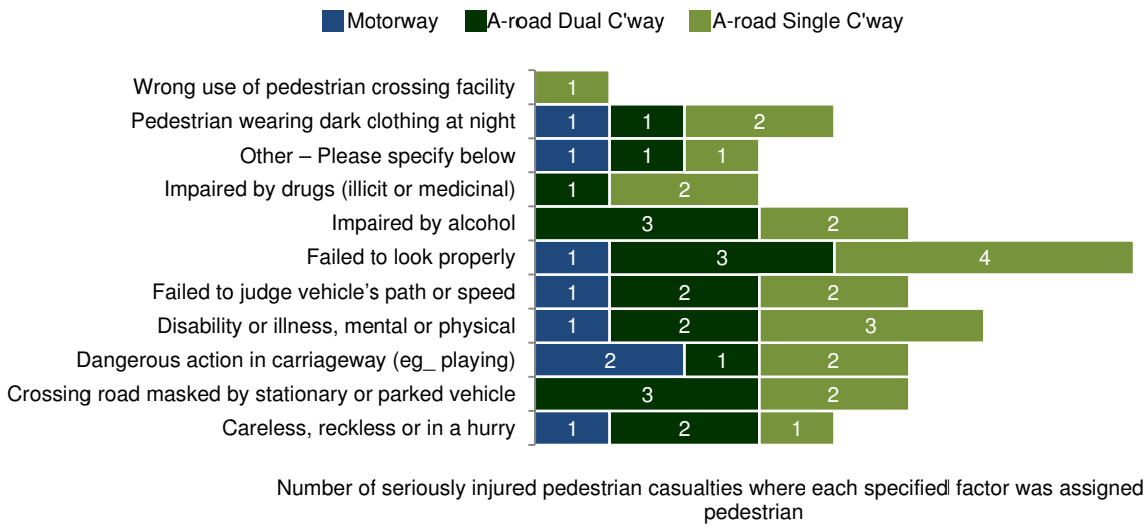


Figure 5-13 Seriously injured pedestrian casualties where specified contributory factors were assigned to pedestrians only 2013

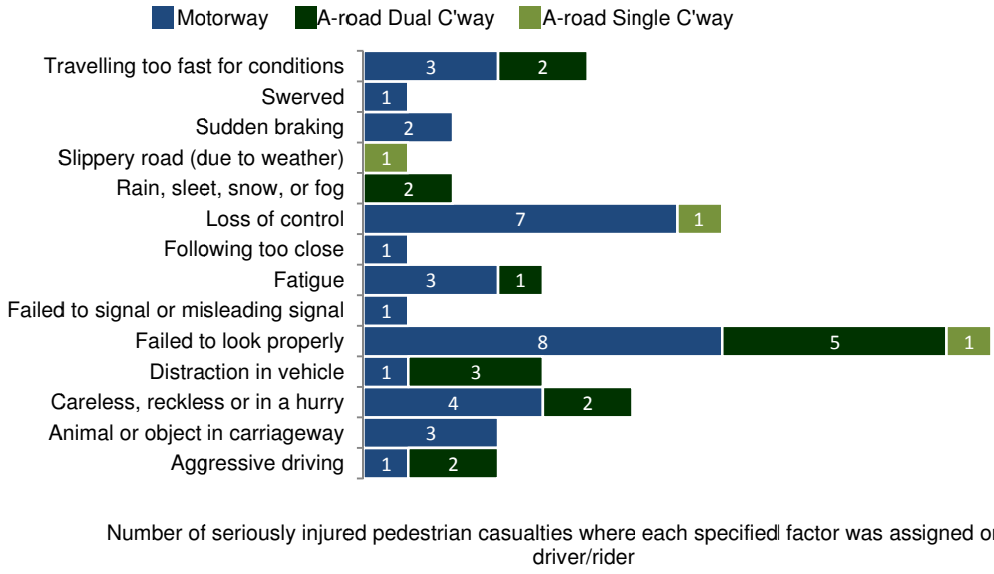


Figure 5-14 Seriously injured pedestrian casualties where specified contributory factors were assigned to vehicles involved only 2013

5.2.10 Seriously injured casualties by collision time period, weekday and month

The number of SI casualties by collision time period, weekday and month is provided in **Appendix I, Tables I-13 to I-15** respectively.

5.3 Young Motorists

The young motorist section investigates casualty trends where a collision involved at least one young motorist aged between 17 and 24 years. The number of casualties involving a young motorist still remains at approximately one quarter of total casualties (4,436 out of 16,094), which is disproportionally high for a single age group.

5.3.1 Casualties involving young motorists by severity

As highlighted in the fatalities topic of interest section, it can be seen that in 2012, the number of fatalities involving young motorists was very low. This observation is most notable when compared to the typical values occurring between 2009 to 2011, and 2013.The historic number of casualties by severity between 2005 and 2013 are shown in **Figure 5-15** and **Figure 5-16**. As reported previously in **Chapter 3**, and shown in **Figure 5-15**, the number of young motorists involved in fatalities increased significantly this year from the previous year by 45.2 per cent. However for KSI casualties and total casualties, a continuing decrease (year-on-year) was maintained between 2012 and 2013 of 3.8 per cent and 5.2 per cent respectively.

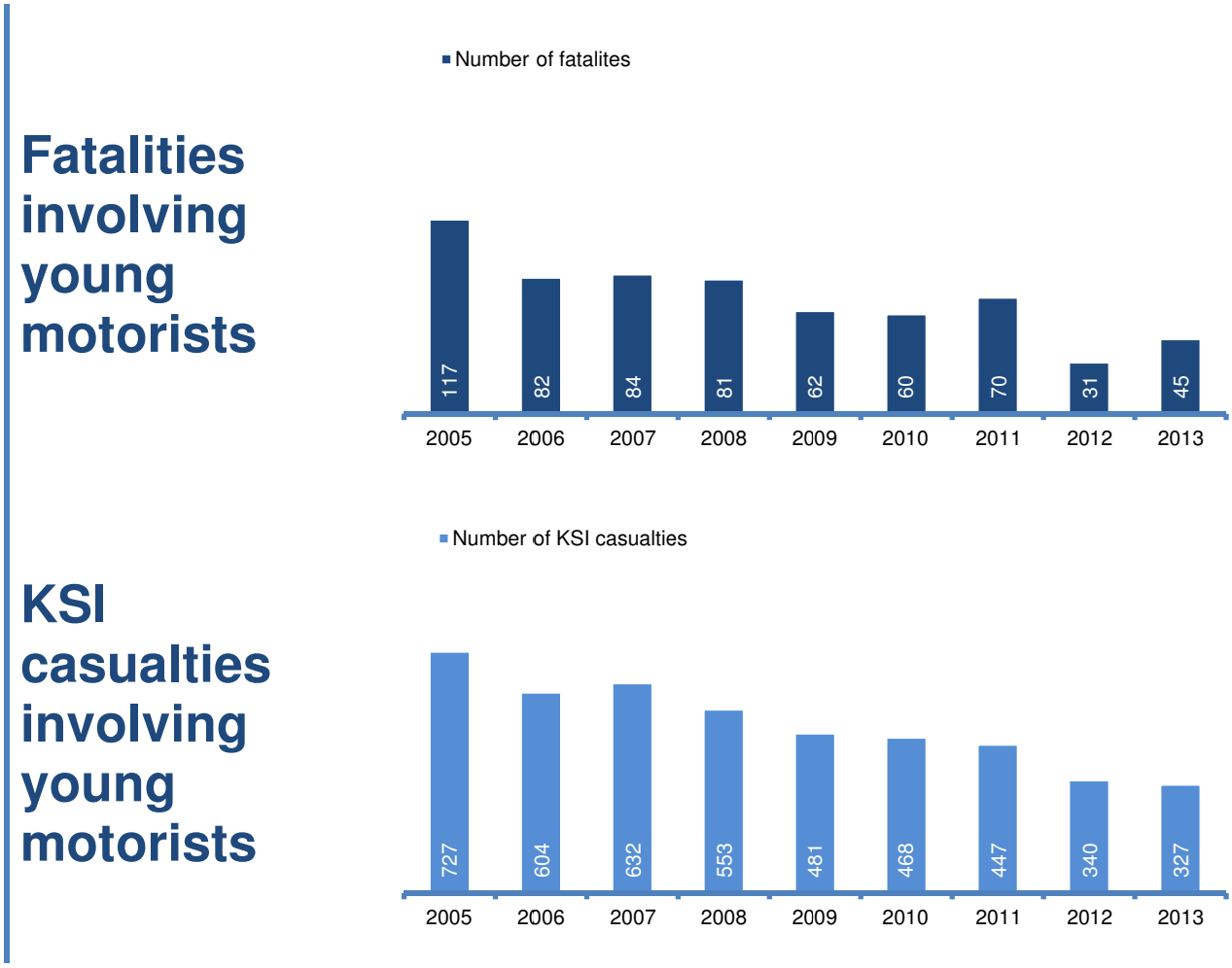


Figure 5-15 Historic fatalities and KSI casualties involving young motorists by severity between 2005 and 2013

All casualties involving young motorists

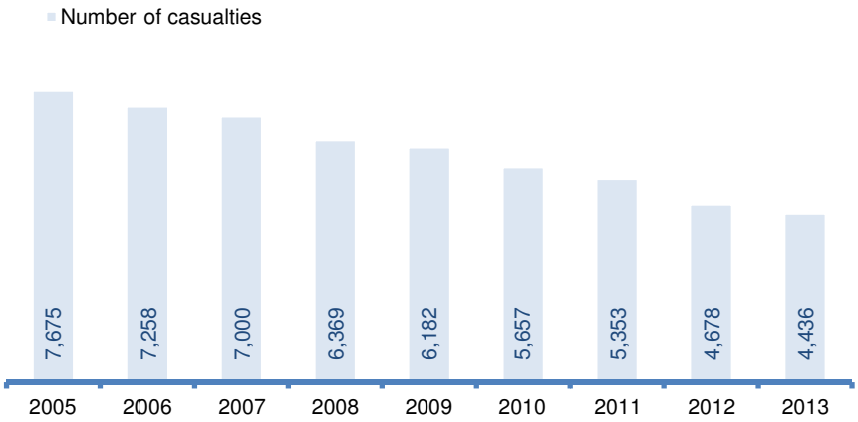


Figure 5-16 Historic casualties involving young motorists by severity between 2005 and 2013

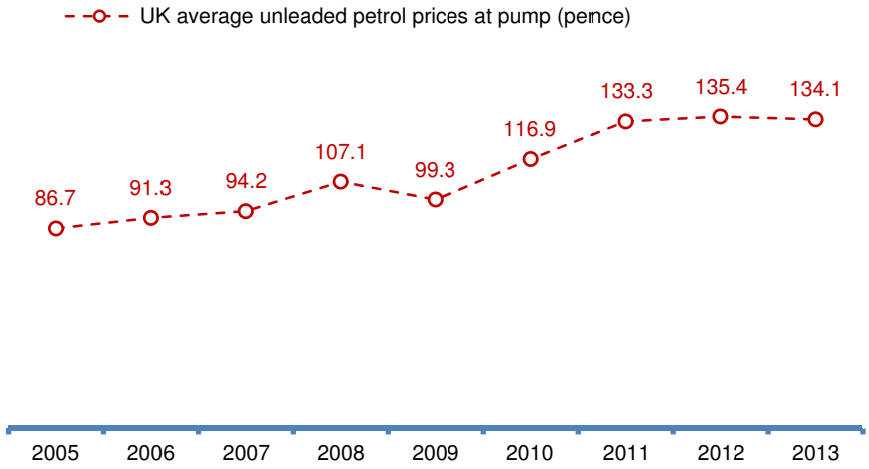
5.3.2 Cost of motoring effect on casualties involving young motorists

Correlating the changes in petrol prices against the number of casualties involving young motorists shows that petrol prices potentially may be influential in reducing this type of casualty.

Average UK cost of petrol at pump

134.1 pence

54.7 per cent since 2005



Notes:
(a) Unleaded petrol prices as of August 2014.
(b) Data sourced from gov.uk, Department of Energy & Climate Change[18].

Figure 5-17 Average UK cost of unleaded petrol at the pump between 2005 and 2013

[18] Dataset: Monthly and annual prices of road fuels and petroleum products, Table 4.1.2 Average annual retail prices of petroleum products and a crude oil price index. Accessed via https://www.gov.uk/government/statistical-data-sets/oil-and-petroleum-products-monthly-statistics,

Figure 5-17 plots the UK average price of petrol on forecourts between 2005 and 2013. During this period the cost of one litre of petrol has increased by over a half (54.7 per cent) from 86.7 pence in 2005 to 134.1 pence in 2013.

By comparing the changes in values indexed since 2005 for both UK average petrol prices and KSI casualties involving young motorists, as shown in **Figure 5-18**, it can be observed that the two parameters potentially correlate. When considering the cumulative change since 2005, typically the cumulative increase in petrol prices corresponds to the cumulative decrease in KSI casualties involving young motorists, and is most evident between 2010 and 2013.

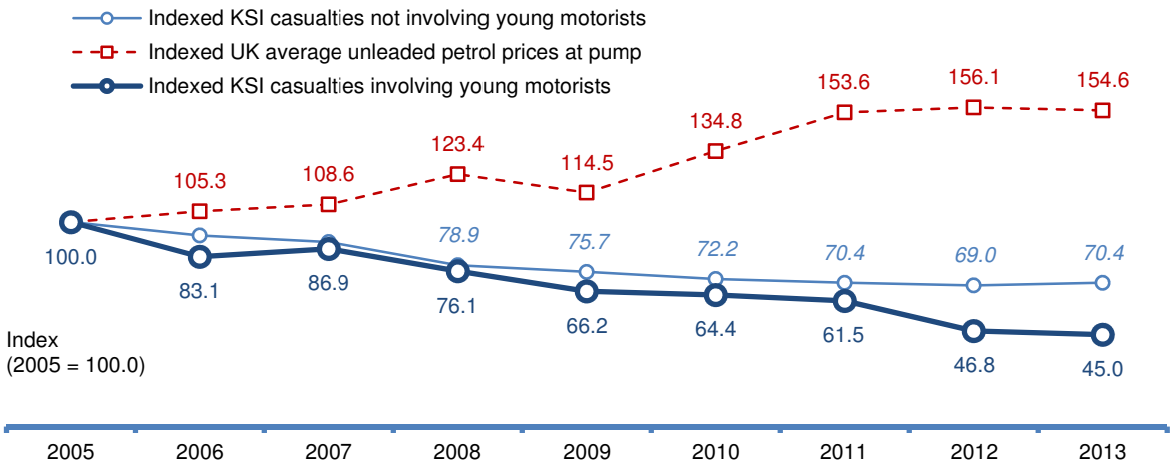


Figure 5-18 Index of changes in UK average petrol price and KSI casualties involving/not involving young motorists between 2005 and 2013

Notes: (a) KSI casualties not involving young motorists represents the number of KSI casualties where no young motorists were involved.

When comparing KSI casualties involving young motorists against KSI casualties that did not, the figure shows that between 2011 and 2012, the potential effect of petrol prices is more evident in the former. This point is where UK average petrol prices peak in the period; 56.1 per cent higher than in 2005. The index change in KSI casualties involving young motorists during this period is 14.7 index points from 61.5 points in 2011 to 46.8 points in 2012. In contrast, the index change in KSI casualties not involving young motorists remained stable decreasing marginally by 1.4 index points from 70.4 in 2011 to 69.0 in 2012.

5.3.3 Casualties involving young motorists by road classification

Appendix J Table J-2 shows the number of casualties involving young motorists by road classification and severity between 2005 and 2013. The changes in the number of casualties tabulated in **Appendix J Table J-2** are additionally presented in **Figure 5-19** by road classification and severity between 2012 and 2013.

The figure shows that there was an increase of 12 fatalities occurring on non-built-up A-road dual carriageways. However on the same road classification there was a decrease in 14 KSI casualties. Finally, the figure shows that the number of total casualties

involving young motorists across all road classifications has typically decreased between 2012 and 2013.

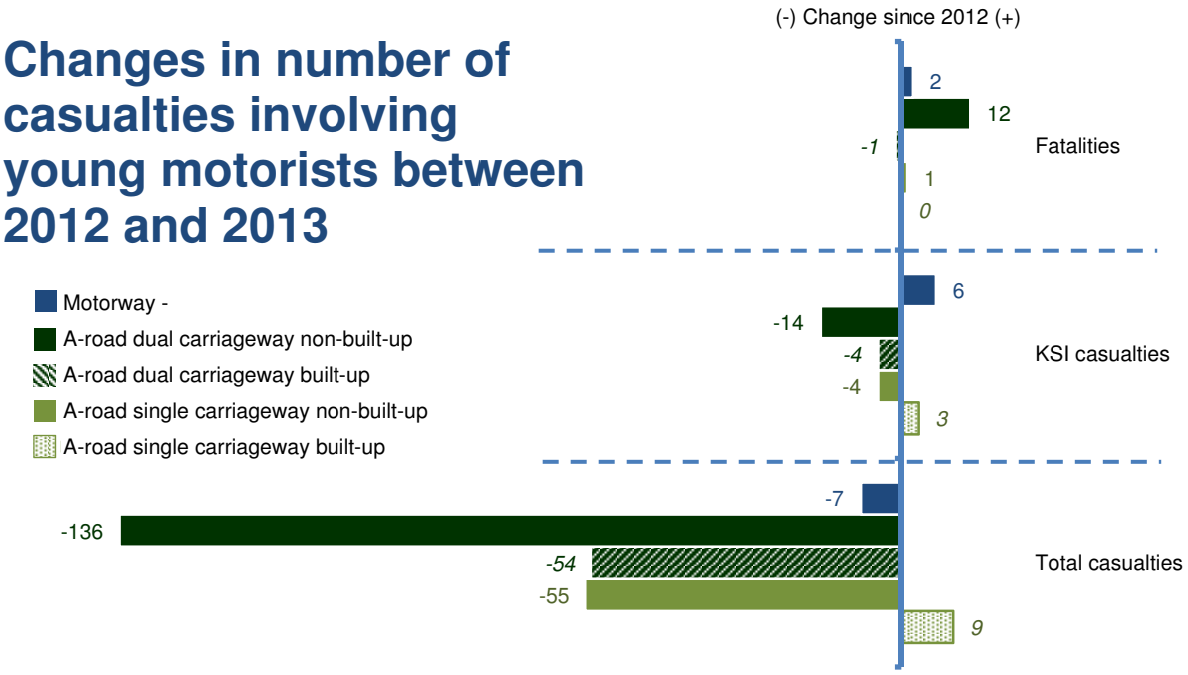


Figure 5-19 Absolute changes in number of casualties involving young motorists by severity and road classification between 2012 and 2013

Notes: (a) Changes in casualties by road classification found in Appendix J Table J-2

5.3.4 Contributory factors associated with young motorists

The overall contributory factors involved in collisions with young motorists are shown in **Appendix J Table J-7.** Of note; the factors listed in the appendix table are the total number of collisions where at least one of the factors was present in the collision and are not necessarily attributed directly to the young motorist. From the table it can be seen that the top five factors recorded at least once in a collision involving a young motorists are:

- failed to judge other person's path or speed;
- failed to look properly;
- following too close;
- sudden braking; and
- loss of control.

The numbers of KSI casualties involving selected contributory factors directly attributed to a young motorist in a collision are highlighted in **Table 5-8**. The selected contributory factors include factors from the "injudicious action", "impairment or distraction" and "behaviour or inexperience" groupings[19].

[19] Refer to Appendix Table F-1i for contributory factor groupings.

Evident in the table is that the number of KSI casualties involving young motorists using mobile phones has decreased by 40.0 per cent from 20 in 2012 to 12 in 2013. Factors also decreasing include travelling too fast for conditions (57.6 per cent) and following too close (46.4 per cent).

However notable increases between 2012 and 2013 include: impaired by alcohol (4.2 per cent); fatigue (9.5 per cent); careless, reckless or in a hurry (2.6 per cent); and aggressive driving which increased from 10 to 16 KSI casualties.

Table 5-8 Number of KSI casualties involving selected contributory factors attributed directly to young motorists between 2005 and 2013

Selected contributory factor / Year	Exceeding speed limit	Travelling too fast for conditions	Following too close	Impaired by alcohol	Impaired by drugs (illicit or medicinal)	Fatigue	Driver using mobile phone	Aggressive driving	Careless, reckless or in a hurry	Learner or inexperienced driver/rider
2005	57	75	27	44	2	44	21	24	77	40
2006	42	77	25	42	6	43	21	29	73	53
2007	38	64	18	33	9	39	20	31	59	50
2008	53	56	30	47	8	46	15	34	48	39
2009	42	51	30	40	5	27	19	37	57	44
2010	37	43	15	35	7	33	21	16	56	21
2011	24	33	16	29	7	28	32	11	65	34
2012	23	33	28	24	2	21	20	10	39	19
2013	19	14	15	25	2	23	12	16	40	17

Notes:

(a) Values reported in table are the number of KSI casualties involving at least one of the specified contributory factors which was directly attributed to a young motorist in a collision.

5.4 Smart Motorway Data

The Highways Agency is requested frequently to provide data on casualties for its smart motorway route schemes (current, under-construction or planned). **T**herefore, in order to enable stakeholders and the public easier access to published data regarding specific schemes, this section on Smart Motorway Data has been introduced.

Presently, there are three different categories of smart motorway. These are outlined below in **Figure 5-20**.

Controlled motorway

Controlled motorways have three or more lanes with variable speed limits. The hardshoulder is only used in emergencies.

Hardshoulder running

The hardshoulder is operational during busy periods; the speed limit is reduced. Road users cannot use the hardshoulder unless overhead signs indicate they are open.

All lane running

There is no hardshoulder on these sections of motorway. Road users must obey variable speed limits and not stop on the motorway. In an emergency, road users will need to use an emergency refuge area, motorway service area or leave at the next junction.

Figure 5-20 Types of smart motorway on the SRN

Adapted from Highways Agency Smart Motorway information website. Accessed at http://www.highways.gov.uk/our-road-network/managing-our-roads/improving-our-network/smart-motorways/

The scheme data can be found in **Appendix K**. Each scheme details the number of casualties by year along with extents represented by HATRIS link so that traffic levels can be cross referenced where required. However, no analysis is undertaken on any scheme as there is currently not sufficient years of data to provide a “pre” and “post” construction comparison for the schemes, even if the schemes are currently operational.

The scheme data provided in **Appendix K** should be considered in conjunction with the notes provided at the beginning of **Appendix K**.

Table 5-9 lists the included smart motorway programme schemes which can be found in **Appendix K** by table reference, scheme and type.

Table 5-9 Smart motorway program scheme list in Appendix K

Appendix Table ID	Scheme	Type
K-1	M1 J10-13	Hard shoulder running (HSR)
K-2	M1 J32-35A	All lane running (ALR)
K-3	M1 J28-31	All lane running (ALR)
K-4	M1 J39-42	All lane running (ALR)
K-5	M1 J6A-10	Controlled motorway – 4 lanes
K-6	M25 J5-7	All lane running (ALR)
K-7	M25 J23-27	All lane running (ALR)
K-8	M25 J16-23	Controlled motorways – 4 lanes
K-9	M25 J27-30	Controlled motorways – 4 lanes
K-10	M3 J2-4A	All lane running (ALR)
K-11	M4 J19-20 and M5 J15-17	Hard shoulder running (HSR)
K-12	M42 J3A-7	Hard shoulder running (HSR)
K-13	M42 J7-9	Controlled motorways – 3 lanes
K-14	M42 J3A – M40 J16	Controlled motorways – 3 lanes
K-15	M5 J4A-6	All lane running (ALR)
K-16	M6 J5-8	Hard shoulder running (HSR)
K-17	M6 J4-5	Hard shoulder running (HSR)
K-18	M6 J8-10A	Hard shoulder running (HSR)
K-19	M6 J10A-13	All lane running (ALR)
K-20	M6 J16-19	All lane running (ALR)
K-21	M6 J13-15	All lane running (ALR)
K-22	M60 J8-18	Controlled motorway – 4 lanes
K-23	M62 J25-30	Hard shoulder running (HSR)
K-24	M62 J18-21	All lane running (ALR)
K-25	M62 J10-12	All lane running (ALR)

5.5 Lighting on the SRN

This topic of interest provides data for monitoring the effect of lighting on road safety. Since 2010[20], parts of the SRN (generally excluding junctions) which previously were designed with lighting are now operating without lights during the hours of darkness.

Appendix L Table L-1 to **Table L-5** provide an overview of historic trends against lighting levels. These trends include; collisions and casualties by lighting condition, road name, road classification, contributory factors, and severity.

5.5.1 Comparison between historic casualties and lighting levels

The proportion of casualties in 2013 occurring within unlit sections of the SRN during darkness was relatively low. In total, there were 144 casualties reported in unlit sections out of the total 16,094 casualties. In comparison, the number of casualties reported occurring in lit sections was over 13 times greater at 1,931.

However as shown in **Figure 5-21**, whilst casualties on lit sections during darkness have fallen steadily in line with overall casualty trends found in **Figure 3-1**; in contrast, the number of casualties on unlit sections during darkness has not. Between 2010 and 2013, the number of casualties on unlit sections during darkness has increased by 54.8 per cent from 93 to 144.

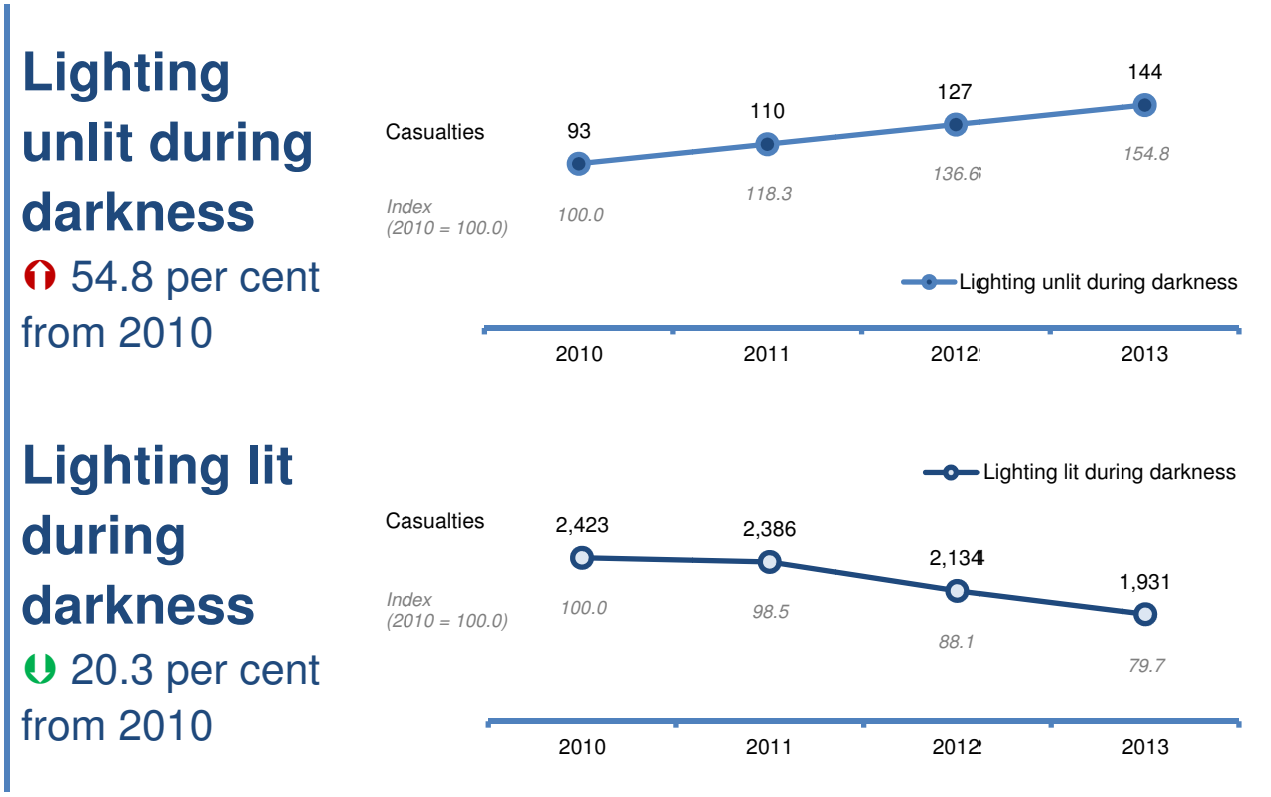


Figure 5-21 Casualties by lighting conditions between 2010 and 2013

[20] Midnight Switch-Off for Motorway Lighting, Highways Agency, 2012, Accessed via http://webarchive.nationalarchives.gov.uk/20120810121037/http://www.highways.gov.uk/knowledge/30236.aspx

As shown in **Table L-2** in **Appendix L**, the number of motorway casualties' occurring within unlit sections has increased by 32.5 per cent from 80 to 106 between 2012 and 2013. Between 2010 and 2013, the percentage increase is equivalent to 171.8 (39 to 106 casualties).

5.5.2 Casualties on specific roads during darkness

An extract of the number of casualties occurring in darkness (all categories of darkness including sections of road that are lit and unlit) on specific roads are detailed in **Table 5-10** along with an expanded list in **Table L-5** in **Appendix L**. As shown by the tables, the largest increases between 2012 and 2013 occurred on the M6, M4, A1 and A1(M) by 17.4, 5.5, 18.8 and 25.4 per cent respectively.

Table 5-10 Casualties during darkness by top 10 road names between 2010 and 2013

No.	Road Name	2010	2011	2012	2013	2013 per cent change from 2012
1	M1	427	356	363	326	-10.2
2	M25	354	367	371	305	-17.8
3	M6	340	362	253	297	17.4
4	M4	184	202	182	192	5.5
5	A1	219	146	160	190	18.8
6	A1(M)	116	119	114	143	25.4
7	A5	112	119	141	135	-4.3
8	M40	161	157	167	125	-25.1
9	M5	149	118	122	124	1.6
10	A38	116	104	125	121	-3.2

5.6 Weather Effects on the SRN

The weather topic of interest analyses the effects of weather on the Highways Agency network. The number of casualties in 2013 recorded as occurring during weather events (rain, snow, and fog or mist) equalled 2,607 and was equivalent to approximately 16.2 per cent of the total 16,094 casualties on the SRN. Fine weather conditions were recorded in over 81.0 per cent of casualties.

For additional data, **Appendix M Table M-1** to **Table M-7** provide breakdowns of collisions and casualties by weather group, road classification, contributory factors, severity, age group, vehicle type and skidding.

5.6.1 Casualties by weather type

Table 5-11 shows the historic number of KSI and total casualties by weather group between 2005 and 2013. Between 2012 and 2013, the following changes occurred in KSI and total casualty numbers during weather events:

- the largest increase in total casualties was during snowfall, which increased by 169.8 per cent from 129 in 2012 to 348 in 2013;
- the largest increase in KSI casualties was additionally during snowfall, which almost trebled from 11 in 2012 to 29 in 2013;
- the largest decrease in total casualties was during rainfall, which decreased by 28.9 per cent from 2,900 in 2012 to 2,062 in 2013; and finally
- the largest decrease in KSI casualties was during rainfall, which decreased by 41.1 per cent from 309 in 2012 to 182 in 2013.

Table 5-11 KSI and total casualties by weather group between 2005 and 2013

	Weather Group					
	Fog or mist		Rain		Snow	
Year	KSI	Total	KSI	Total	KSI	Total
2005	33	288	258	3,195	35	295
2006	41	279	298	3,369	14	133
2007	41	262	351	3,456	11	111
2008	31	235	275	3,142	17	212
2009	23	170	238	2,759	21	253
2010	22	230	204	2,275	44	409
2011	20	127	204	2,306	7	62
2012	24	211	309	2,900	11	129
2013	25	197	182	2,062	29	348

5.6.2 Casualties by road classification

Appendix M Table M-2 provides breakdowns of casualties by weather groups and road classifications by year.

Analysis of **Appendix M Table M-2** shows that the number of total casualties occurring during snowfall on motorways increased significantly (168.7 per cent) from 67 in 2012 to 180 in 2013. The highest number of casualties during snowfall on motorways between 2005 and 2013 was recorded as 225 in 2010.

The positon of each motorway collision during snowfall in 2013 is mapped in **Figure 5-22**.

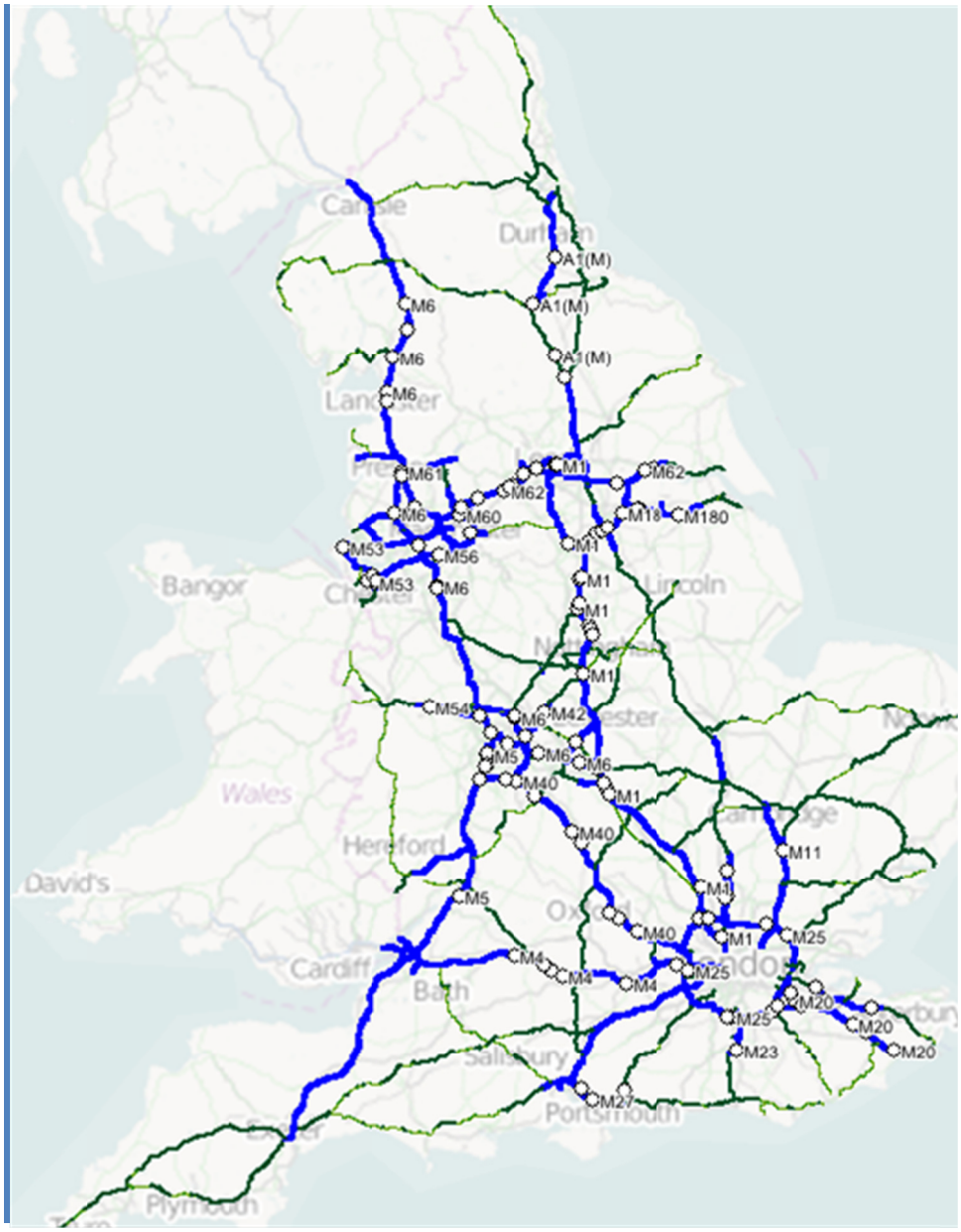


Figure 5-22 Motorway collisions during snowfall, 2013

Source: OpenStreetMap 2011 Contributors CC-BY-SA

The distribution of motorway casualties during snowfall by month in 2013 by the top 5 road names is shown in **Table 5-12**. The distribution corresponds to the "January Freeze" experienced at the start of the year which continued through to early April. From the table, it is apparent that the M6, as one of the busiest motorway on the SRN was the worst affected by the snowfall.

Table 5-12 Motorway casualties during snowfall by month and top 5 road names, 2013

		Month of Year, 2013					
	Road Name	Jan	Feb	Mar	Apr	Nov	Dec
	All Motorways	77	34	64	3	1	1
Top 5 road names	M6	17	1	6		1	1
	M1	8	7	8			
	M40	12		5			
	M25	6	2	4	2		
	M4	11	1				

5.6.3 Casualties against measured temperature and rainfall

The assessment of casualties against measured air temperature and rainfall is provided in the following figures:

- **Figure 5-23** shows the total number of casualties by month for 2013, and additionally the mean number of casualties by month between 2005 and 2013; and
- Similarly, **Figure 5-24** and **Figure 5-25** show the monthly mean UK air temperature and rainfall in degrees Celsius and millimetres respectively including the average of the monthly means[21] between 2005 and 2013.

From the figures it can be observed that between 2005 and 2013 in:

- **Quarter 1 (Jan to Mar) –** typically casualty values are at their lowest (~1,500) corresponding with low temperatures (4°C to 6°C) and moderate rainfall;
- **Quarter 3 (Jul to Sep) –** typically casualty values are at their highest (~1,800) corresponding with high temperatures (14°C to 18°C) and low/moderate rainfall, the period corresponds with the school summer holiday;
- **Quarter 4 (Oct to Dec) –** typically casualty values remain high (~1,800) following Quarter 3 corresponding with declining temperatures (reducing from approximately 11°C in October to 4°C in December) with high rainfall;
- the distribution of casualties by month in 2013, although offset below, does not significantly deviate from the 2005 to 2013 average trend.

[21] The average of the monthly mean will not represent the true average, which is only obtained from averaging all the daily values, however is provided to give an indication of the magnitude for all years based on the data available.

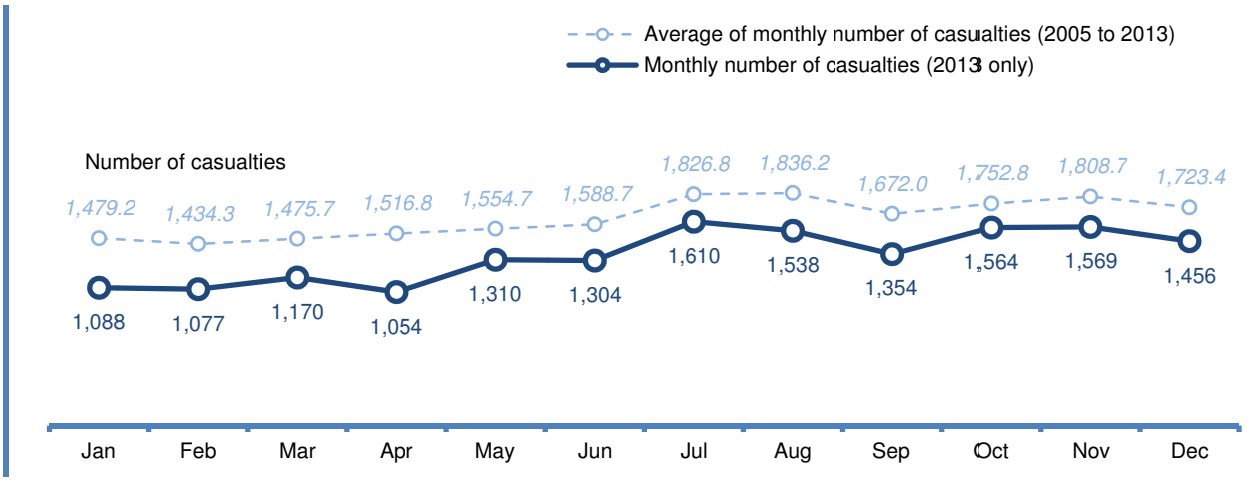


Figure 5-23 Number of total casualties by month between 2005 and 2013

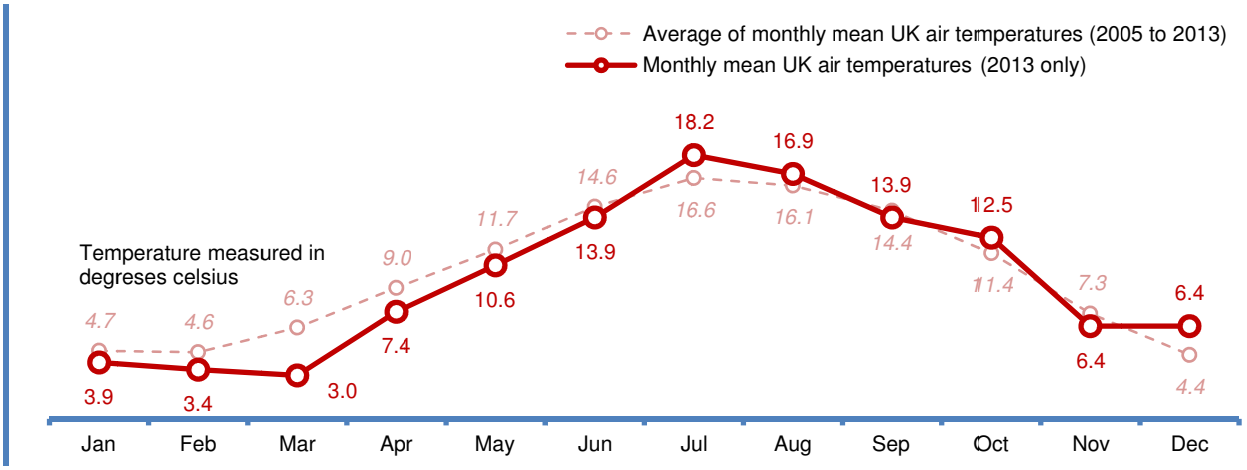


Figure 5-24 Mean UK air temperatures (degrees Celsius) by month between 2005 and 2013

Temperature data sourced from DECC Energy Weather: Digest of United Kingdom energy statistics (DUKES). Accessed from https://www.gov.uk/government/statistics/weather-digest-of-united-kingdom-energy-statistics-dukes

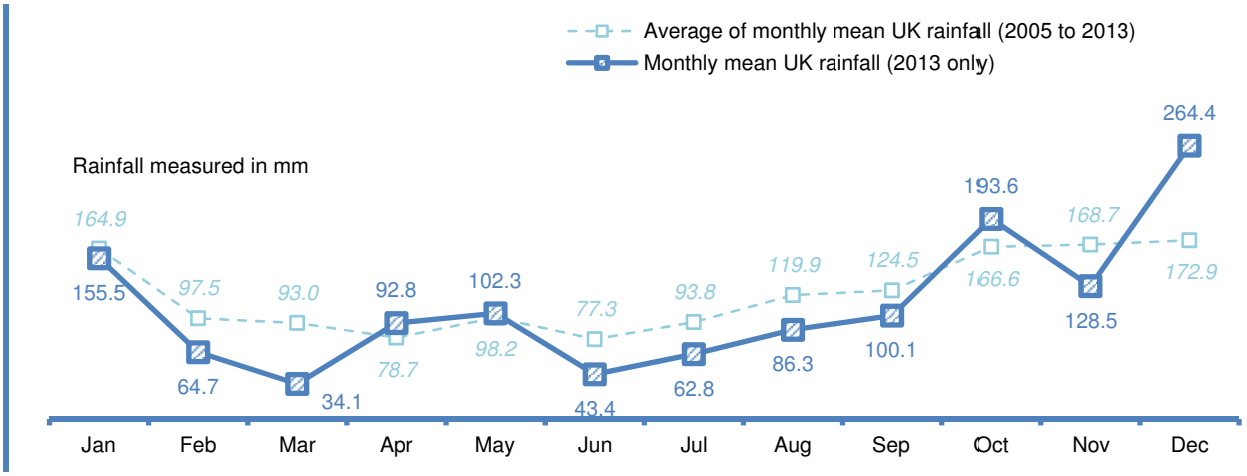


Figure 5-25 Mean UK rainfall (millimetres) by month between 2005 and 2013

Rainfall data sourced from DECC Energy Trends Statistics. Accessed from https://www.gov.uk/government/statistics/energy-trends-section-7-weather

5.6.4 Collisions by weather related contributory factors

Appendix M Table M-6 shows that the number of collisions involving specific weather related contributory factors have all decreased between 2012 and 2013. The percentage changes for each factor are shown in **Table 5-13**.

Table 5-13 Number of collisions involving specific weather related contributory factors between 2012 and 2013

Contributory Factors		2012	2013	2013 per cent change from 2012
103	Slippery road (due to weather)	1,090	892	18.2
307	Travelling too fast for conditions	916	674	26.4
706	Dazzling sun	167	145	13.2
707	Rain, sleet, snow, or fog	292	205	29.8
708	Spray from other vehicles	130	83	36.2

5.7 Roadworks

This section provides historical data on the changes in casualties at roadworks between 2005 and 2013. **Table N-1** to **Table N-9** in **Appendix N** provide breakdowns of collisions and casualties involving roadworks by road classification, junction detail, vehicle type, driver age, pedestrian involvement, contributory factors, severity and severity ratios

Roadworks are essential to the SRN as they ensure roads are safe and serviceable during their lifetimes, as well as increase capacity, through additional lanes or easing of bottlenecks.

In the past decade, the Highways Agency has sought methods to keep road users and road workers safe within roadwork schemes. One example is the introduction of average speed cameras to enforce a safe speed limit through works to protect road users and road workers.

5.7.1 Historic trends in casualties at roadworks

Historic trends of casualties within roadworks on the SRN between 2005 and 2013 are highlighted in **Figure 5-26** below. Evident in the figure is that the levels of casualties up until 2010 were typically around 900 casualties per year (albeit 727 in 2009). However, post 2010 the numbers of casualties at roadworks dropped by 33.6 per cent from 900 to 598 between 2010 and 2011 respectively and a further 20.8 per cent between 2011 and 2012. Despite recent falls, the number of casualties increased by 3.8 per cent from 474 in 2012 to 492 in 2013.

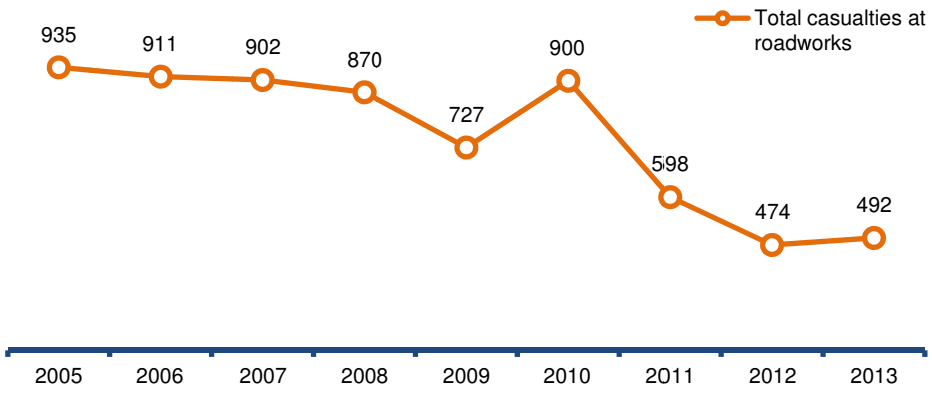


Figure 5-26 Historic trend in casualties at roadworks between 2005 and 2013

5.7.2 Comparison of casualties at roadworks against roads spending

A comparison between casualties occurring at roadworks against capital and current expenditure on national roads[22] is highlighted in **Figure 5-27** for May 2006 to April 2013[23].

From the figure it can be seen that since May 2009, the number of casualties occurring in roadworks follows closely the amount of capital expenditure on national roads as typically would be expected.

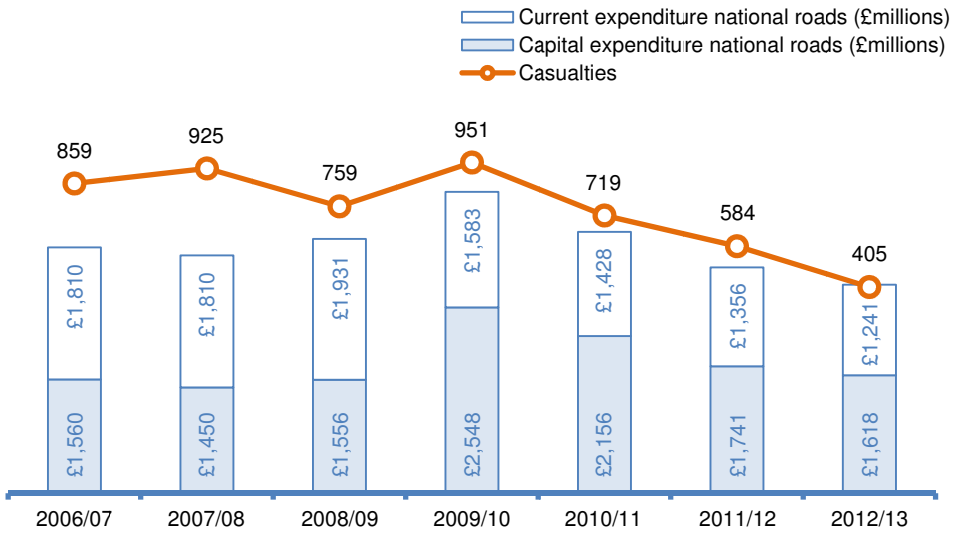


Figure 5-27 Historic casualties at roadworks against expenditure on national roads (£millions) between 2006/07 to 2012/13

It is anticipated the spending profile on construction activities will increase in the next five years as a number of smart motorway schemes and other major projects commence construction. Therefore, casualties resulting from collisions within road roadworks could potentially also increase respectively.

5.7.3 Contributory factors in collisions at roadworks

The top 10 contributory factors involved in collisions in roadworks during 2013 are listed in **Figure 5-28.** The figure highlights the number of collisions where a specific factor is reported at least once including the factor's rank when considered for all collisions. In 2013, the most common factor reported was "Failed to look properly", which was reported in 137 collisions. Assessing the ranks shows that apart from the contributory factor "Temporary road layout", the remaining factors are all in the top 10 factors

[22] For this report, annual values of capital and current expenditure on "national roads" is used as an approximation of overall national roadworks activity on major routes of which the SRN is assumed to constitute the vast majority. Values obtained from Table TSGB1303 "UK Public Expenditure on Transport by function", sourced from DfT, 2013.

[23] Values based on end of financial year therefore casualty data year adjusted to start in May and finish in April the following year.

reported for collisions on the SRN overall. Therefore it can be concluded that the type of contributory factors causing collisions in roadworks do not differ greatly to standard carriageway conditions.

1st Failed to look properly 137	2nd Failed to judge other person's path or speed 104	6th Sudden braking 55
4th Following too close 55	7th Careless, reckless or in a hurry 40	5th Poor turn or manoeuvre 30
3rd Loss of control 27	10th Travelling too fast for conditions 23	8th Slippery road (due to weather) 17

Key

Overall SRN Rank (2013)

Contributory factor involved at roadworks

Num.Collisions

Temporary road layout (eg. contraflow)

37

Notes:
(a) Figure shows the top 10 contributory factors in roadworks by number of collisions where the factor was recorded at least once for 2013.
(b) Rank represents contributory factor position based on all collisiions on the SRN found in Table F-2 Contributory factors by severity 2013 ranked by total collisions, not KSI collisions.

Figure 5-28 Contributory factors in collisions at roadworks by number of collisions and rank, 2013

Figure 5-29 displays the number of collisions involving either excess speed or tailgating between 2005 and 2013. These contributory factors are more specifically reported as "Exceeding speed limit", "Travelling too fast for conditions" and "Following too close". The figure shows that positively since 2011 there has been reductions in following too close through roadworks, with the biggest reduction occurring between 2010 and 2011 by 45.3 per cent from 106 to 58 collisions. However, the figure shows there was a minor increase of 2 collisions between 2012 and 2013. Speed related contributory factors have also witnessed falls within this period.

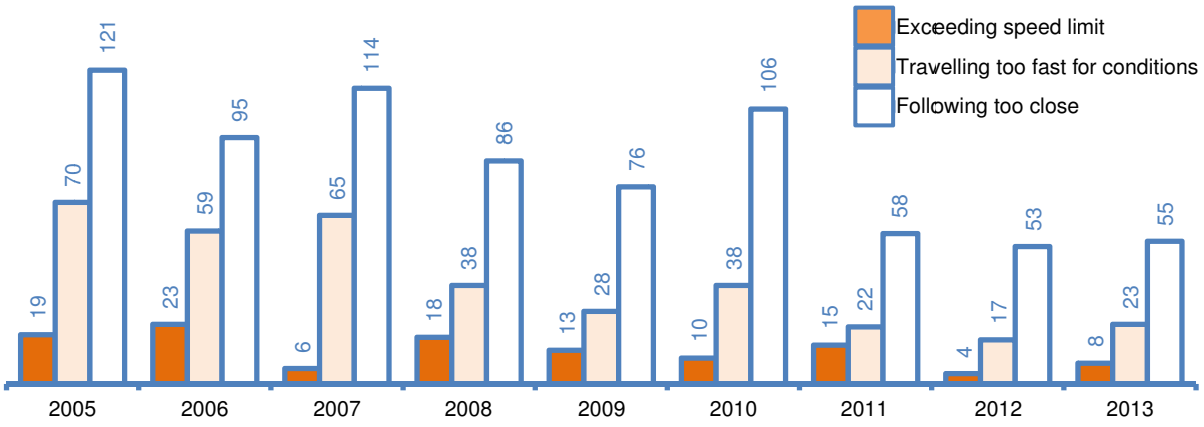


Figure 5-29 Historic collisions at roadworks involving excess speed and tailgating by year

5.8 Objects Hit On and Off the Carriageway

An assessment of collisions and casualties resulting from hitting objects on and off the carriageway is included in **Section 5.8**. **Appendix O, Table O-1** to **Table O-6** provide breakdowns of collisions and casualties involving objects hit on and off carriageways by objects hit, road classification, contributory factors and severity.

5.8.1 Casualties resulting from hitting objects on carriageway

Figure 5-30 highlights the number of KSI casualties resulting from hitting objects on the carriageway. As shown in the figure, the number of KSI casualties has marginally increased by one KSI casualty (0.9 per cent) since 2012. For historic data between 2005 and 2013, refer to **Appendix O Table O-1**.

Objects hit on carriageway
117 KSI casualties
0.9 per cent from 2012 (116)

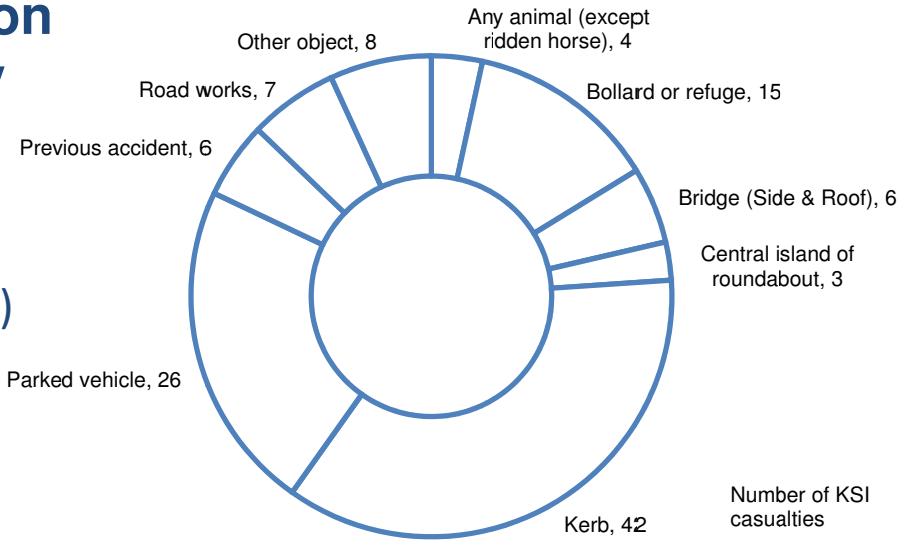


Figure 5-30 Number of KSI casualties resulting from hitting objects on the carriageway, 2013

Assessing the contributory factors involved in collisions where vehicles have hit objects on the carriageway shows that the top 5 factors by number of collisions in 2013 are:

- loss of control;
- failed to look properly;
- careless, reckless or in a hurry;
- slippery road (due to weather); and
- poor turn or manoeuvre.

Historic data between 2005 and 2013 listing the top 20 contributory factors attributed to collisions are available in **Appendix O Table O-5**.

5.8.2 Casualties resulting from hitting objects off carriageway

Figure 5-31 highlights the number of KSI casualties resulting from hitting objects off the carriageway. The figure shows that static objects including safety barriers are involved in a high number of KSI casualties. In 2013, the number of KSI casualties resulting from hitting objects off carriageway (564) was nearly one third (33.0 per cent) compared to total KSI casualties (1,709). For historic data between 2005 and 2013, refer to **Appendix O Table O-3**.

Objects hit off carriageway
564 KSI casualties
8.0 per cent
from 2012 (613)

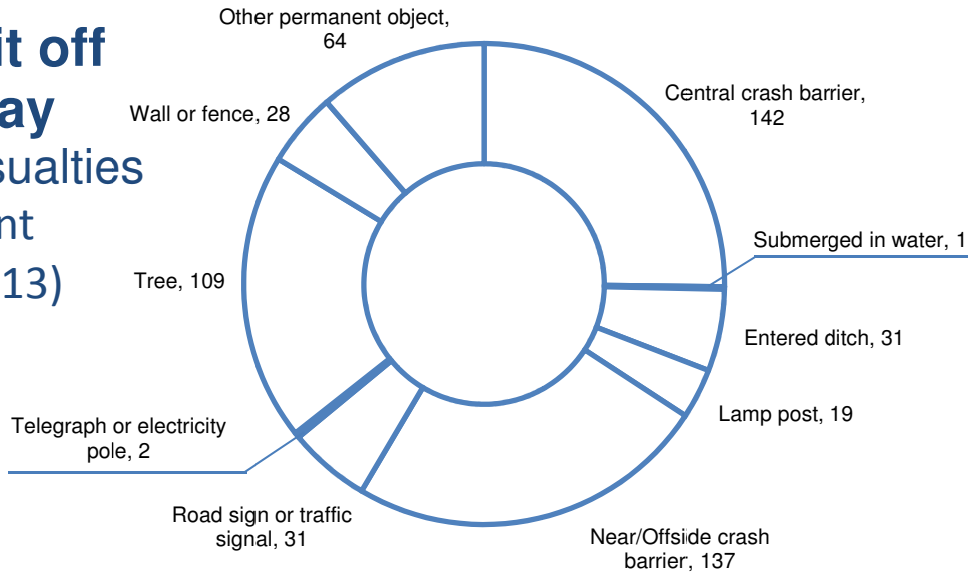


Figure 5-31 Number of KSI casualties resulting from hitting objects off the carriageway, 2013

Assessing the contributory factors involved in collisions where vehicles have hit objects off the carriageway shows that the top 5 factors by number of collisions in 2013 are:

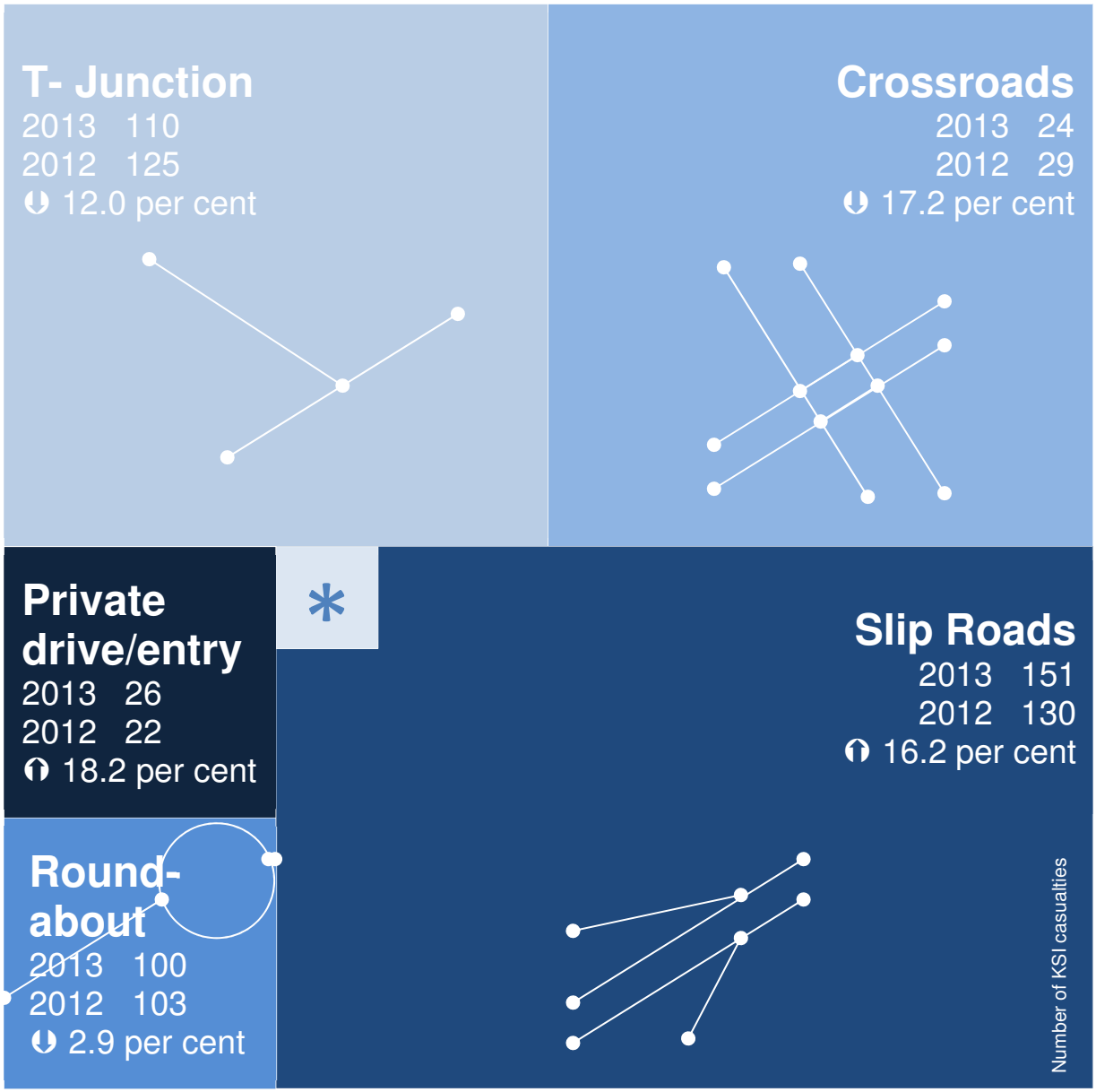
- loss of control;
- failed to look properly;
- slippery road (due to weather);
- failed to judge other person's path or speed; and
- poor turn or manoeuvre.

Historic data between 2005 and 2013 listing the top 20 contributory factors attributed to collisions are available in **Appendix O Table O-6**.

5.9 Junctions

Section 5.9 focuses on collisions and casualties occurring at junctions. For additional statistics on junctions refer to **Appendix P**. **Tables P-1** to **P-7** provide breakdowns of collisions and casualties by junction detail, junction control, road name, road classification, vehicle type, driver age, contributory factors and severity.

The number of KSI casualties by junction detail between 2012 and 2013 is highlighted in **Figure 5-32**.



Notes:
(a) * denotes "junction - more than 4 arms (not roundabout)" – 2012 (14), 2013 (3).
(b) figure reports the number of KSI casualties

Figure 5-32 Number of KSI casualties by junction detail between 2012 and 2013

From the figure it can be observed that the number of casualties occurring on slip roads and private drives and entrances have increased by 16.2 and 18.2 per cent respectively since 2012. The most frequent junction detail by number of KSI casualties remained slip roads with 151 KSI casualties in 2013. For additional historic data refer to **Appendix P Tables P-3**.

5.9.1 Collisions at junction by road name

This section reports roads where collisions at junctions are most prevalent.

In 2013, the road with the highest number of junction collisions was the A5 with 156, followed by the A27 (124) and the A1 (122). From the table it is evident that the majority of the top 5 road names are A-roads. The highest ranked motorway is the M1, where the majority of the collisions at junctions occur at slip roads.

Table 5-14 Top 10 road names for at junction collisions by junction detail, 2013

No.	Road Name	Crossroads	Junction - more than 4 arms (not roundabout)	Mini-roundabout	Private drive or entrance	Roundabout	Slip road	T or staggered junction	Other junction	Total
1	A5	14	0	0	19	59	8	55	1	156
2	A27	14	2	0	6	68	9	25	0	124
3	A1	0	0	0	7	21	49	28	17	122
4	M1	0	2	0	2	25	76	1	0	106
5	A38	0	0	0	1	36	40	22	4	103
6	A46	1	0	0	1	64	10	14	1	91
7	M25	0	1	0	0	24	60	0	3	88
8	M6	0	0	0	0	18	58	6	4	86
9	A30	6	2	0	0	36	17	11	6	78
10	A2	3	1	0	0	23	45	4	1	77

Notes:
(a) table reports number of collisions by junctions
(b) table ranked by total column

5.10 Tyres

The tyres section examines collisions and casualties where 'Tyre illegal, defective or under inflated' is listed as at least one of the contributory factors (also referred to as tyres in this section for ease). This indicates a lack of preparation or carelessness on the part of the driver or rider, and therefore casualties associated with it as the main factor can be considered as preventable. Tyres are linked with skidding, breaking distance, blow-outs etc. and can be dangerous to the occupants and other road users.

For additional statistics, **Table Q-1** to **Table Q-5** in **Appendix Q** provides the breakdown of collisions and casualties involving illegal, defective or under inflated tyres by road name, road surface condition, weather condition, casualty type, contributory factors and severity.

5.10.1 Casualties resulting from illegal, defective or under-inflated tyres

The number of total casualties by year is reported in **Figure 5-33** below. As highlighted by the figure, the number of casualties related to tyres during the economic recession from 2008 onwards increased marginally from 362 in 2008 to 374 in 2010. However the number of reported casualties related to tyres has steadily improved since 2010 with a reduction of 39.8 per cent from 374 to 225 in 2013. As shown in **Table Q-1** in **Appendix Q**, the number of KSI casualties related to tyres has also decreased from 2011.

Involving tyres

29 KSI casualties

↓ 29.3 per cent from 2012

225 total casualties

↓ 32.0 per cent from 2012

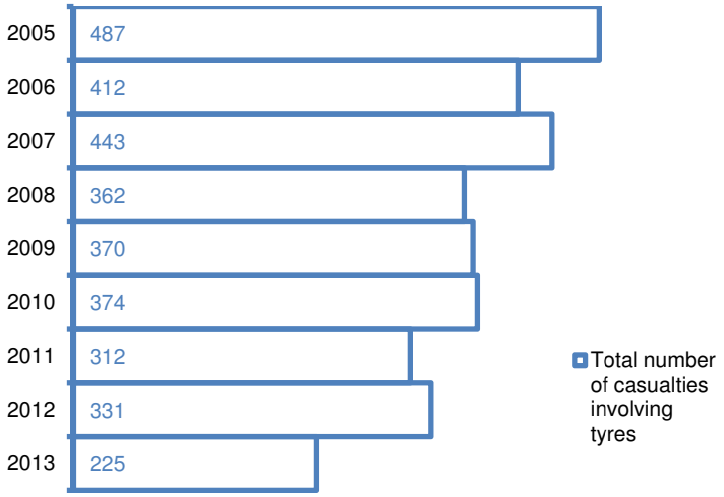


Figure 5-33 Historic casualties involving illegal, defective or under-inflated tyres by year

5.11 Goods vehicles – HGVs and LGVs

This section considers the traffic and casualty statistics associated with goods vehicles. Heavy Goods Vehicles (HGVs) and Other Goods Vehicles (Other GVs or LGVs) rely heavily on the SRN to deliver goods to businesses in the UK and for export and import goods to and from foreign markets. HGVs are classified and generally reported as goods vehicles where the vehicle gross weight is greater than 3.5 tonnes, whereas LGVs are those with the gross weight equal to or less than 3.5 tonnes. For the purposes of this report goods vehicles with unclassified gross weight are also classed under LGVs (or Other GVs).

Table R-1 to **Table R-7** in **Appendix R** provides the breakdowns of collisions and casualties involving HGVs and LGVs by road name, casualty age, contributory factors and severity.

5.11.1 Changes in HGV and LGV traffic levels

Table 5-15 outlines the change in traffic levels of HGVs and LGVs by year. The table shows that in 2013, the amount of HGV traffic (87.74 HMVM) was significantly less than LGVs (115.75 HMVM). The difference between HGV and LGV traffic levels has doubled from 13.67 HMVM in 2010 to 28.01 HMVM in 2013.

Table 5-15 Estimated traffic levels for HGV and LGVs (Other GV) on the SRN between 2010 and 2013

Year	HGV	LGV (other GV)	
2010	91.45	105.12	
2011	89.33	108.78	Estimated traffic (HMVM)
2012	87.25	111.82	
2013	87.74	115.75	

Furthermore, analysing the percentage changes from 2010 as detailed in **Figure 5-34** highlights that LGV traffic is growing steadily year on year since 2010. Assessing the index percentages in the figure shows that traffic levels for LGVs are increasing typically 3 to 4 percentage points per year. In contrast, the level of HGV traffic has decreased by 4.1 per cent over the same period.

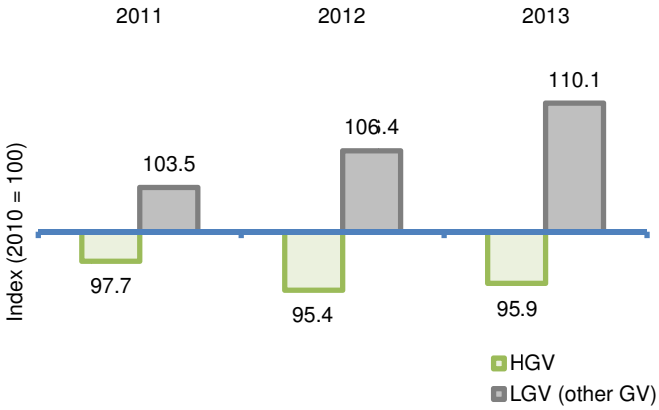


Figure 5-34 Index changes of estimated traffic levels for HGV and LGVs (Other GV) on the SRN between 2011 and 2013

It is anticipated, that due to the now mandatory Driver Certificate of Professional Competence (CPC)[24] coming into force on the 9th September 2014, the levels of HGV traffic will fall further. In contrast, LGV traffic level will potentially increase further as LGVs drivers do not require the CPC under the new European directive. Since LGVs can be driven by less experienced and less qualified drivers there is a road safety concern that collisions contributed by this vehicle type as a whole may see an increase.

5.11.2 Comparison of casualties and casualty rates involving either HGVs or LGVs

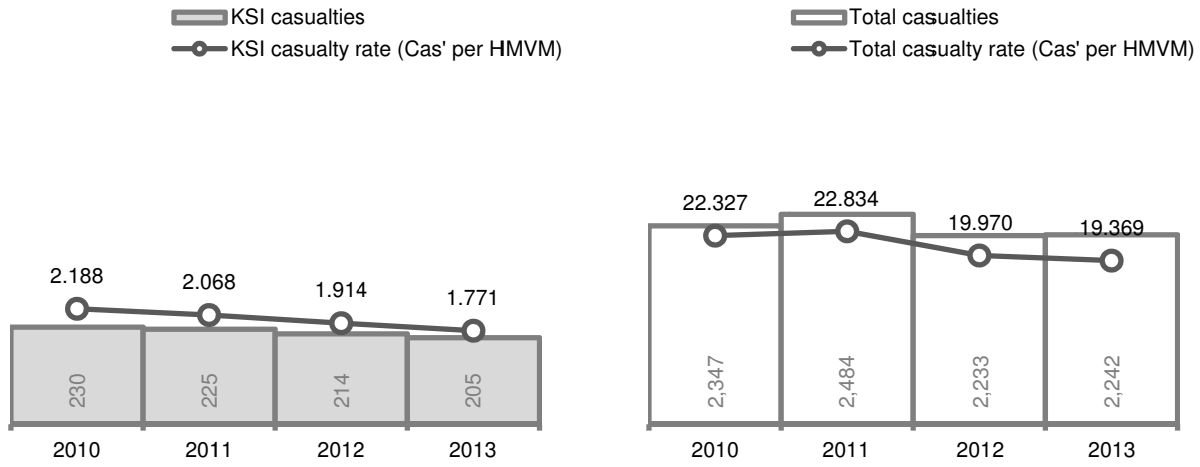
Comparison of casualties and casualty rates involving either LGVs or HGVs is provided in **Figure 5-35** and **Figure 5-36** respectively.

As shown by the figures, the likelihood of KSI or total casualties involving a HGV is greater than where the casualty involves a LGV. Comparing KSI casualty rates for 2013 shows that the KSI casualty rate for HGVs (4.992 KSI casualties per HMVM) is almost 3 times that of the value for LGVs (1.771 KSI casualties per HMVM). For context, in 2013 the SRN KSI casualty rate was approximately 2.002 KSI casualties per HMVM and 18.850 casualties per HMVM for total casualties.

Based on evidence provided in the two figures, it appears that casualties associated with HGVs still require monitoring as they continue to increase. LGV casualty rates remain relatively stable however will be continued to be monitored for future trends.

Additional statistics on casualties involving either HGVs or LGVs by severity and year can be found in **Table R-1** in **Appendix R**.

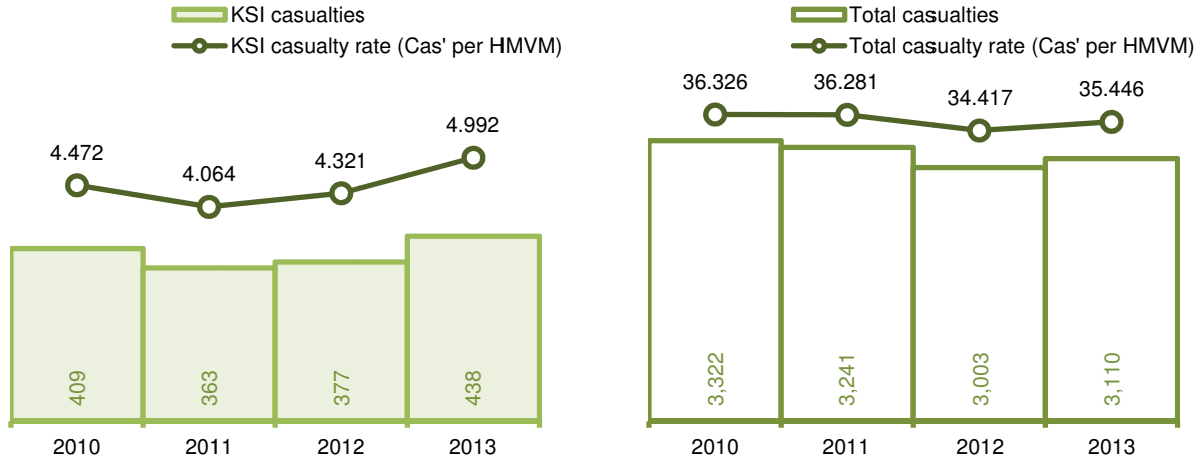
[24] https://www.gov.uk/driver-certificate-of-professional-competence-cpc/overview



(a) KSI casualties and KSI rate involving LGVs (b) Total casualties and total rate involving LGVs

Notes:
(a) Figure reports number of KSI and total casualties involving at least one LGV in a collisions.
(b) Casualty rates based on traffic values provided in **Table 5-15**.

Figure 5-35 Number of KSI and total casualties involving at least one LGV between 2010 and 2013



(a) KSI casualties and KSI rate involving HGVs (b) Total casualties and total rate involving HGVs

Notes:
(a) Figure reports number of KSI and total casualties involving at least one HGV in a collisions.
(b) Casualty rates based on traffic values provided in **Table 5-15**.

Figure 5-36 Number of KSI and total casualties involving at least one HGV between 2010 and 2013

5.12 Motorcycles (PTW)

This topic of interest analyses the number of motorcycle occupant casualties occurring on the SRN. For this topic of interest section only, the term “motorcycle” also refers to all powered two wheelers (PTWs) and is interchangeable.

For additional data, refer to **Appendix S Tables S-1** to **S-5**.

In 2013, PTW occupants accounted for 15.2 per cent of all 244 fatalities and 18.4 per cent of all 1,709 KSI casualties on the SRN

5.12.1 Motorcycle (PTW) casualties by severity

Figure 5-37 highlights the changes in PTW occupant fatalities and KSI casualties since 2005. From the figure it can be seen that in 2013, the number of casualties across these severities for PTWs increased from their respective values in 2012.

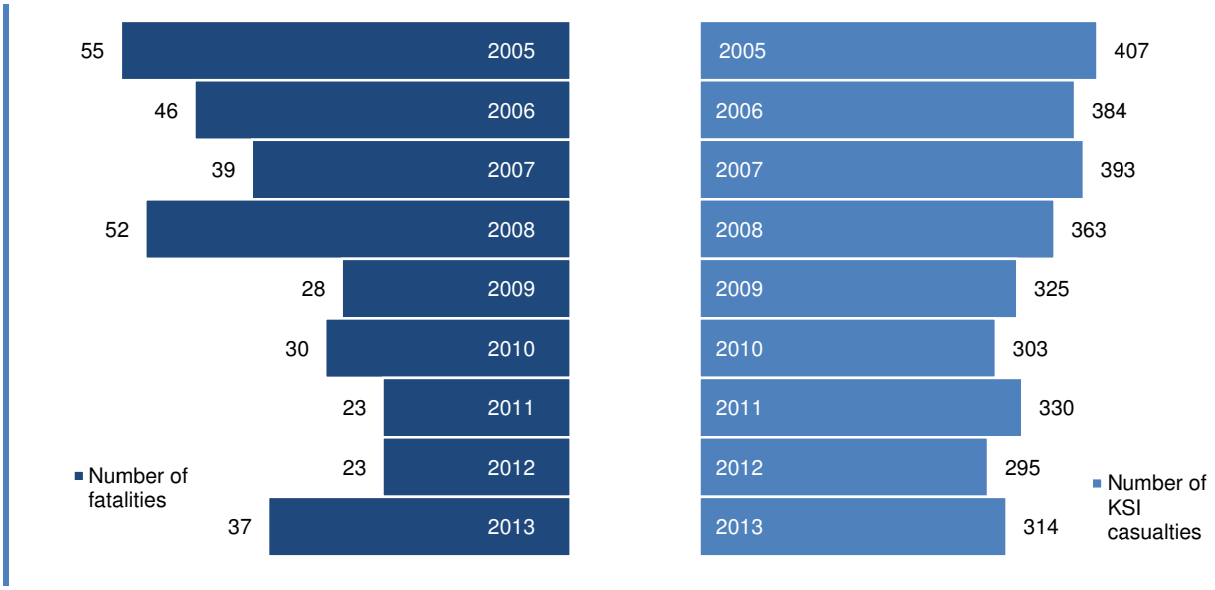


Figure 5-37 Historic number of PTW occupant fatalities and KSI casualties between 2005 and 2013

The increases in PTW occupant casualties between 2012 and 2013 included:

- 60.9 per cent increase in fatalities from 23 in 2012 to 37 in 2013; and
- 6.4 per cent increase in KSIs from 295 in 2012 to 314 in 2013.

Of note, there was also a 4.2 per cent increase in total casualties from 812 in 2012 to 846 in 2013 as shown in **Appendix C Table C-3**.

Assessing the historic trends in the above figure shows that the number of PTW occupant fatalities and KSI casualties, although on a downward trend overall, have become volatile in nature.

5.12.2 Motorcycle (PTW) casualties by road classification

The road classifications most affected by the increases in fatalities involving PTWs between 2012 and 2013 included motorways and non-built-up A-road dual carriageways. These two road classifications are highlighted in **Figure 5-38**.

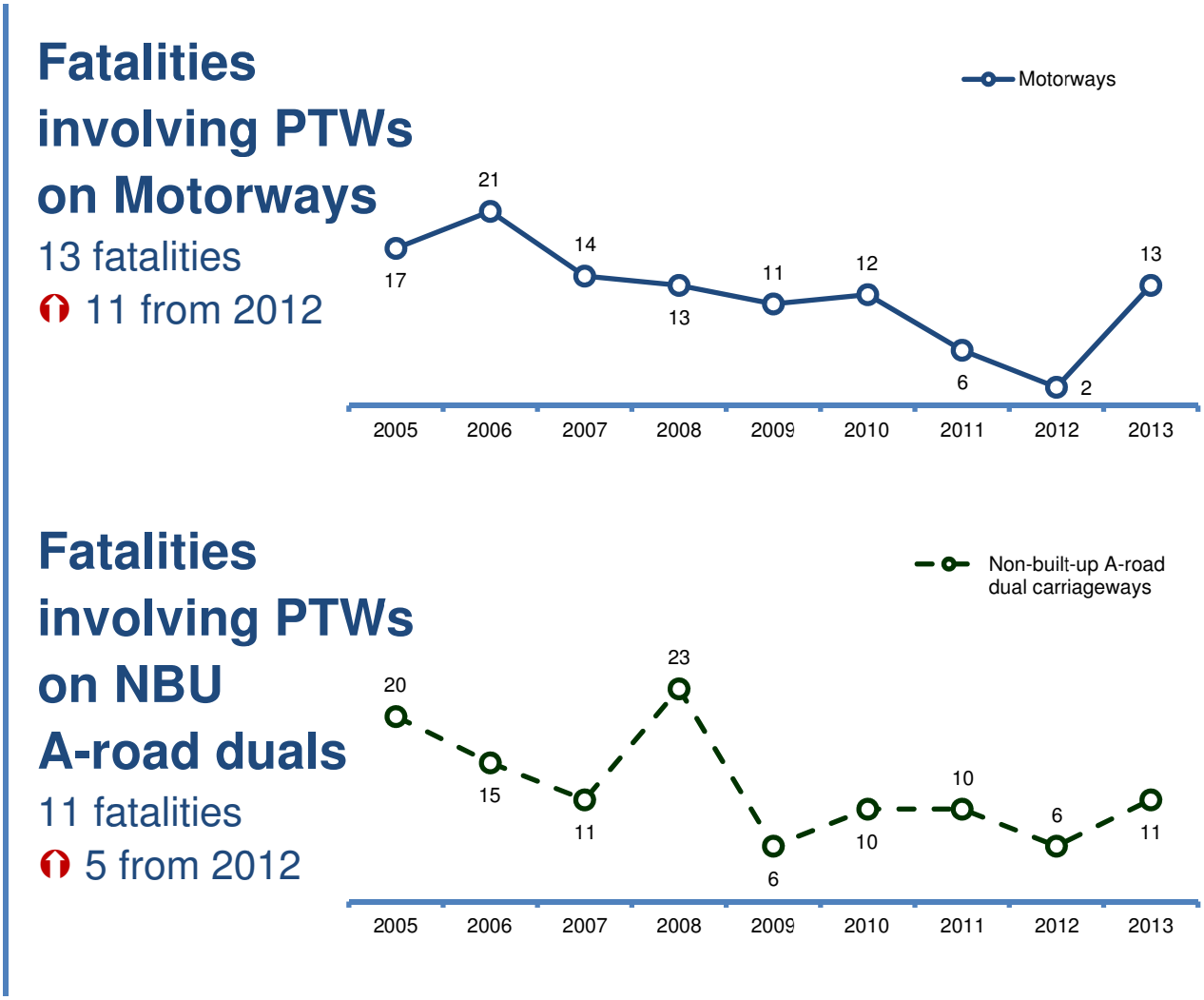


Figure 5-38 Historic number of fatalities involving PTWs on motorways and non-built-up A-road dual carriageways between 2005 and 2013

As shown by the figure, the number of fatalities involving PTWs on motorways has increased by 11 fatalities. However it is clear that the two previous years (2011 and 2012) were exceptionally low in comparison to the overall data.

The number of total casualties involving PTWs occurring on non-built-up A-road dual carriageways increased by 28.9 per cent from 350 in 2012 to 451 in 2013 (**Appendix S, Table S-4)**. However **Appendix S, Table S-2** shows that the majority of this increase occurred on the A249. In 2013, the A249 encountered a single serious multiple vehicle collision that included at least one PTW hence results in a large increase in all types of casualties involving PTWs for the road name.

As shown in **Appendix S Table S-1**, the number of fatalities involving PTWs was equivalent to 37 in 2013, highlighting that 100.0 per cent of fatalities in these collisions were PTW occupants.

5.12.3 Motorcycle (PTW) casualties involving rainfall

Figure 5-39 illustrates the incidence of KSI casualties involving PTWs during rainfall against annual average UK rainfall, in mm, between 2005 and 2013. The figure shows there is a weak to moderate correlation between the two parameters which is most evident between 2010 and 2011.

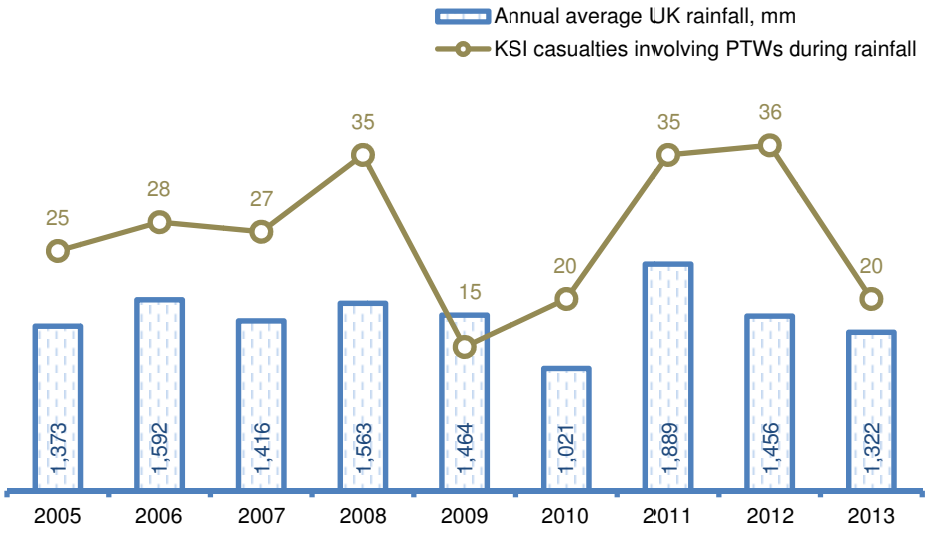


Figure 5-39 Historic number of KSI casualties involving PTWs during rainfall against annual average UK rainfall between 2005 and 2013

Annual average rainfall sourced from DECC Energy Trends Statistics. Accessed from https://www.gov.uk/government/statistics/energy-trends-section-7-weather

5.12.4 Motorcycle (PTW) casualties by contributory factor involved

Table 5-16 highlights the number of KSI casualties involving the top 10 contributory factors attributed directly to all riders between 2005 and 2013. This table differs slightly to that of **Appendix S, Table S-5** which the reports total casualties involving factors attributed to any vehicle involving a PTW related collision.

As shown by the table below, the most common factors directly attributed to riders is loss of control. This factor was involved in 61 KSI casualties. The table also shows that factors that are classified as rider error are the most prevalent type. The tenth most common factor was rider inexperience, assigned to riders in 14 KSI casualties involving a PTW. This factor typically occurs less frequently in overall KSI casualty trends.

Table 5-16 Number of KSI casualties involving the top 10 contributory factors attributed directly to riders between 2005 and 2013

Year	Loss of control	Failed to judge other person's path or speed	Failed to look properly	Poor turn or manoeuvre	Careless, reckless or in a hurry	Sudden braking	Slippery road (due to weather)	Travelling too fast for conditions	Following too close	Learner or inexperienced driver/rider
2005	79	50	44	47	34	26	18	46	24	20
2006	77	60	48	34	31	18	16	30	27	19
2007	65	60	50	43	38	37	12	26	30	16
2008	78	50	39	26	26	20	22	37	20	21
2009	53	39	34	42	20	31	14	17	28	14
2010	75	54	32	26	24	28	16	17	19	10
2011	75	38	36	36	23	19	22	26	11	16
2012	63	41	50	24	20	23	20	23	21	14
2013	61	54	38	34	29	24	19	17	15	14

Notes:

(a) Table sorted by 2013

5.13 Hardshoulders and Lay-bys

This section provides collision and resulting casualty information involving motorway hardshoulders and A-road lay-bys.

As noted previously in past Highways Agency reports, the Smart Motorway Program (SMP) includes several schemes where the traditional hardshoulder will be or has been used as an additional running lane and emergency refuge area at specified intervals. Therefore this assessment of hardshoulder and lay-by areas safety performance has been included.

Within **Appendix T**, **Table T-1** to **Table T-5** presents statistics relating to collisions and casualties involving hardshoulders and lay-bys by road name, road classification, casualty age, contributory factors and severity.

5.13.1 Comparison between motorway hardshoulders and A-road lay-bys

Table 5-17 below shows the total number of casualties directly located on either motorway hardshoulders or A-road lay-bys at point of impact by road classification and year.

Table 5-17 Number of casualties involved in either motorway hardshoulders or A-road lay-bys by vehicle location, road classification and year

Refuge type	Hardshoulder		Lay-by		Lay-by	
Road classification	Motorway		A-road dual carriageway		A-road single carriageway	
	On HS only	All involved	On LB only	All involved	On LB only	All involved
Year 2005	88	218	33	149	4	33
2006	64	139	42	163	1	55
2007	86	184	38	145	5	50
2008	77	207	52	157	3	38
2009	86	176	30	114	8	35
2010	66	164	37	136	5	36
2011	85	165	34	134	7	49
2012	64	112	25	102	2	29
2013	48	121	29	105	3	37

Notes:

(a) Table reports the number of casualties who were associated with vehicles located on a motorway hardshoulder or A-road lay-by only where specified as “On HS only” or “On LB only”. Casualties involving a vehicle entering, leaving or on the hardshoulder or lay included are included within “All involved”.

(b) It is assumed that in the majority of cases if the road classification was recorded as “motorway” and the vehicle location was reported as “On lay-by or hard shoulder” then the vehicle was located on a motorway hardshoulder at the time of the collision. In contrast, if the road classification was denoted as “A-road” and the vehicle location was reported as “On lay-by or hard shoulder”, then the vehicle was located on an A-road lay-by.

When comparing the different refuge types for motorways and A-roads it is evident that motorway hardshoulders are relatively unsafe in comparison to lay-bys in terms of absolute casualties. This is particularly true when compared to A-road single

carriageway lay-bys. In 2013, there were 48 casualties on motorway hardshoulders compared to 3 casualties on A-road single carriageway lay-bys.

In addition, from the table it can also be determined that the number of total casualties involved in collisions for motorway hardshoulders and A-road dual carriageway lay-bys are relatively similar in magnitude. However the proportion of casualties resulting from being located on either a hardshoulder or lay-by at the point of impact is consistently higher on motorways hardshoulders (39.7 percent of 121 casualties in 2013). The percentages for A-road dual and single carriageways are 27.6 per cent and 8.1 per cent respectively in the same year.

5.13.2 Hardshoulder and lay-by casualties resulting from fatigue or distraction inside the vehicle

The top 20 contributory factors ranked by 2013 total casualties involving hardshoulders and lay-bys are reported in **Table T-5**, **Appendix T**.

Figure 5-40 focuses specifically on the number of casualties involving hardshoulders and lay-bys linked to fatigue and distraction inside the vehicle. In the appendix table, these factors are ranked 8th and 11th respectively. These factors potentially attributed to the driver of the vehicle inadvertently drifting into the hardshoulder or lay-by and colliding with a stationary vehicles.

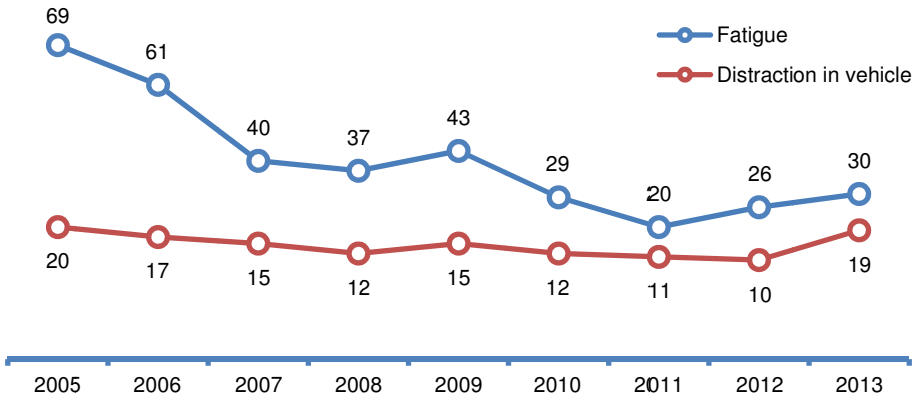


Figure 5-40 Historic casualties involving either a hardshoulder or lay-by resulting from fatigue or distraction inside the vehicle by years

As shown by the figure, it can be seen that the number of casualties involving hardshoulder or lay-bys resulting from fatigue has increased by 50.0 per cent from 20 in 2011 to 30 in 2013.

The number of casualties where distraction was involved increased to 19 casualties in 2013 from 11 in 2011 (72.7 per cent).