

**NORTH EAST**  
**Regional Road Safety Resource**  
[www.neroadsafety.org.uk](http://www.neroadsafety.org.uk)

Project Report: 32

**Analysis of Bus and Coach Passenger Casualties**  
**North East England**  
**2006 - 2010**

Produced December 2011

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## Summary of Key Findings

- Between 2006 and 2010 there have been 2,102 bus and coach passengers injured in collisions in the North East. Of this number, 1,998 were slightly injured, 101 were seriously injured and three were killed in these collisions.
- During the period the number of casualties on buses and coaches has been steadily increasing, while over the same time the number of total casualties has been falling.
- Tyne and Wear accounts for nearly two thirds of the North East's bus and coach passenger casualty numbers over these five years, Tees Valley around one sixth, Durham just under one eighth and Northumberland around a twelfth.
- The most casualties occur in the Newcastle and Sunderland local authority areas, with all five Tees Valley authorities making up the lowest numbers of casualties.
- Casualty numbers peak in April and November; however, these numbers generally remain consistent for most of the year.
- Over the week, casualties are highest on Tuesday, Wednesday and Thursday, with the lowest number of casualties occurring on Sundays. During the working week, casualties tend to peak at midday and 15:00-15:59, while at the weekend the peak comes at 14:00-14:59.
- The majority of passengers injured on buses and coaches were sitting down when the collision occurred, and the vehicle tended to be driving in a straight line at the time.
- The most at risk age groups for casualties on buses and coaches are the under 30s and the over 50s, and passengers over 60 tend to suffer more severe injuries.
- Durham, North and South Tyneside and Redcar and Cleveland have higher than average proportions of over 60s injured in collisions, while Stockton has an above average proportion of child casualties.
- Over the day, child (0-15) and adult (16-59) casualties tend to peak at school opening and closing times, while bus passengers aged adults (60+) generally seem to be injured in collisions between 09:00 and 14:59.
- Older passengers tend to be more susceptible to injuries while they are standing up than younger passengers, and passengers over 80 years old have the highest numbers and proportions of injuries while boarding and alighting a bus or coach.
- The main contributory factor for buses and coaches involved in collisions is the bus or coach driver suddenly braking.
- If all bus and coach passenger casualties had been prevented in the period, it is estimated that this would have saved the North East economy just over 50 million pounds.

## Introduction

This report has been produced by the North East Regional Road Safety Resource to provide information and analysis on bus and coach passenger casualties in the North East between 2006 and 2010. The data used to produce this report is based on the Road Safety Resource's database of Stats 19 provided by Cleveland, Durham and Northumbria police forces. Stats 19 classifies a vehicle constructed and equipped to carry 17 or more seated passengers as a 'bus or coach'.

This report is intended to assist road safety professionals in identifying the current trends in bus and coach passenger casualties. It also provides information on dates, times and areas where bus and coach passenger casualties are most likely to occur, along with details on the passenger's position and the bus or coach's movements at the time of the collision. Furthermore, there will be information included on the ages of passengers injured in collisions to attempt to identify more vulnerable age groups, and on the contributory factors to the bus or coach collision to hopefully assist work with bus and coach companies to identify causes of casualties on their vehicles. Finally there will be a look into the financial costs of the casualties and the value of preventing bus and coach passenger casualties in the future.

The reason why bus and coach passenger casualties have been chosen for this report is that the number of casualties in these vehicles has been steadily increasing for the past five years, while total casualties in the region have been reducing over the same period. In addition, this rise in casualties is set against a general decline in the overall distance that people in the North East are travelling on local bus services. Figures published by the Department for Transport in their *Annual Bus Statistics 2010/11* show that the total number of kilometres travelled on local bus services in the North East have fallen by around 6% from 2005/06 to 2010/11. Finally, further to this, the Department for Transport's *Reported Road Casualties in Great Britain* series of reports show that nationally the number of casualties amongst bus and coach occupants has been falling between 2006 and 2010, while the number of casualties in the North East has been rising.<sup>1</sup>

Furthermore, in terms of passenger casualties, there has been more than twice the amount of injuries sustained by bus and coach passengers than by passengers on all other forms of transportation (except cars) combined.

The fact that the total number of casualties and the distance that people are travelling on a bus or coach, coupled with the disproportionate number of casualties amongst passengers on these vehicles shows that the increase in casualties on these vehicles should be investigated further.

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<sup>1</sup> The bus statistics report is published annually by the Department for Transport. The most recent version was published on 20 October 2011 and is available at the following website:

<http://www.dft.gov.uk/statistics/releases/annual-bus-statistics-201011>\*

The general road safety report is also published annually by the Department for Transport. The most recent version was published on 29 September 2011 and is available at the following website:

<http://www.dft.gov.uk/statistics/releases/road-accidents-and-safety-annual-report-2010>\*

\* Please note that all links were correct at the time of publication but could be subject to subsequent change.

## Summary of Bus Casualty Numbers

If all casualties on buses, coaches and minibuses (those vehicles constructed and equipped to carry between 8 and 16 seated passengers) are taken into account, there were 2,957 casualties on these vehicles between 2006 and 2010, with 2,656 being on buses and coaches, and 301 on minibuses.<sup>2</sup>

Of these 2,656 casualties on buses and coaches, 2,102 were passengers, 369 were pedestrians hit by the vehicle and 185 were the driver. This means that casualties of passengers on buses and coaches make up over two thirds of the total casualties on buses, coaches and minibuses, which is why we will look more specifically at these casualties.

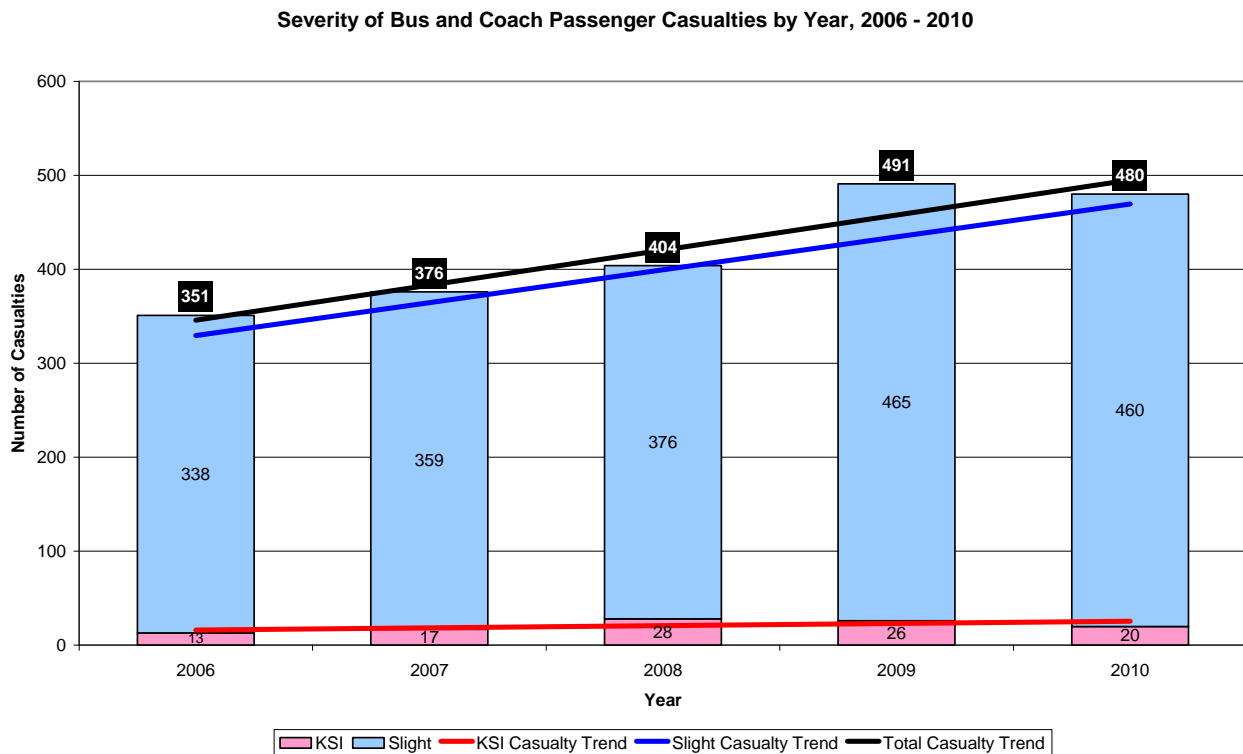
Over the five year period between 2006 and 2010 there were 2,102 casualties who were passengers on a bus or coach in the North East. Of this number, 1,998 were slightly injured, 101 were seriously injured, and 3 were killed in a collision while onboard a bus or coach. These numbers equate to 4.5% of the total road casualties in the North East, and 15.6% of casualties to vehicle passengers in the period. As mentioned in the introduction, this equates to more than double the amount of passenger casualties on all other forms of transportation apart from cars during the period.

During the period 2006 to 2010, Figure 1 shows that there has been a general increase in the number of passenger casualties on buses and coaches until 2009, with a slight decrease in 2010. This is also the case for those casualties where the individual was killed or seriously injured (KSI). Overall, this equates to a 36.8% increase in total bus and coach passenger casualties between 2006 and 2010.

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<sup>2</sup> These numbers also include pedestrians who were hit by these vehicles

**Figure 1: Severity of Bus and Coach Passenger Casualties by Year**



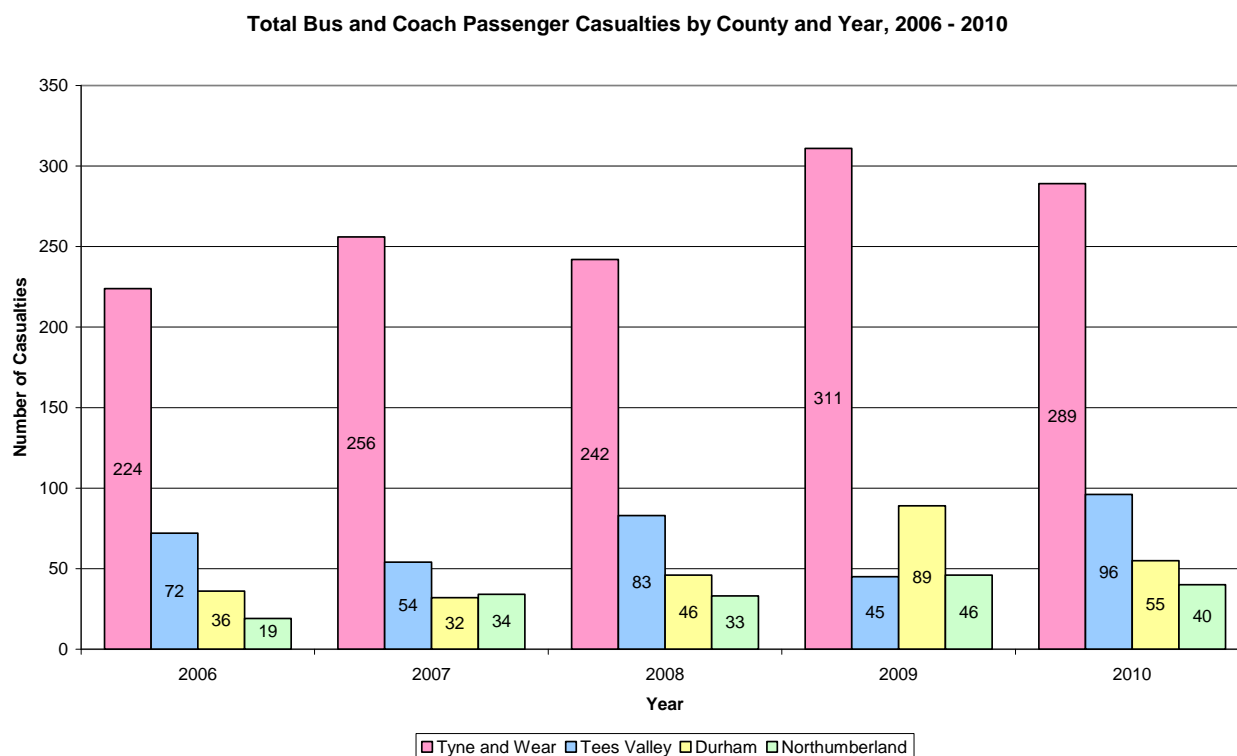
This general increase should also be set against the decrease in total casualties over the period. Between 2006 and 2010, there has been an 18.9% drop in the total number of casualties on the North East's roads. This equates to a year on year rise in the proportion of casualties that are bus or coach passengers. There is a similar position with KSI casualties, apart from in 2010 where there was a slight decrease in the proportional share of casualties compared with the overall total.

We can see from these figures that the main rise in casualties has been amongst those passengers who were slightly injured on buses and coaches. In addition to this, the figures also show that KSI casualties have been rising over the period, but at a slower rate than slight casualties. This leads us on to question what causes lie behind this rise in casualties of bus and coach passengers, and the following sections of the report will look in more detail at the bus and coach passenger casualties to highlight areas where further work could be focussed.

## Regional Distribution of Bus Passenger Casualties

Figure 2 shows the number of total bus and coach passenger casualties in the region split into the county in which the collision occurred. What we can see from this is that casualties from collisions in Tyne and Wear account for nearly two thirds of all bus and coach passenger casualties. Given that Tyne and Wear has both the highest population and the highest number of bus journeys in the region then it should be expected that the number of casualties from these journeys will be high as well. Looking at these two other data sets, we can see that Tyne and Wear, whilst accounting for under half of the region's population does account for almost two thirds of its total bus journeys, so therefore it is the bus journey data set that tells us whether any particular county has higher than expected bus passenger casualties. As a proportion of total bus and coach passenger casualties in the region, for four of the five years, casualties in Tees Valley made up around 20% and Durham around 10%, apart from in 2009 when these percentages were reversed. Tyne and Wear and Northumberland consistently account for over 60% and fewer than 10% of the total casualties respectively.<sup>3</sup>

**Figure 2: Total Bus and Coach Passenger Casualties by County**



Department for Transport data shows that there is a slightly higher proportion of bus and coach passenger casualties in Tyne and Wear and Northumberland than their share of bus journeys, while in Durham and Tees Valley, the opposite is true. However, as all of these proportions are within 2% of the proportion of casualties then there is not any particular area where there is an unexpected problem.

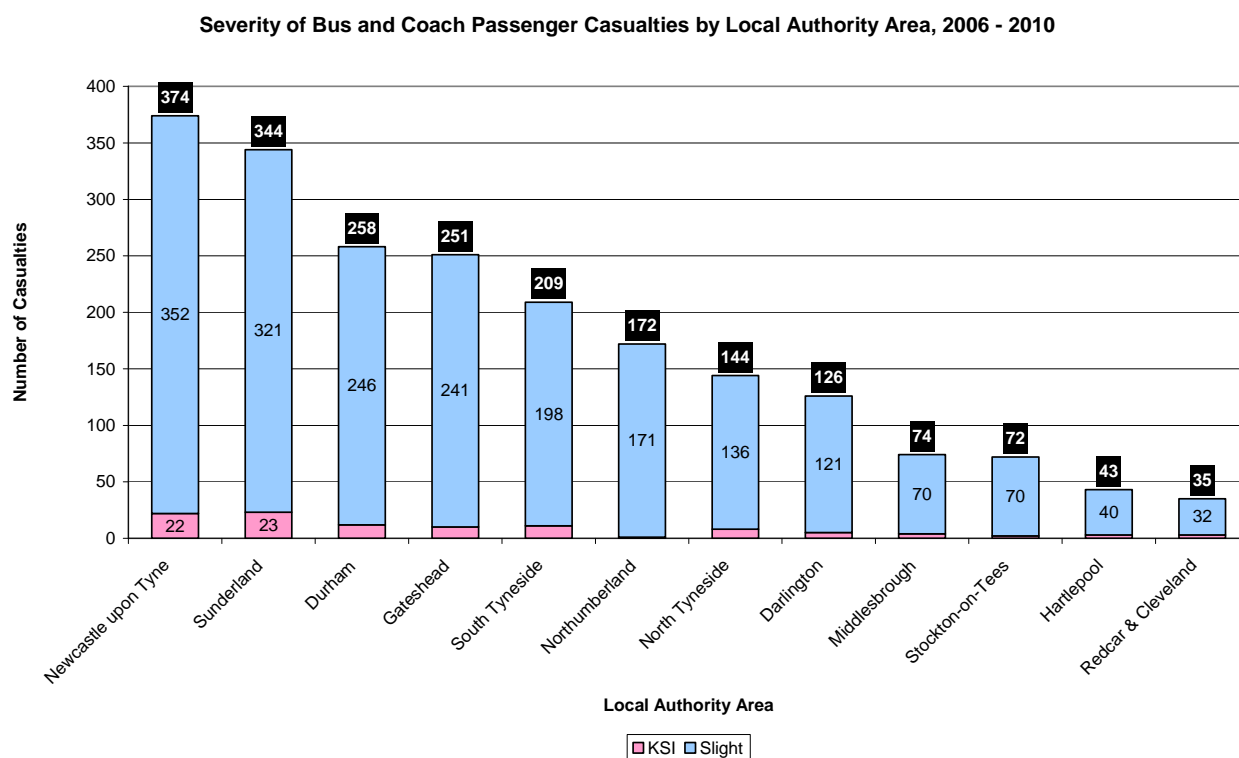
<sup>3</sup> Population figures have been taken from the *Annual Mid-year Population Estimates, 2010* report published by the Office for National Statistics on 30 June 2011 and available at the following website:

<http://www.ons.gov.uk/ons/rel/pop-estimate/population-estimates-for-uk--england-and-wales--scotland-and-northern-ireland/mid-2010-population-estimates/index.html>

Data on bus passenger journeys is taken from the Department for Transport's *Annual Bus Statistics 2010/11*, available at the following website: <http://www.dft.gov.uk/statistics/releases/annual-bus-statistics-201011>

Looking in more detail at the local authority area in which bus passenger casualties occurred, Figure 3 shows that the two Tyne and Wear cities, Newcastle and Sunderland, have the highest levels of bus and coach passenger casualties, and account for over one third of the total casualties. On the other end of the scale, the five Tees Valley local authorities have the lowest levels of casualties in the region, with fewer combined casualties than in Newcastle alone. These trends do differ slightly from the figures for total casualties in the period. Whilst the proportion of casualties in the five Tees Valley local authorities are still amongst the lowest in the region, the highest levels of total casualties are in Durham and Northumberland.

**Figure 3: Severity of Bus and Coach Passenger Casualties by Local Authority**



Unfortunately, the Department for Transport's figures do not break the Tyne and Wear local authorities' bus passenger numbers down any further, as data is not collected at this level, however, the other North East local authorities do have data, which means that we can see if any area has proportionally higher than expected casualty levels. The figures in *Annual Bus Statistics 2010/11* show that there are again similar levels of casualties to the number of passenger journeys. Northumberland and Darlington both have a higher proportion of casualties than passenger journeys, however, as with the county level data, this is still only a 2% difference so cannot be seen as indicative of an unexpected problem.

In summary, the most bus and coach passenger casualties occur in Tyne and Wear, with the highest proportions of casualties in this county coming from Newcastle and Sunderland. The least casualties occur in Northumberland County and in Redcar and Cleveland local authority. The number of casualties in the counties and local authorities of the North East proportionally match the levels of bus passenger journeys in the region. This means that there is a link between bus usage and casualties, implying that there is probably no specific problem in any one area that is causing casualty levels to increase.

## Month, Day and Time of Collisions

The following figures show the breakdown of bus and coach passenger casualty numbers by the month, day of the week and time of day of the collision.

From Figure 4 we can see that there are monthly fluctuations in the number of bus and coach passenger casualties, with February and August having the least casualties and April and November having the most. These months also show that there are two peaks in the monthly casualty levels in the year. Although the April peak is slightly higher, there is no major difference between the two halves of the year, and as one covers spring and summer and the other autumn and winter then we cannot say for certain that there is a specific problem with bus passenger casualties in any particular weather or lighting conditions peculiar to those seasons. A factor behind the drop in casualties in August could probably be related to the school summer holidays, as less people would be travelling by bus or coach during this period then it would seem logical that the number of casualties would also drop.

Compared to this information, total casualties in the period only have one yearly peak which is in November. Therefore, this yearly cycle could be something that is of use to road safety professionals when dealing with bus and coach companies. A result from this is that we may begin to gain an insight into what could be causing this cycle, and then start to work on reducing casualties from those months.

**Figure 4: Severity of Bus and Coach Passenger Casualties by Month**

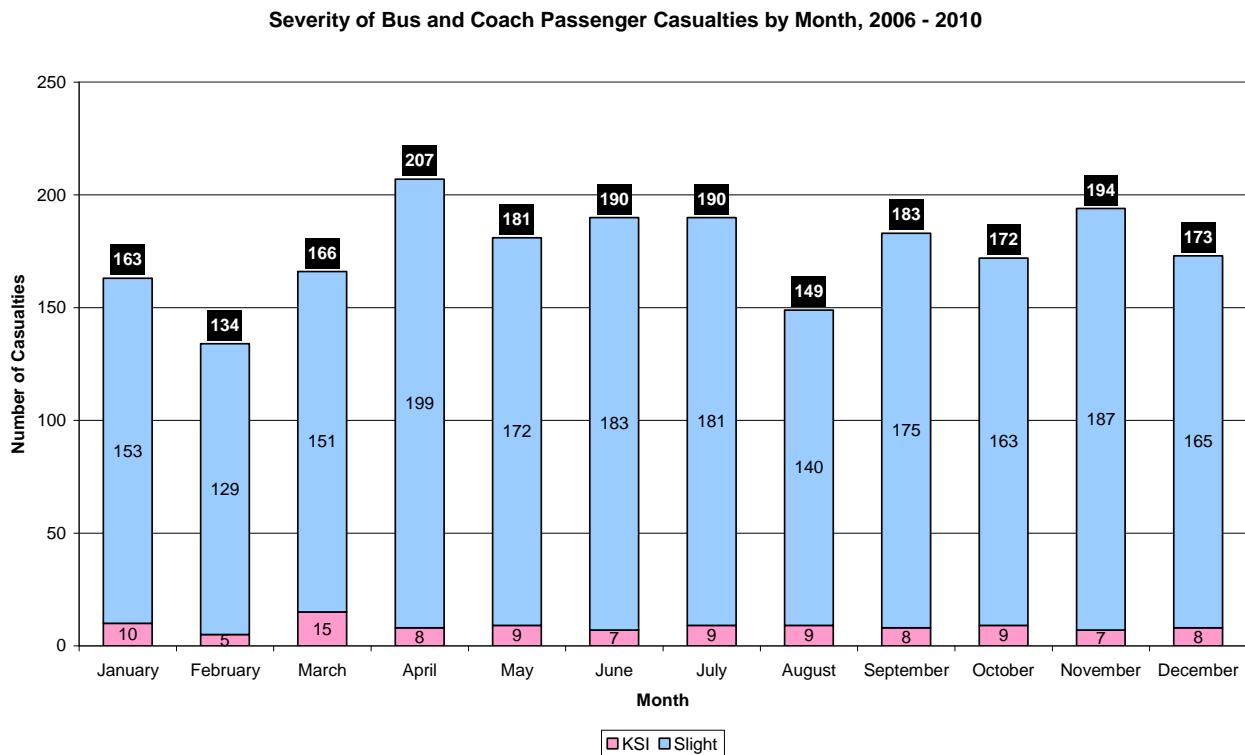
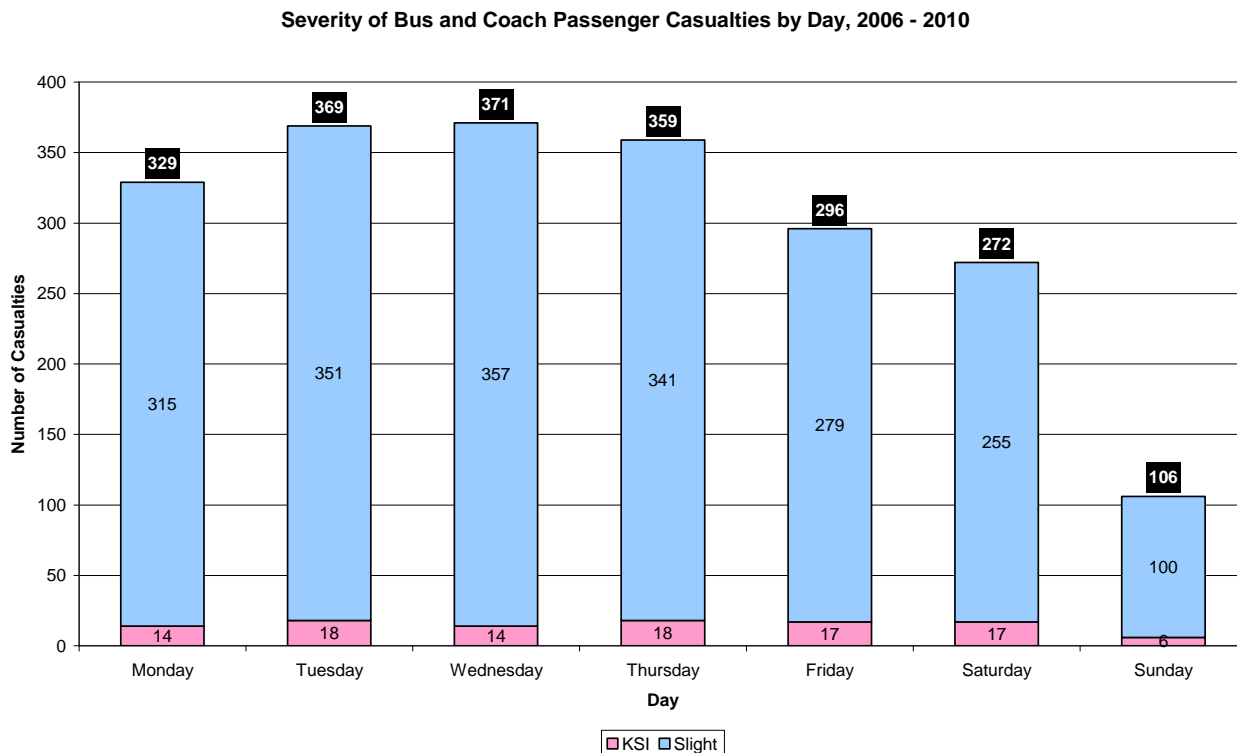


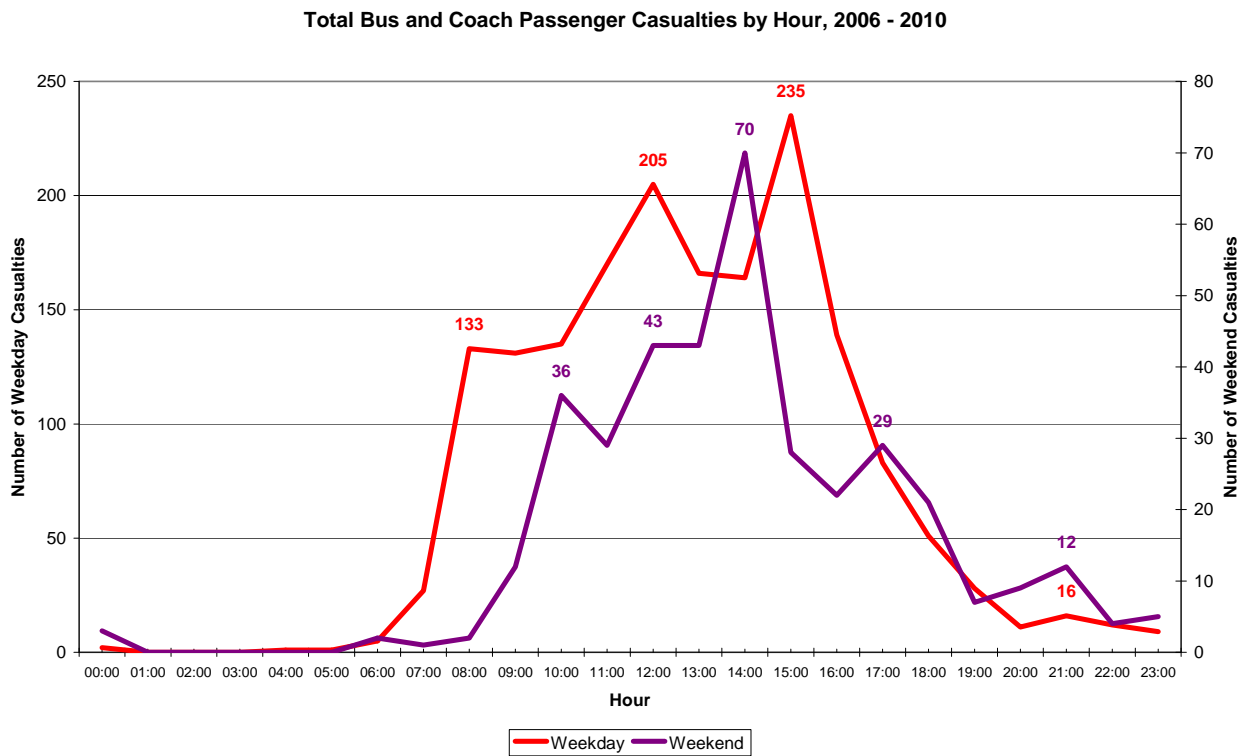
Figure 5 shows us that there are significantly more casualties on buses and coaches during the working week than over the weekend. This is probably due to people using public transport to commute to and from work and school during the week, and then using other forms of transport when travelling over the weekends. It is interesting to note however that casualties on Fridays and Saturdays are at similar levels.

**Figure 5: Severity of Bus and Coach Passenger Casualties by Day**



The final figure in this section looks at the distinction between bus and coach passenger casualties by hour during the working week and over the weekend. What is clear from this figure is that both the working week and the weekend have a distinct peak in casualties in the early afternoon. During the working week, we can see that the number of casualties has a significant rise at 08:00, which would link in with the morning rush hour. There is then a second peak at midday and the largest peak comes between 15:00 and 15:59, which links in with school closing times. Over the weekend, these peaks are condensed, with the morning peak occurring at 10:00 and the afternoon being between 14:00 and 14:59. However, the weekend also has two slight rises into the evening at 17:00 and 21:00.

**Figure 6: Total Bus and Coach Passenger Casualties by Hour and Day**



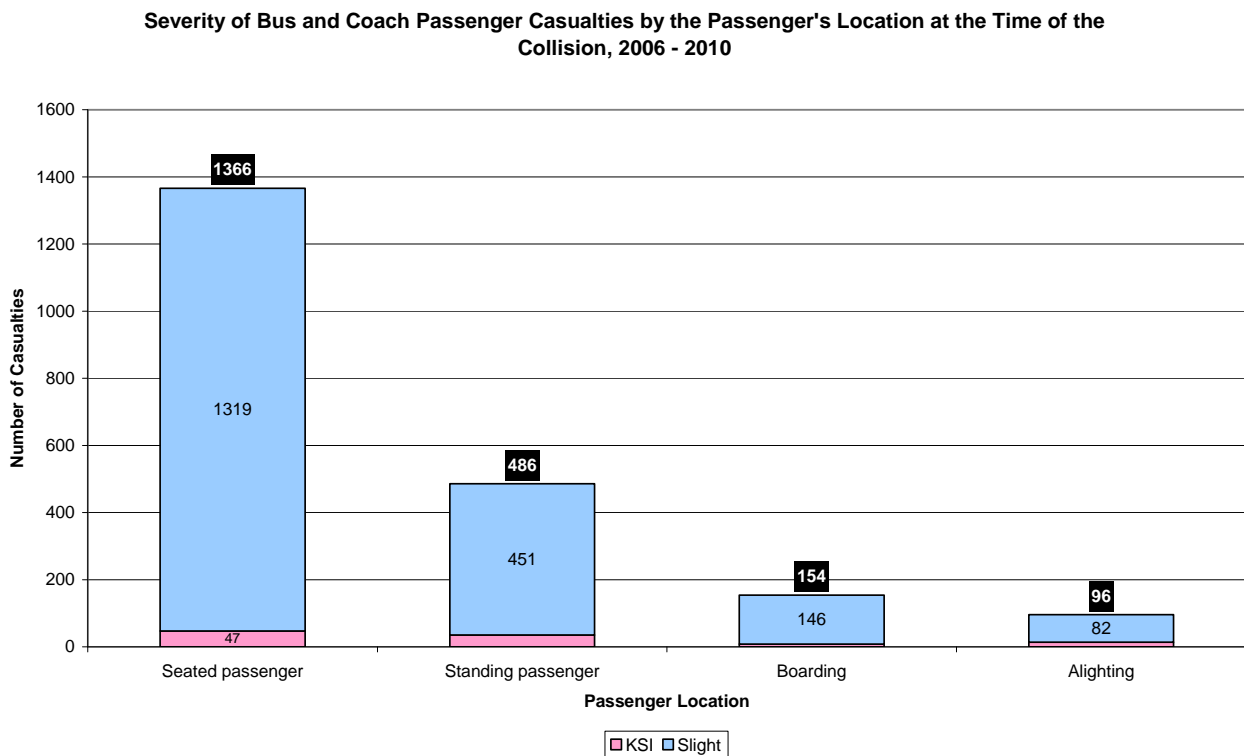
In summary, we have seen that bus and coach passenger casualties have two yearly peaks in April and November, which is different to the figures for total casualties in the period. The drop in casualties in August is probably linked to the school holidays, and related to this, the fact that bus and coach passenger casualties drop over the weekend is probably due to most people not using these vehicles to commute over these days. When looking at the hours of the day where the most casualties occur it is interesting to note that there is no major peak at the traditional rush hour time of 17:00; instead, the peak comes much earlier at 15:00.

## Passenger Location and Vehicle Manoeuvre

In the case of bus and coach passenger casualties, the Stats 19 forms allow the reporting police officer to list the location of a bus or coach passenger at the time of the collision, and the manoeuvre that the bus or coach was undertaking when the collision occurred.

Figure 7 shows that almost two thirds of all passenger casualties were sitting down at the time of the collision. Proportionally however, the highest levels of KSI casualties were sustained by passengers who were alighting from the bus or coach at the time of the collision. As the figures from the Department for Transport show that the number of bus passenger journeys has generally been increasing over the period, while the actual distance travelled on buses has been falling, this means that passengers will be spending less time sitting down on buses. What this could lead to is a drop in the number of passenger casualties that were sitting down at the time of the collision and an increase in the more proportionally severe casualties. This emphasises again the importance of working with bus companies to increase both driver and passenger awareness of safety concerns when using these forms of public transportation.

**Figure 7: Severity of Bus and Coach Passenger Casualties by Passenger Location**

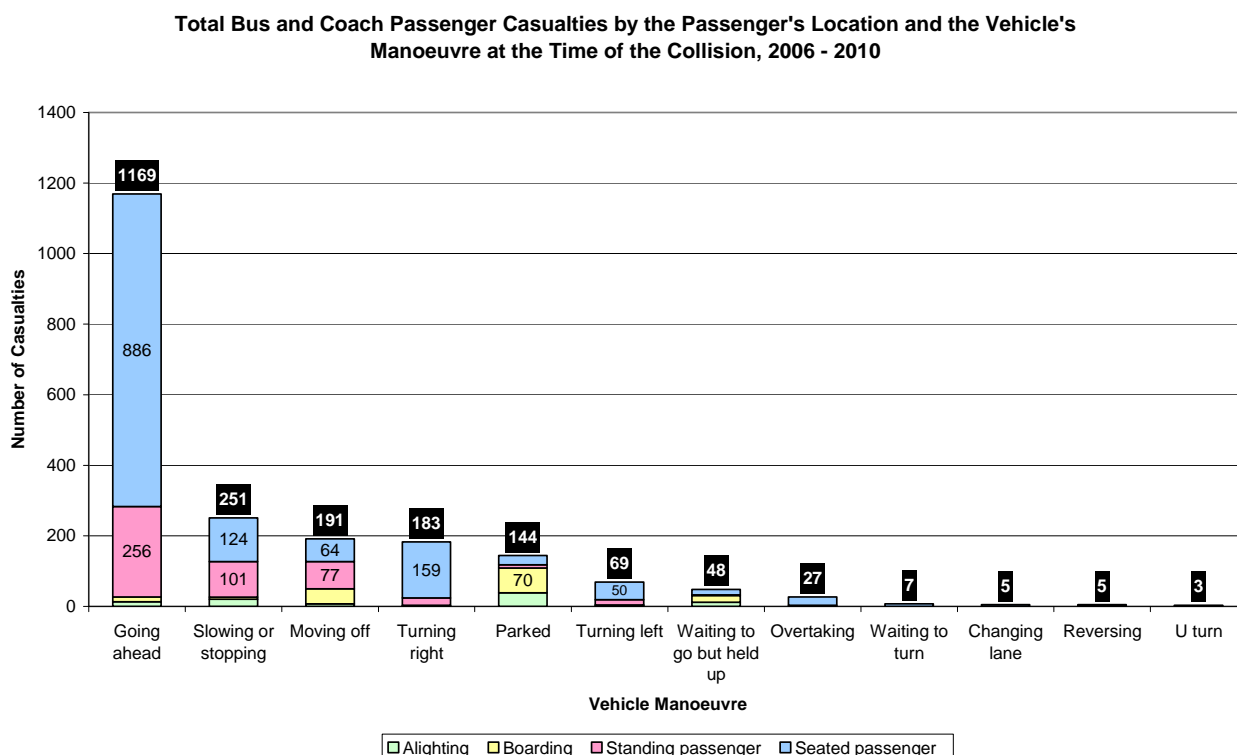


When we combine the information on the bus or coach passenger's location at the time of the collision with the manoeuvre that the bus or coach was doing we can get a better idea about when the most casualties are likely to occur, and which passengers are most at risk. We can see from Figure 8 that over half of all casualties occur when the bus or coach was driving in a straight line at the time of the collision. While this manoeuvre also accounts for the highest proportion of casualties for total collisions in the period, it is interesting to note that the proportion of casualties from the other vehicle manoeuvres differs from the numbers for total collisions.

Apart from the casualties that occurred when the bus or coach was going ahead or turning right, the number of bus and coach passengers injured in other manoeuvres differ significantly from those of total casualties in the period. The casualties that occurred when the bus or coach was slowing or stopping, parked and moving off are significantly higher than for general casualties, while the proportion of casualties when the bus or coach was waiting to go but held up is a lot lower. It is possible that casualties during these manoeuvres are higher because of the nature of bus and coach travel, which will involve a much greater amount of time performing these manoeuvres than the general vehicle traveller.

Finally, it is also useful to note the position of the passenger at the time of the collision, which in some cases links in with the type of manoeuvre that the bus or coach was performing at the time. For example, it should be expected that the number of casualties who were boarding or alighting will be high when the bus is parked. However, it is also important to note that there are passengers who have been injured when boarding and alighting when the bus or coach is performing other manoeuvres, which it may be useful to highlight to bus companies.

**Figure 8: Severity of Bus and Coach Passenger Casualties by Passenger Location and Vehicle Manoeuvre**

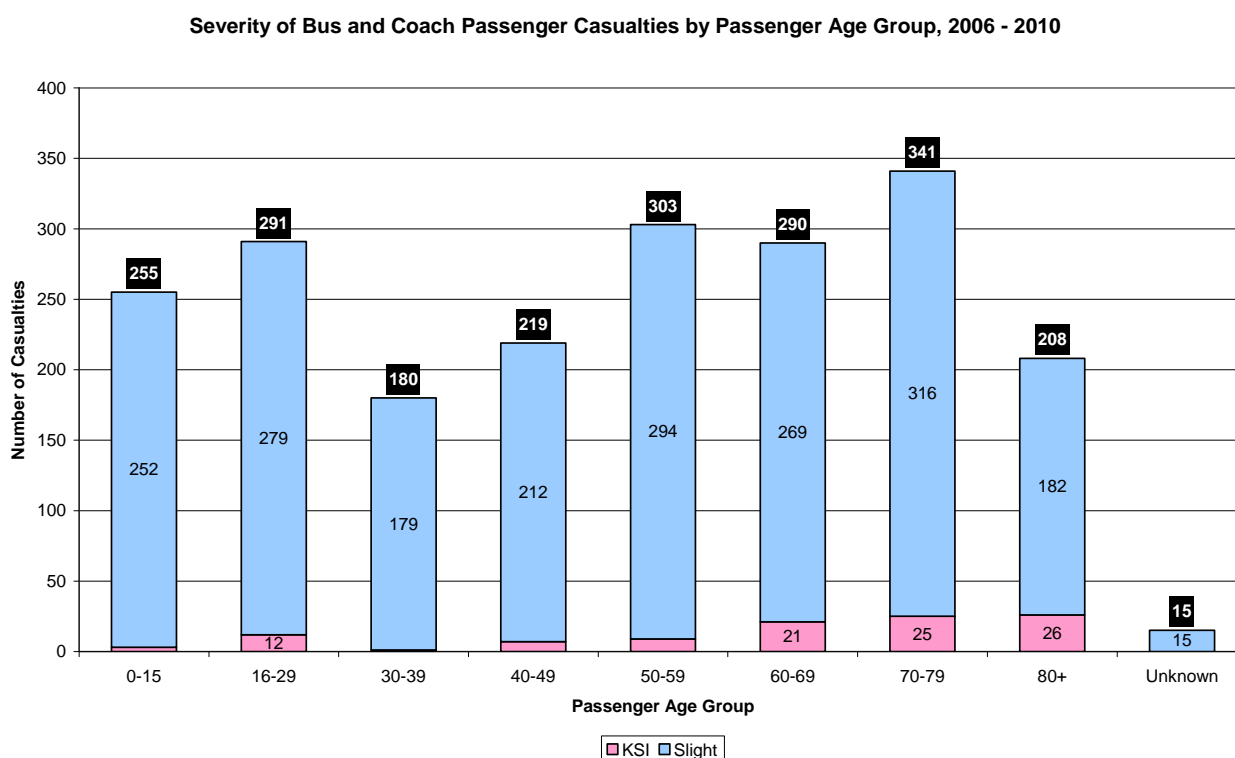


## Passenger Age

This section of the report looks at the age of the bus and coach passengers, and some of the variables explored previously in the report are broken down by age group.

When we split the passenger ages down into logical age groups, we can see that the highest proportion of casualties are suffered by passengers aged 70 to 79 years old, while the lowest proportion are passengers aged 30 to 39. We can see from Figure 9 that there is a general increase in casualties from the age of 30-39 to 70-79. It is important to note that the two most numerous categories appear to be the over 50s and the under 30s, although the over 60s tend to suffer more severe injuries. For the purpose of this report, these age groups will be combined into three larger age groups: children (passengers aged 0 to 15), adults (ages 16 to 59) and bus pass aged adults (aged 60+).

**Figure 9: Severity of Bus and Coach Passenger Casualties by Passenger Age**



The next figure shows that there is a fairly consistent make-up of age groups in each local authority area, however, Durham, North and South Tyneside and Redcar and Cleveland have higher than average proportions of bus pass aged adult casualties, while Stockton has a high proportion of child casualties. This could be useful information when raising issues with bus companies in these areas to advise them to be especially aware of these age groups using their services.<sup>4</sup>

<sup>4</sup> It is worth noting that due to the nature of bus and coach collisions there can sometimes be multiple casualties. However, the trends from these collisions with multiple casualties tend to match the general casualty trends that have been identified in this report.

**Figure 10: Total Bus and Coach Passenger Casualties by Local Authority and Age**

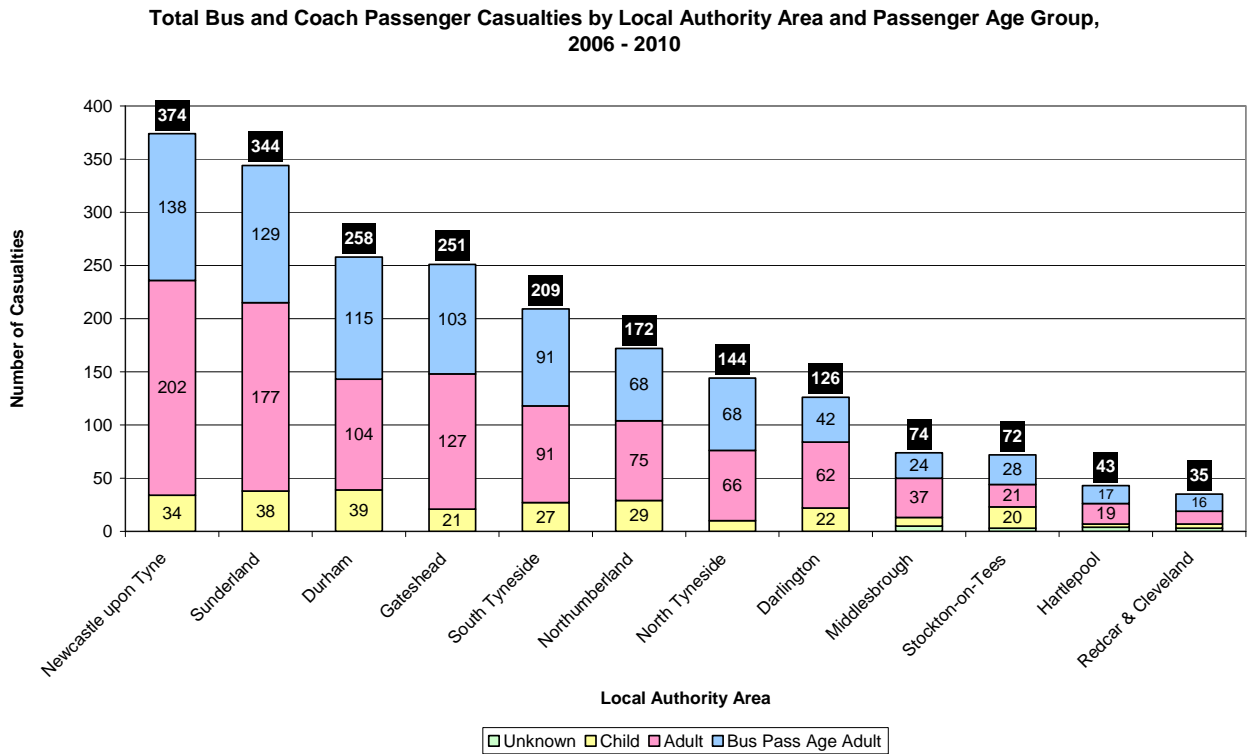
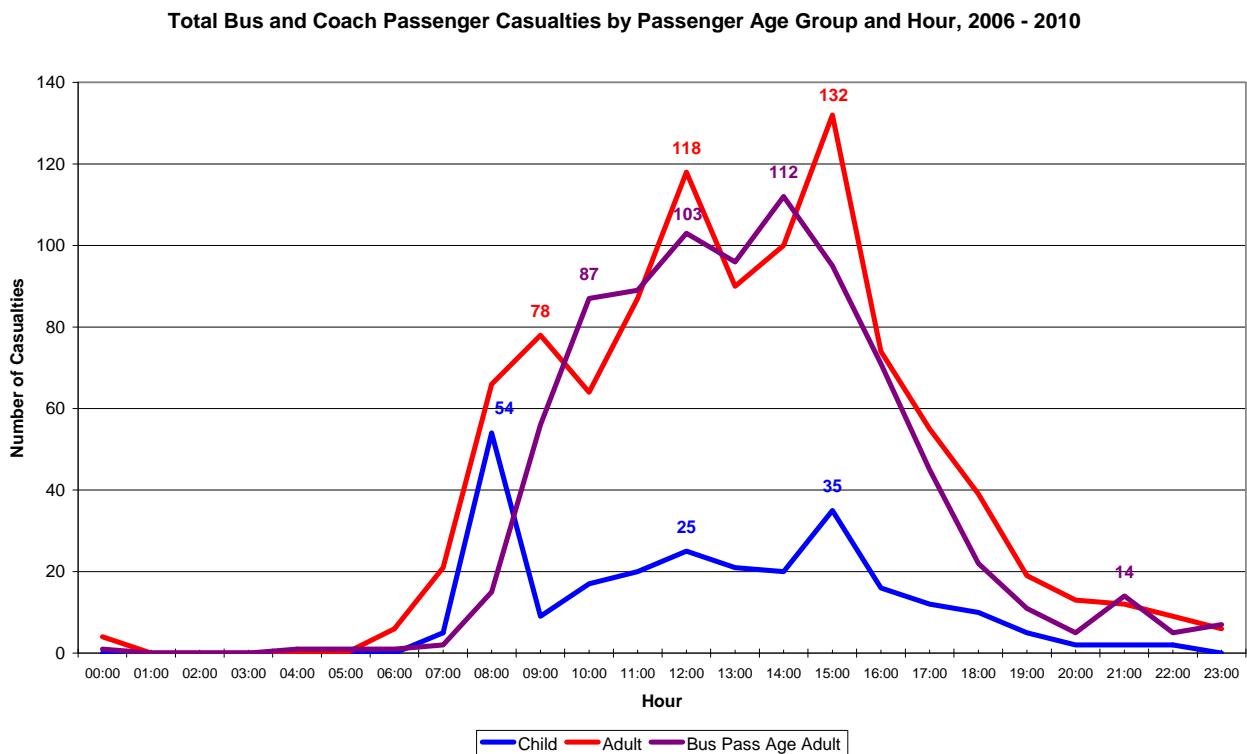


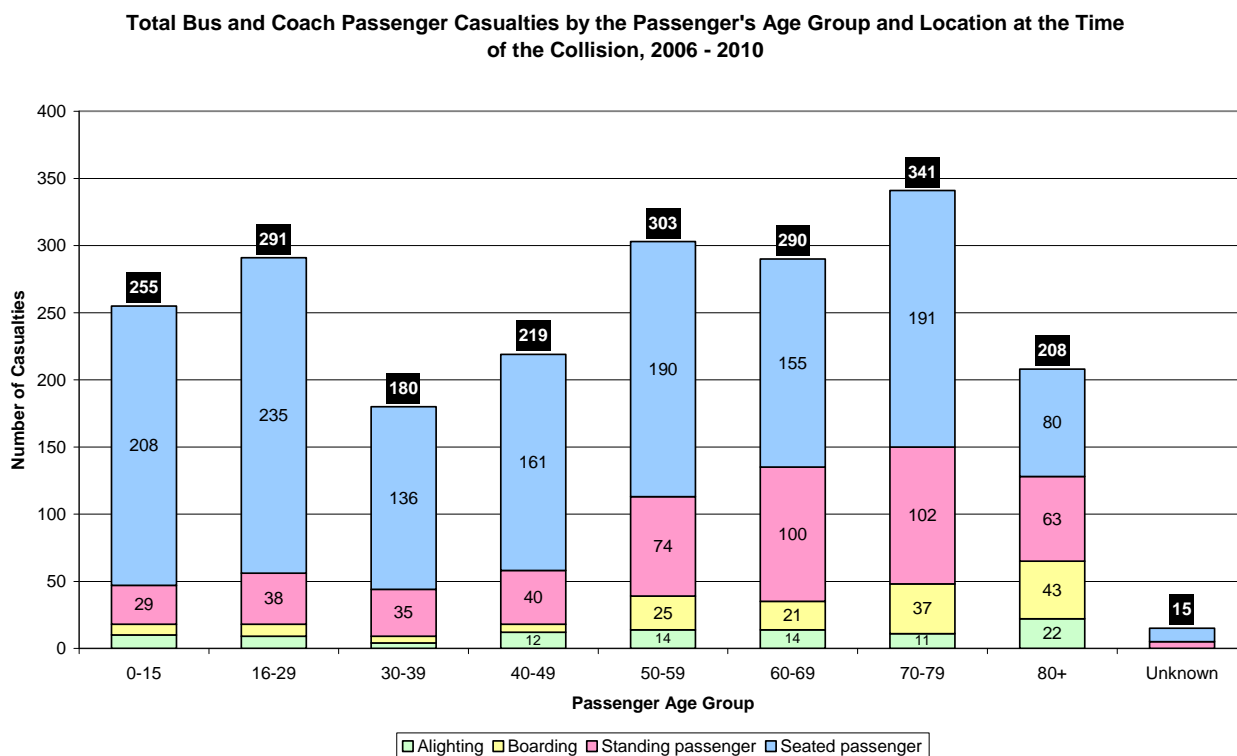
Figure 11 shows that child casualties peak at the expected times of school opening and closing, and adult casualties follow roughly the same pattern. Casualties suffered by bus pass aged adults however sharply increase between 09:00 and 10:59, and then stay high until 14:00, which is probably related to the free bus travel times for this age group.

**Figure 11: Total Bus and Coach Passenger Casualties by Hour and Age**



The final figure shows that the older age groups are generally more susceptible to suffer an injury when standing up than other ages, which is something that road safety professionals could take into consideration when working with bus and coach companies to reduce casualties on their services. Also, the proportion of casualties suffered when boarding and alighting by passengers aged over 80 is very high compared to the casualties of seated passengers in this age group.

**Figure 12: Total Bus and Coach Passenger Casualties by Passenger Location and Age**



In summary, we can see that the most at risk age groups for casualties on bus and coach services in the North East are those passengers aged over 50 and under 30 years old. When broken down by hour, children and bus pass aged adult casualties seem to tend to occur when there are increased passenger numbers on these services – school opening and closing times and when the free bus travel times come in to effect.

## Contributory Factors

The Stats 19 form gives the reporting police officer an opportunity to list up to six factors that they feel contributed to the collision. It must be noted that these contributory factors are the opinion of the reporting officer, and as such are not definite fact. However, they do give us a general idea of the types of factors that result in casualties suffered by bus and coach passengers in collisions.

Figure 13 shows the top five factors that resulted in casualties from the bus or coach. These numbers also include injuries caused to other vehicle occupants and pedestrians involved in the collision, and as there can be more than one contributory factor listed for each vehicle in the collision, we cannot definitively link these figures to the number of casualties.

**Figure 13: Main Contributory Factors to Bus and Coach Collisions with Collision Severity**

Contributory Factor Description	Fatal	Serious	Slight	Grand Total
Sudden braking	4	30	351	385
Failed to look properly	3	18	252	273
Poor turn or manoeuvre	0	10	154	164
Failed to judge other person's path or speed	0	8	145	153
Careless, reckless or in a hurry	0	8	103	111

We can see from Figure 13 that the most frequent factor that contributes to a collision is the bus or coach driver suddenly breaking. This is a marked difference to the general numbers in the North East, where the most frequent factor is the failure of the driver or rider to look properly. This is definitely something that could be raised with bus and coach companies to highlight to their drivers in order to reduce overall casualty levels on their services in the North East.

## Value of Prevention of Bus and Coach Passenger Casualties

Finally, the Department for Transport works out costings of the value of prevention of casualties from road traffic collisions. This allows us to calculate the total cost to the region of bus and coach passenger casualties. The costings are worked out using several sources, such as the expense to the emergency services and the loss of future economic output of the casualty. What these estimates allow us to do is to put a monetary figure on the cost of road casualties in the North East, and to speculate on how much the region would have saved if the casualties had been prevented.<sup>5</sup>

**Figure 14: Financial Cost of Bus and Coach Passenger Casualties**

Severity	2006	2007	2008	2009	2010	Total
<b>Fatal</b>	£1,585,510	£1,585,510	£0	£1,585,510	£0	£4,756,530
<b>Serious</b>	£2,137,920	£2,850,560	£4,988,480	£4,454,000	£3,563,200	£17,994,160
<b>Slight</b>	£4,644,120	£4,932,660	£5,166,240	£6,389,100	£6,320,400	£27,452,520
<b>Total</b>	£8,367,550	£9,368,730	£10,154,720	£12,428,610	£9,883,600	£50,203,210

These figures further illustrate that value of the prevention of bus and coach passenger casualties, as it is estimated that if all of the collisions that caused these casualties had been prevented, this would have saved the North East economy just over 50 million pounds over the last five years.

<sup>5</sup> This information has been obtained from the following source:  
<http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.4.1.pdf>