



Transport Statistics Bulletin

Road Statistics 2006: Traffic, Speeds and Congestion

A National Statistics publication produced by Transport Statistics: DfT

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Symbols and conventions: (i) Unless otherwise stated, all tables refer to Great Britain.

(ii) Metric units are generally used.

Units: Figures are shown in italics when they represent percentages, indices or ratios.

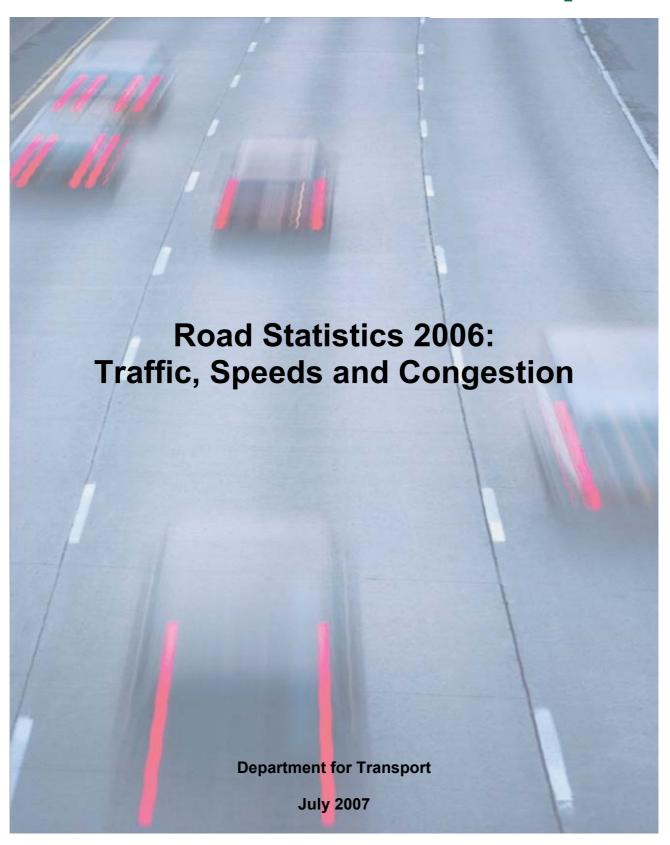
Rounding of figures: In tables where figures have been rounded to the nearest final digit, there may be an apparent slight discrepancy between the sum of the constituent items and the total as shown.

Conversion factors: 1 kilometre = 0.6214 mile 1 tonne = 0.9842 ton 1 tonne-km = 0.6116 ton-mile 1 gallon = 4.546 litres 1 billion = 1,000 million 1 litre = 0.220 gallons

Symbols: The following symbols have been used throughout.

= not available = not applicable = Negligible (less than half the final digit shown) = Nil0 * = Sample size too small for reliable estimates. = of which ow { = subsequent data is disaggregated = subsequent data is aggregated = break in the series Ρ = provisional data \mathbf{F} = forecast expenditure = estimated outturn n.e.s = not elsewhere specified TSO = The Stationery Office

Transport



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Road Statistics 2006: Traffic, Speeds and Congestion

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Which publications has this replaced?

This annual bulletin, *Road Statistics 2006: Traffic, Speeds and Congestion,* brings together statistics that in previous years had been published in four separate reports. The DfT titles that have been replaced are:

- Road Traffic Statistics (annual bulletin)
- Vehicle Speeds in Great Britain
- Traffic Speeds in English Urban Areas
- Traffic Speeds on English Trunk Roads.

As well as bringing together statistics that were previously published in the above bulletins, *Road Statistics 2006: Traffic, Speeds and Congestion* includes previously un-published data and is an attempt to present road statistics in a more accessible and coherent way.

Road Statistics 2006: Traffic, Speeds and Congestion

Introduction and overview

This is the first bulletin in a new annual series bringing together information on traffic, road lengths, vehicle speeds and congestion in Great Britain. It replaces the annual Road Traffic Statistics bulletin; most of the Vehicle Speeds bulletin (although first results were published in April); and includes results from the 2006 Urban Speed Survey as well as historic Inter-Urban Speed Surveys. Congestion data are included as experimental statistics.

The department aims to produce regular estimates of road traffic, road lengths, vehicle speeds and congestion to the highest possible standards. These statistics are used for a variety of purposes within government, informing policy and providing the source data for analytical research. One of the main uses of the traffic estimates is to feed directly into the National Transport Model. The National Transport Model is a tool for comparing the likely impact of alternative national transport policies. DfT also make the national traffic estimates public in order to provide researchers, local authorities, industry and the public with high quality data.

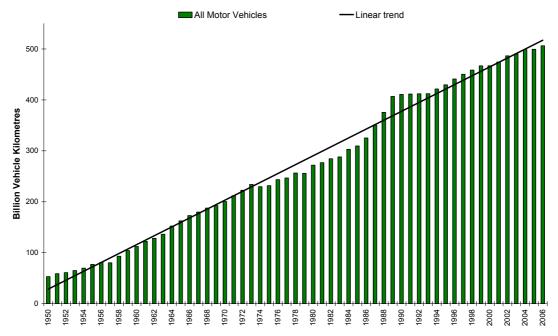
Traffic

Traffic data are collected continuously from a national network of around 190 Automatic Traffic Counters (ATC). In addition to counting traffic, the ATCs also record some of the physical properties of passing vehicles (which are used to classify traffic by type) and vehicle speeds.

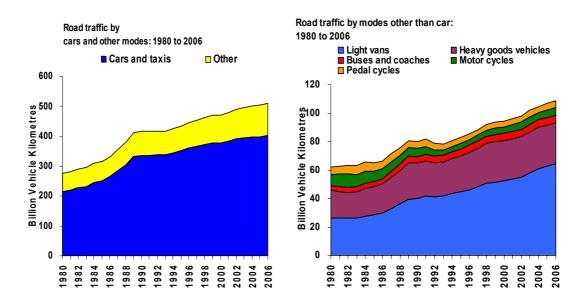
Provisional traffic estimates derived from the ATCs only are published quarterly. The 2006 annual estimates published here are mainly based on about 10 thousand manual counts, which are combined with ATC data and road lengths to produce overall estimates.

The figure below illustrates the trends in traffic since 1950. Traffic growth has mainly been the result of growth in car ownership. Over this period, annual traffic growth has averaged 4.3 per cent.

All motor vehicle traffic in Great Britain: 1950 - 2006



The two figures below show the distribution of traffic amongst different vehicle types from 1980 to 2006. It can be seen that cars have accounted for the large majority of traffic (around 80 per cent) for each of the past 25 years. The next most common vehicle on the roads is the light van and there has been strong growth in light van traffic over recent years.



However, traffic growth has varied in different time periods. In more recent years, the greatest growth was in the period of strong economic growth in the late 1980s. There was little growth in the recession of the early 1990s, before a period of stronger growth in the late 1990s. Growth has now reduced slightly, to about 1.2 per cent per annum over the last 7 years. This may be a temporary fall from the growth levels experienced in the late 1990s, or could mark the start of a change in trend.

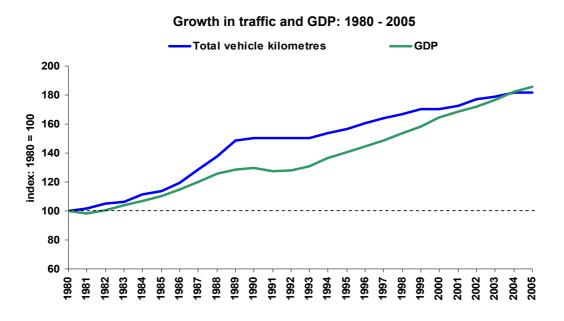
Table - Average Annual Traffic Growth

Time period	Average annual growth (%)
1950 - 2006	4.3%
1985 - 1989	7.1%
1989 - 1993	0.3%
1993 - 1999	2.1%
1999 - 2006	1.2%

It had been recognised in the past that traffic growth appears to be strongly linked to economic growth, as the next chart illustrates. However, it is now thought that there maybe some 'decoupling' of these trends. Fluctuating fuel prices have had some effect. Decoupling may also be associated with low traffic growth in areas which already have high levels of car ownership. For example, in 2004 only 16 per cent of households on the South West had no car, and 37 per cent had two or more cars. However, there is still potential for considerable growth in some areas, such as the North East, where in 2004 35 per cent of households had no car and 24 per cent two or more (see next table).

It is also clear from the National Travel Survey (NTS) that much of the recent growth in traffic can be associated with the increases in driving by women. Driving licence holding is still increasing for women in all age groups, while it is probably close to saturation for men in their 30s to 50s. Women are also more likely to benefit from the increasing number of households which have more than one car.

There is also some NTS evidence that the increasing distances travelled by car over the last 20 years have levelled off. In the mid-1980s, the average length of a car trip was 7.6 miles. This increased to 8.5 miles by the mid-1990s, but was still 8.5 miles in 2005. On average, women drive shorter distances than men.



Car Ownership by country and Government Office Region: 2004

				Percentage
			Two or	All
	No car	One car	more cars	<u>Households</u>
North East	35	42	24	100
North West	26	44	30	100
Yorkshire and the Humber	27	46	26	100
East Midlands	22	46	32	100
West Midlands	24	44	32	100
East of England	17	45	37	100
London	39	43	18	100
South East	18	43	39	100
South West	16	47	37	100
England	25	44	31	100
Wales	25	44	32	100
Scotland	31	43	26	100
Great Britain	25	44	31	100

The first section of this bulletin explores detailed recent trends in traffic, by vehicle and road type, against the background of road lengths by type. There have been wide variations in trends on different roads (such as motorways and minor urban roads), and also by vehicle type, such as cars, motorcycles and goods vehicles.

Vehicle Weights

Some ATCs are also equipped to weigh vehicles. These are known as 'Weigh in Motion' (WIM) sites

Section 1 includes some information on weights of heavy goods vehicles from 34 WIM sites on motorways and trunk roads. This information is important for estimating the wear on roads, and also gives an indication of the number of overweight vehicles on the road.

Speeds

This bulletin contains data on vehicle speeds from two sources. The first is 'free flow' speed data obtained from the network of around 100 automatic traffic counters (ATCs), which are sited as far as possible at points where traffic is not congested. These free flow speeds give important information on compliance with speed limits.

The second source is data from 'floating car' surveys, which have been run in urban areas and on trunk roads every 2-3 years. The 'floating car' surveys give the median car traffic speed, as the survey vehicle aims to overtake, and be overtaken by, roughly the same number of vehicles. In the past, these surveys have been used to give an indication of changing congestion. Data from historical Inter-Urban Speed Surveys are presented in section 3. The 2006 Urban Speed Survey is reported on in detail in section 4. This also includes a comparison with data from new sources.

In the past, data from floating car surveys have been used as a proxy measure of congestion. In future, it is planned that these surveys will be replaced by new sources of data. These include information on speeds from ATCs and anonymised data from automatic number plate recognition (ANPR) cameras and global positioning system (GPS) units in vehicles. These sources have very much larger sample sizes, enabling more roads to be covered at greater precision, and over a greater proportion of the week.

Congestion

One of the four strategic aims of the Department for Transport (DfT) is:

'to sustain economic growth and improved productivity through reliable and efficient transport networks'

It is therefore important for the department to be able to measure how efficiently the road network is performing using clearly established measures of congestion. Congested roads lead to longer delays and greater inconsistencies in journey times, therefore a congested road is less efficient and less reliable than a road with free-flowing traffic. Congestion is easily recognised by those experiencing it, but less easily defined.

Congestion on inter-urban roads

On the Highways Agency (HA) network of strategic inter-urban roads (HA motorways and trunk roads), congestion is now defined as the delay experienced per 10 miles compared to a reference journey time (the time that could theoretically be achieved when the traffic is free-flowing). This measure is used by DfT to track progress on its 2004 Public Service Agreement (PSA1):

By 2007-08, make journeys more reliable on the strategic road network.

For the PSA target, reliability is measured by average delay on the slowest 10% of journeys on each of about 90 routes on the strategic road network. Delay per vehicle is weighted by traffic flows to give the overall average for the PSA measure. Information on progress was published in the Departmental Annual Report in May 2007.

It should be noted that increasing traffic is not directly related to increasing congestion. On some quiet roads, traffic can increase substantially with little effect on congestion. On roads close to capacity, a small increase in traffic may take the road over its design capacity and lead to significant congestion occurring. The relationship between total traffic growth and congestion over a network (such as the motorway and trunk road network) is not well understood and considerable research is in progress to explain this relationship. Section 3 contains experimental statistics on congestion on the strategic roads network. This includes more information on the data sources used.

Congestion on urban roads

DfT also has a target on urban congestion. PSA4 states that:

By 2010-11, the ten largest urban areas will meet the congestion targets set in their local transport plan relating to movement on main roads into city centres. The target will be deemed to have been met if, on target routes in the ten largest urban areas in England, an average increase in travel of 4.4% is accommodated with an average increase of 3.6% in person journey time per mile.

This target is noted here for completeness. However, the exact form of the target and its baseline were not set until July 2006, and no trend data are yet available. The first report on progress on this target is expected to be published in the DfT Autumn Performance Report 2007.

Feedback

This is a new publication and the first in this form, we would be very interested to hear your comments to help us develop the publication to meet users' needs in future years.

If you have any comments, please send them to roadtraff.stats@dft.gov.uk or write to:

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Special Note

National Statistics

- 1. National Statistics are produced to high professional standards set out in the National Statistics Code of Practice. They undergo regular quality reviews to ensure that they meet customer needs. They are produced free from any political interference.
- 2. The statistics presented in the first two chapters of this publication (*Road Traffic in Great Britain* and *Free Flow Vehicle Speeds in Great Britain*) are National Statistics and adhere to the National Statistics Code of Practice. *Road Traffic in Great Britain* contains 2006 data released for the first time.
- 3. The final two chapters *Congestion and Traffic Speeds on the Inter-Urban Road Network* and *Urban Congestion* contain speed survey results, which are National Statistics. These chapters also present 'experimental statistics' that are under development and we are currently testing their ability to meet customer needs. We believe they are robust enough to give a reasonable indication of overall trends, but while the series are experimental their quality cannot be assured to the rigorous standards required by National Statistics.

Road Lengths

- 4. DfT bases its road length estimates on data provided by Ordnance Survey. In 2006, DfT switched from using Ordnance Survey's OSCAR roads data set to the ITN data set in calculating the length of B roads and unclassified roads. This methodological change resulted in the total estimated length of minor roads to increase by approximately 3 per cent. This step change can be seen in Table 1.6. However, road lengths used in the calculation of DfT's 2006 minor road traffic estimates were frozen at the 2005 level in order to ensure a consistent series of traffic estimates.
- 5. In 2004, amendments were made to the data for roads in Scotland where some private roads (predominantly those for which the Forestry Commission is responsible) were previously incorrectly recorded as public roads.

Quality Review

6. The Review of Road Traffic and Road Length Statistics (National Statistics Quality Review Series Report 49) was published in January 2007 and is available from the National Statistics web-site: http://www.statistics.gov.uk/about/data/methodology/quality/reviews/transport.asp

Work is now taking place to take forward the recommendations made in the review.

Local Authority level statistics

7. Estimates of road traffic at local authority level, together with corresponding figures for casualties in road accidents, will be made available on the DfT web site in the Autumn. They are provided to enable the calculation and monitoring of road casualty rates for individual local authorities. These traffic figures are less robust than the regional and national totals and are not classed as National Statistics.

National Events Affecting Traffic

8. In 2000, the September fuel dispute led to a decline in car and taxi traffic for that year. The widespread outbreak of Foot and Mouth disease in 2001 and the control measures put in place also had an effect on traffic.

Further available data

- The full tables of road traffic data, in previous years published as Road Traffic Statistics, are available in the web-annex to this publication. The same annex also includes detailed notes on the methodology behind speed surveys and measurements of congestion in urban areas: http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/
- The main tables of 2006 free flow vehicle speeds data were published as the Vehicle Speeds in Great Britain first release on 5 April 2007. Key tables from that first release have been updated and can be found on the DfT web-site: http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/vehiclespeedsgb/
- More information on congestion on the Strategic Road Network and the department's Public Service Agreement to tackle congestion can be found on the DfT web-site: http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/congestiononthestrategicroad5359
- The most recently available Annual Average Daily Flows, by vehicle type, for individual major road links are available from the DfT Matrix web-site: www.dft-matrix.net
- More information and data covering the range of DfT statistics, including Road Traffic and Free Flow Vehicle Speeds (previously known as *Vehicle Speeds in Great Britain*) for earlier years, can be found on the DfT web-site: http://www.dft.gov.uk/pgr/statistics

More detailed information on traffic estimates by type of vehicle and class of road is available from the Department for Transport. Enquiries should be made to Statistics Roads: Road Traffic and Road Length Statistics branch at the address below:

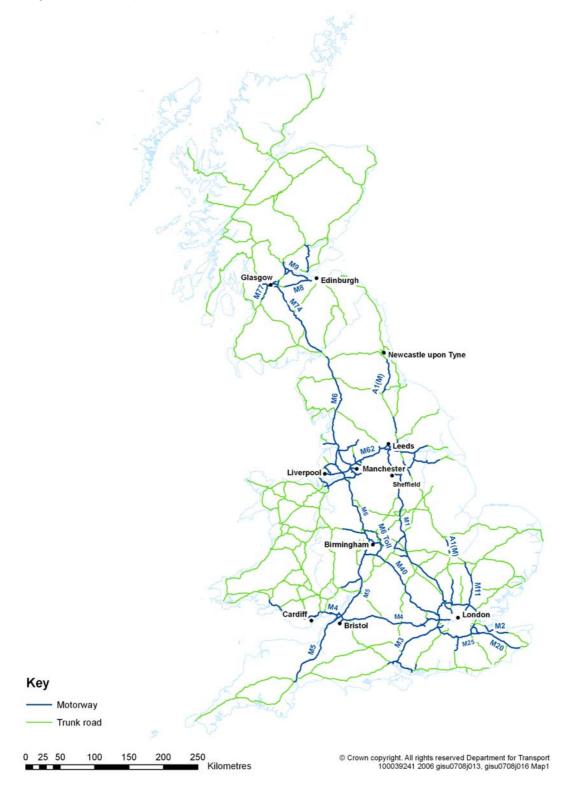
20 7944 309530 020 7944 2164

E-mail: roadtraff.stats@dft.gov.uk

Department for Transport Transport Statistics Roads 2 Branch Zone 3/17 Great Minster House 76 Marsham Street LONDON SW1P 4DR

Enquiries about the contents of this document should also be made to the above address.

Map: Motorways and trunk roads in Great Britain



Note: There are no trunk-roads in Shetland (omitted from map)

1. Road Traffic in Great Britain

- Between 2005 and 2006, overall estimated traffic levels rose by 7 billion vehicle kilometres (1.4 per cent) to 506.4 billion vehicle kilometres.
 This is the first year that total estimated traffic in Great Britain has exceeded 500 billion vehicle kilometres.
- Car traffic (402.4 billion vehicle kilometres) accounted for 79 per cent of all motor vehicle traffic. Car traffic has increased by 1.3 per cent over the past year, 12 per cent since 1996 and 851 per cent since 1955.
- Light van traffic has shown the greatest rate of growth in recent years, increasing by 39 per cent since 1996 to 64.3 billion vehicle kilometres in 2006.
- Pedal cycle traffic was estimated to be 4.6 billion vehicle kilometres in 2006, an increase of 5 per cent from 2005 and 12 per cent from 1996.
- In 2006, 28 per cent of all traffic was on rural 'A' roads, 22 per cent was on urban minor roads, 20 per cent on motorways, 16 per cent on urban 'A' roads and 14 per cent on rural minor roads.
- Traffic on motorways has grown faster (27 per cent) over the last ten years than on any other road type.
- Average daily flows on all roads in England (3.9 thousand vehicles per day) were almost twice the average in Scotland (2.0 thousand vehicles per day); the average flow on roads in Wales was 2.2 thousand vehicles per day.
- Of all the Government Office Regions, London had by far the lowest road traffic, per person, during 2006. About thirteen per cent of the Great Britain population live in London, but only 7 per cent of all road traffic was in the capital.
- Overall, traffic was higher on weekdays than at weekends; the highest level of traffic occurs on Friday and the lowest on Sunday.
- The minor (i.e. 'B', 'C' and unclassified) road length in Great Britain is estimated to be 348 thousand kilometres, amounting to 87 per cent of the total. Motorways and 'A' roads account for 1 per cent and 12 per cent of the road network respectively; about three-quarters (76 per cent) of the latter are rural roads. In contrast, 20 per cent of total traffic is on motorways and 44 per cent on 'A' roads.

Trends in road traffic

This section provides details of traffic estimates for Great Britain, which give the number of vehicle kilometres travelled in any given year by vehicle type, road class and region. More information on the measurements of traffic and the definitions of vehicle types and road classes used here is given in the glossary.

Road traffic by vehicle type

- Between 2005 and 2006, overall estimated traffic levels rose by 7 billion vehicle kilometres (1.4 per cent) to 506.4 billion vehicle kilometres. This is the first year that total estimated traffic in Great Britain has exceeded 500 billion vehicle kilometres.
- Car traffic (402.4 billion vehicle kilometres) accounted for 79 per cent of all motor vehicle traffic. Car traffic has increased by 1.3 per cent over the past year, 12 per cent since 1996 and 851 per cent since 1955.
- Light van traffic has shown the greatest rate of growth in recent years, increasing by 39 per cent since 1996 to 64.3 billion vehicle kilometres in 2006.
- Goods vehicle traffic has increased gradually over the last 10 years, from 26.2 in 1996 to 29.1 billion vehicle kilometres in 2006 (an 11 per cent increase)
- Pedal cycle traffic was estimated to be 4.6 billion vehicle kilometres in 2006, an increase of 5 per cent from 2005 and 12 per cent from 1996.

Table 1.1 Road traffic by vehicle type: 1955 - 2006

Billion vehicle kilometres Cars Motor-Buses and cycles and Liaht Goods motor Pedal taxis etc. coaches vans vehicles vehicles cycles 1955 42.3 7.5 9.8 77.0 4.2 13.2 18.2 12.0 1960 68.0 10.0 3.9 15.0 15.3 112.3 1965 115.8 6.7 3.9 19.0 17.3 162.7 7.0 1970 155.0 4.0 3.6 20.3 17.6 4.4 4.4 1975 181.6 5.1 3.2 23.5 231.7 1980 215.0 7.7 26.1 19.7 271.9 5.1 1985 250.5 7.4 3.7 28.6 19.6 309.7 6.1 1990 335.9 5.6 4.6 39.9 24.9 410.8 5.3 1991 335 2 5 4 48 417 24 5 411 6 5.2 4.6 1992 338.0 4.5 41.2 23.8 412.1 4.7 4.6 412.3 4.0 1993 338.1 3.8 41.6 24.3 1994 345.0 3.8 4.6 24.8 4.0 43.3 421.5 1995 351.1 3.7 4.9 44.5 25.4 429.7 4.1 1996 359.9 3.8 5.0 46.2 26.2 441.1 4.1 1997 365.8 4.0 5.2 48.6 26.9 450.3 4.1 1998 370.6 4.1 5.2 50.8 27.7 458.5 4.0 1999 4.5 5.3 51.6 28.1 467.0 2000 376.8 4.6 4.2 5.2 52.3 28.2 467.1 2001 382.8 4.8 5.2 53.7 28.1 474.4 4.2 2002 392.9 5.1 5.2 55.0 28.3 486.5 4.4 2003 393.1 5.6 5.4 57.9 28.5 490.4 4.5 2004 398.1 5.2 5.2 60.8 29.4 498.6 4.2 4.4 2005 397.2 5.4 5.2 62.6 29.0 499.4 402.4 2006 5.2 5.4 64.3 506.4 4.6 29.1

Figure 1.1a Motor vehicle road traffic by vehicle type: 1955 - 2005 and 2006

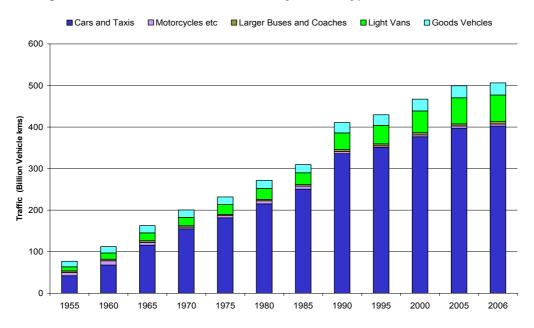


Figure 1.1b Growth in traffic by vehicle type: 1996 – 2006

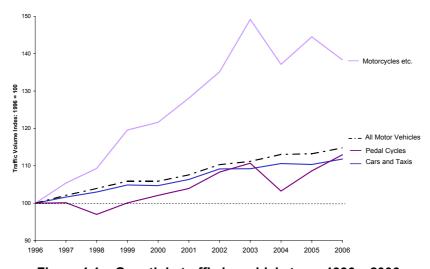
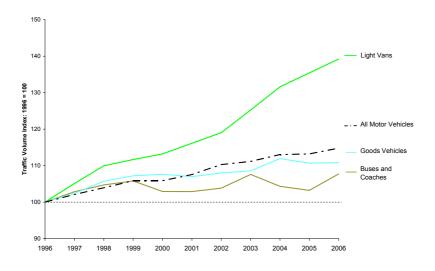


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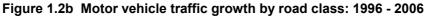


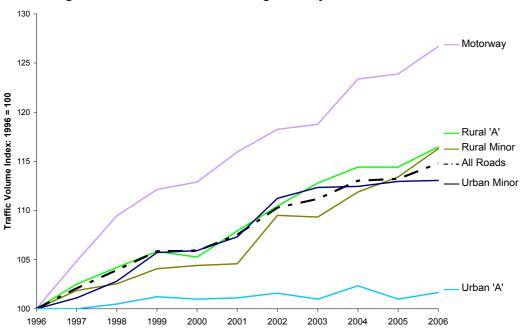
Motor vehicle traffic by road class

- In 2006, 28 per cent of all traffic was on rural 'A' roads, 22 per cent was on urban minor roads, 20 per cent on motorways, 16 per cent on urban 'A' roads and 14 per cent on rural minor roads.
- Traffic on motorways has grown faster (27 per cent) over the last ten years than on any other road type.
- Urban 'A' roads have shown the slowest traffic growth since 1996, increasing by only 2 per cent over this time.

☐ Urban 'A' ■ Motorway ■ Rural 'A' ■ Rural Minor ■ Urban Minor 600 500 Traffic (Billion Vehicle kms) 400 300 100 0 1996 2001 2002 2003 2004 2006

Figure 1.2a Motor vehicle traffic by road class: 1996 - 2006





Road traffic in Great Britain by country and Government Office Region

- Most traffic in Great Britain was in the South East of England (16 per cent), where 14 per cent of the population resided in 2005.
- Per person, traffic levels in London were by far the lowest during 2006.
 About 13 per cent of the Great Britain population live in London, but only 7 per cent of all road traffic was in the capital.

Figure 1.3a Percentage of all road traffic in Great Britain by country and Government Office Region: 2006

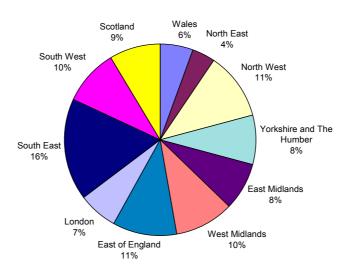
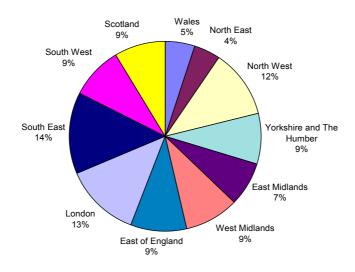


Figure 1.3b Percentage of population in Great Britain by country and Government Office Region: 2005



Source: Office for National Statistics (2005) – latest available population figures

Motor vehicle flows

The first section looked at the volume of traffic (vehicle kilometres) within the year. This section looks at average daily traffic flows – this is the number of vehicles travelling on each road class on an average day in the year. Flow measured on a single road includes traffic travelling in both directions.

Motor vehicle flow by road class

- Average motorway traffic flow increased to 77 thousand vehicles per day in 2006. This represents a 2 per cent increase since 2005 and a 19 per cent increase since 1996.
- Traffic flows on urban roads (both 'A' and minor) have remained at a steady level for the past decade whereas flow on rural roads has shown a gradual increase.
- The average major road in Great Britain had more than 12 times the flow of the average minor road.

Table 1.2 Motor vehicle flow by road class: 1993 - 2006

Thousand vehicles per day

		M	ajor roads						
			'A' roads		All	M	linor roads		
	Motorway	Rural	Urban	All	major — roads	Rural	Urban	All	All roads
1993	58.2	8.9	19.2	11.3	14.4	0.7	2.1	1.3	2.9
1994	59.8	9.1	19.5	11.6	14.7	0.8	2.1	1.3	3.0
1995	61.9	9.3	19.9	11.8	15.1	0.8	2.1	1.3	3.0
1996	64.8	9.6	20.1	12.1	15.6	0.8	2.1	1.3	3.1
1997	66.6	9.8	20.1	12.3	16.0	0.8	2.1	1.3	3.2
1998	68.7	10.0	20.2	12.4	16.3	0.8	2.2	1.3	3.2
1999	69.7	10.1	20.2	12.5	16.5	8.0	2.2	1.3	3.3
2000	69.6	10.0	20.1	12.4	16.4	0.8	2.2	1.3	3.3
2001	71.6	10.3	20.1	12.6	16.7	0.8	2.2	1.4	3.3
2002	73.0	10.5	20.2	12.8	17.0	0.8	2.3	1.4	3.4
2003	73.3	10.7	20.1	13.0	17.2	0.8	2.3	1.4	3.4
2004	74.9	10.9	20.3	13.1	17.5	0.9	2.4	1.4	3.5
2005	75.5	10.9	20.1	13.1	17.5	0.9	2.4	1.5	3.5
2006	77.0	11.1	20.3	13.3	17.7	0.9	2.2	1.4	3.5

Motor vehicle flows by road class, country and Government Office Region: 2006

- Average daily flows on all roads in England (3.9 thousand vehicles per day) were almost twice the average in Scotland (2.0 thousand vehicles per day); the average flow on roads in Wales was 2.2 thousand vehicles per day.
- Average vehicle flows ranged from 100 thousand vehicles per day on motorways in London to 0.5 thousand vehicles per day on minor rural roads in Scotland.
- The English region with the highest vehicle flows across all roads was London and the region with the lowest recorded flows was the South West.
- Across Great Britain as a whole, average traffic flow on urban 'A' roads was almost twice as high as on rural 'A' roads and likewise flow on minor urban roads was markedly higher than on minor rural roads.

Table 1.3 Motor vehicle flow by road class, country and Government Office Region: 2006

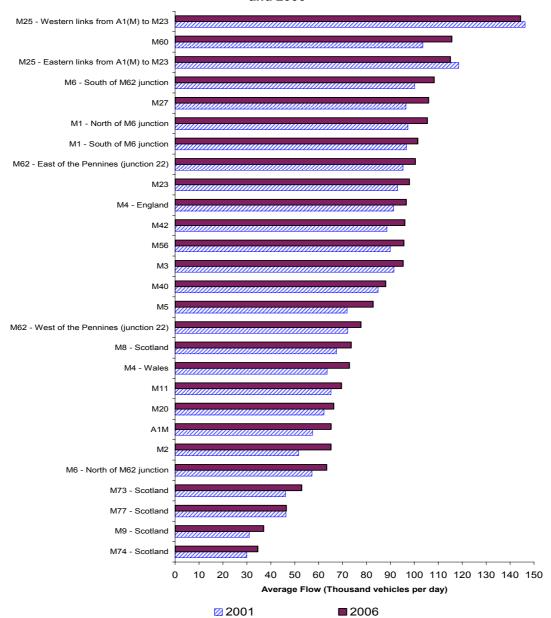
Thousand vehicles per day

		Major r	oads				·	
				All major	Minor roads			
	Motorway	Rural	Urban	roads	Rural	Urban	All roads	
North East	53.7	13.8	21.4	17.1	0.7	2.6	3.4	
North West	75.8	11.0	17.9	22.4	1.0	2.0	4.2	
Yorkshire & the Humber	73.7	13.0	18.8	20.5	1.0	1.9	3.6	
East Midlands	95.6	14.0	19.5	18.9	1.0	2.0	3.6	
West Midlands	80.3	11.7	19.8	21.4	1.0	2.7	4.1	
East of England	86.1	18.3	18.3	22.6	1.2	2.4	3.8	
London	100.2	29.6	28.9	31.3	2.1	2.6	6.1	
South East	94.1	18.1	19.4	26.9	1.5	2.4	5.0	
South West	72.1	11.2	19.8	16.2	0.7	2.1	2.6	
England	82.1	14.1	20.8	21.7	1.0	2.3	3.9	
Wales	65.3	8.2	17.5	11.2	0.6	1.9	2.2	
Scotland	43.4	4.9	16.7	7.4	0.5	1.8	2.0	
Great Britain	77.0	11.1	20.3	17.7	0.9	2.2	3.5	

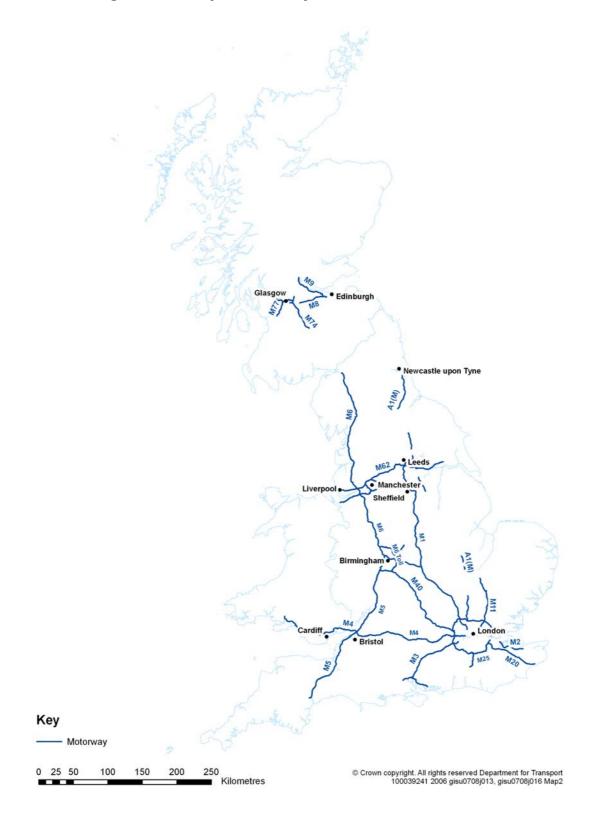
Motor vehicle flows for major sections of the motorway network: 2006

- The following chart shows the average daily flow on major sections of the motorway network. Each section comprises a number of links (lengths of road between junctions). The average flow represents the flow of traffic across ALL links.
- The busiest section of motorway in 2006 was the M25 western links with an average daily flow of 144 thousand vehicles. However, the M25 was the only motorway on which flow reduced between 2001 and 2006.
- The motorway showing the largest growth between 2001 and 2006 was the M2, with a 26 per cent increase in traffic over that time.

Figure 1.4a Average vehicle flows for major sections of the motorway network: 2001 and 2006







Seasonal, daily and hourly fluctuations in traffic

The data in this section are derived from continuous automatic counts conducted at about 190 fixed sites on major and minor roads.

Average daily traffic flows by month

Figures 1.5a and 1.5b show average daily traffic flows by month over a five year period from 2002 to 2006. The data are presented as an index, with 100 representing the average daily flow for the whole 5 year period, for cars and heavy goods vehicles separately, on motorways, other urban roads and other rural roads.

- The highest flows of cars on motorways and rural roads were in July and August, although flows remained relatively high from April to October. On other urban roads there was a more even distribution of traffic flows throughout the year, with a small reduction in August.
- Goods vehicle traffic flows peaked in the autumn for all types of road before declining to lower levels in December and January. There are fewer working days in December and January (because of Christmas and New Year) and this has an effect on the average daily flow.

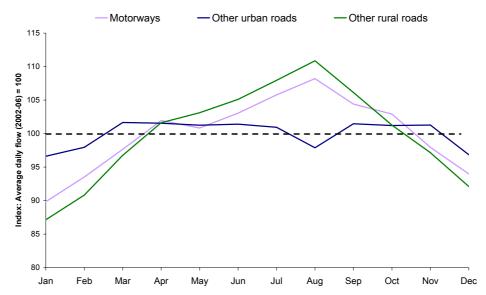


Figure 1.5a Indexed average daily traffic flows of cars by month (2002 – 2006)

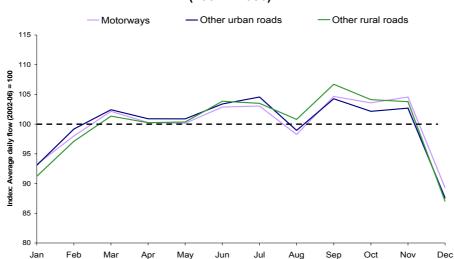


Figure 1.5b Indexed average daily traffic flows of heavy goods vehicles by month (2002 – 2006)

Traffic flow distribution by day of the week

- In 2006, overall traffic flows were higher on weekdays than at weekends; the highest level of traffic occurs on Fridays and the lowest on Sundays. Car traffic accounts for four-fifths of all traffic and hence the overall traffic levels throughout the week are affected more by changes in volumes of car trips than those made in other types of vehicle.
- Goods vehicle traffic flows are much higher during the week, on all road types, than at the weekend. In particular, on Sundays traffic was only around a quarter of weekday levels. Car traffic does not show such a clear weekday/weekend split although it too is lowest on Saturdays and Sundays.
- Car traffic was highest on Fridays whereas goods vehicle traffic was highest on Tuesday, Wednesday and Thursday.

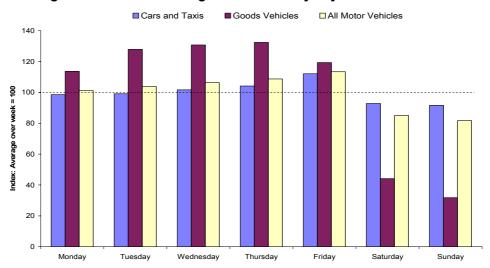


Figure 1.6 Indexed average traffic flows by day of the week: 2006

Distribution of traffic by time of day

- On weekdays, car traffic was about one quarter higher in the peak hours of the morning (8-9 am) and afternoon (5-6 pm) than in the hours between 10 am and 4 pm.
- There is relatively very little car traffic during the late night and very early morning period (11 pm to 6 am) across all days of the week.
- The pattern of car traffic throughout the day was markedly different at weekends. On Saturdays there was more traffic between 10 am and 3 pm than at other times.
- The pattern of goods vehicle traffic during the week does not show the two distinct peaks that car traffic shows. Goods vehicle traffic is greatest, and remains at a consistently high level, during the period between 7 am and 4 pm, before trailing off into the evening.
- Goods vehicle traffic is much lower at weekends than during the week and over the weekend it shows less distinction between the 'night' and 'day' hours.

Figure 1.7a Traffic distribution by time of day for cars and goods vehicles on weekdays: 2006

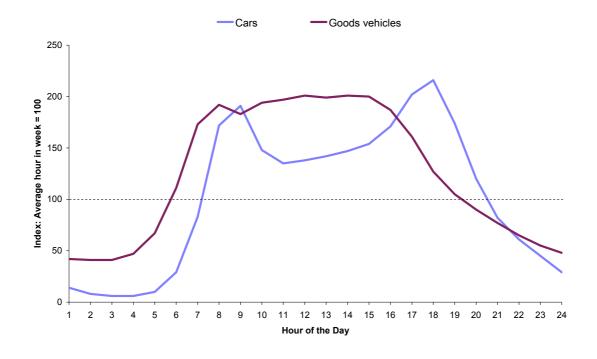


Figure 1.7b Traffic distribution by time of day for cars and goods vehicles on Saturdays: 2006

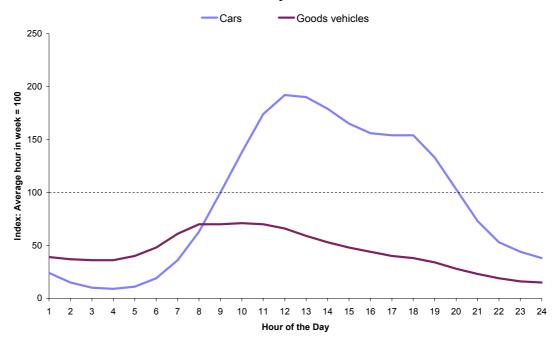
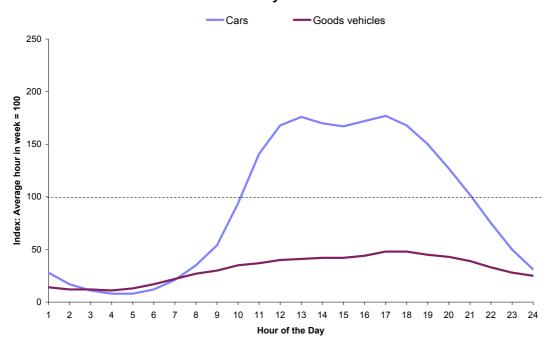


Figure 1.7c Traffic distribution by time of day for cars and goods vehicles on Sundays: 2006



Road Lengths

Road lengths by road class: 1993 - 2006

- Previous sections of this chapter provide traffic estimates. In order to calculate these it is necessary to have accurate and up-to-date information on road lengths by road class.
- The total road length in Great Britain in 2006 was estimated to be 398 thousand kilometres.
- The minor (i.e. 'B', 'C' and unclassified) road length in Great Britain is estimated to be 348 thousand kilometres, amounting to 87 per cent of the total. Motorways and 'A' roads account for 1 per cent and 12 per cent of the road network respectively; about three-quarters (76 per cent) of the latter are rural roads. In contrast, 20 per cent of total traffic is on motorways and 44 per cent on 'A' roads.

Table 1.4 Road length by road class: 1993 - 2006

Thousand kilometres

		Major roads										
		'A' roads: rural		٠,	'A' roads: urban			Minor roads				
	Motor- way	Trunk	Principal	Total	Trunk	Principal	Total	Major Roads	Rural	Urban	Total	All roads
1993	3.2	10.5	24.6	35.1	1.2	9.9	11.0	49.3	207.6	127.9	335.5	384.8
1994	3.2	10.5	24.6	35.1	1.1	9.9	11.0	49.4	207.9	128.3	336.2	385.6
1995	3.3	10.5	24.8	35.3	1.1	9.9	11.0	49.6	208.2	128.6	336.8	386.4
1996	3.3	10.6	24.6	35.2	1.1	9.9	11.0	49.5	208.5	129.0	337.5	387.0
1997	3.4	10.7	24.6	35.3	1.1	9.9	11.0	49.7	208.8	129.3	338.2	387.9
1998	3.4	10.6	24.8	35.4	1.1	9.9	11.0	49.8	209.1	129.7	338.8	388.6
1999	3.4	10.6	24.9	35.5	1.1	10.0	11.1	50.0	209.4	130.1	339.5	389.5
2000	3.5	10.6	24.9	35.5	1.1	10.0	11.1	50.1	209.7	130.4	340.2	390.2
2001	3.5	10.6	24.9	35.5	0.8	10.4	11.1	50.1	210.0	130.8	340.8	391.0
2002	3.5	10.0	25.6	35.5	0.7	10.4	11.1	50.2	210.3	131.2	341.5	391.7
2003	3.5	9.0	26.5	35.5	0.6	10.5	11.1	50.1	210.7	131.6	342.2	392.3
2004 1	3.5	8.6	26.9	35.5	0.5	10.6	11.1	50.2	207.6	129.9	337.5	387.7
2005 ¹	3.5	8.2	27.3	35.6	0.4	10.7	11.1	50.2	207.6	130.2	337.8	388.0
2006 ¹	3.6	8.3	27.3	35.6	0.4	10.7	11.1	50.3	210.8	137.3	348.0	398.3

^{1.} New information has enabled better estimates of minor road lengths to be made; see special note.

Figure 1.8a Percentage of road lengths in Great Britain by road class: 2006

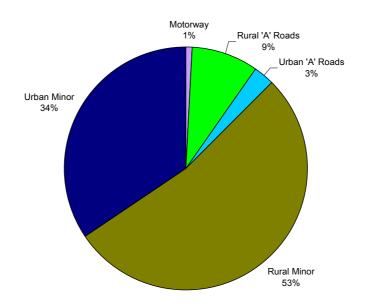


Figure 1.8b Percentage of traffic in Great Britain by road class: 2006

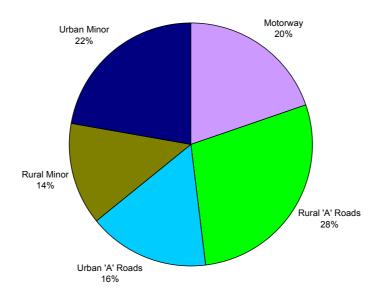
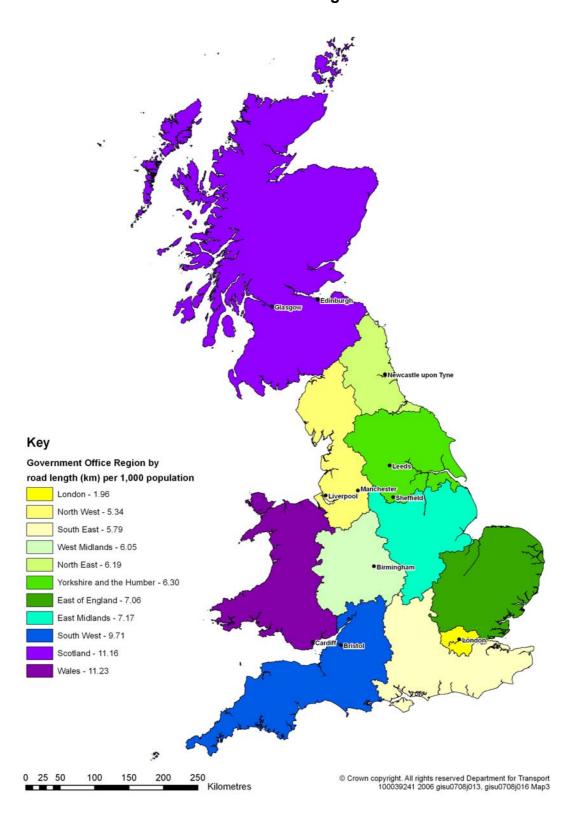


Figure 1.8c Road lengths per 1,000 population by country and Government Office Region: 2005



Sources :

Office for National Statistics (2005) and DfT (2005)

Goods Vehicle Traffic and Weights

Introduction

This section focuses on heavy goods vehicle (goods vehicles over 3,500 kgs) traffic and vehicle weights. Accurate information on goods vehicle traffic is important because of the critical role that the movement of goods plays in the economy (83 per cent of freight, by tonnes lifted, is carried by road). There are two main types of heavy goods vehicle – rigid lorries and articulated lorries. These can be differentiated further by the number of axles on the vehicle. The type of vehicle and the number of axles determines the maximum legal weight for driving on British roads.

Traffic flows of goods vehicles by axle configuration

- Total heavy goods vehicle traffic in 2006 was 29 billion vehicle kilometres; this represented a 0.3 per cent increase since 2005 and a 11 per cent increase since 1996 (see table 1.1)
- Two-fifths of all heavy goods vehicle traffic was on motorways; however only 28 per cent of rigid vehicle traffic was on motorways compared to 56 per cent of articulated good vehicles.
- Rigid 2-axle heavy goods vehicles were the most common type of lorry on British roads and accounted for 39 per cent (11.3 billion vehicle kilometres) of all goods vehicle traffic in 2006.

Table 1.5 Goods vehicle traffic by axle configuration and road class: 2006

	Rig	id by nun	nber of axle	es	Articu				
	2	3	4 or more	Total	3 and 4	5	6 or more	Total	All
Motorways	28	26	26	28	47	61	53	56	42
Rural 'A' roads	35	36	42	36	38	32	37	35	35
Urban 'A' roads	15	13	16	15	8	5	6	6	10
All major roads	78	<i>7</i> 5	84	78	93	99	96	97	87
Minor roads									
Rural	11	14	10	11	4	1	2	2	7
Urban	12	11	6	11	3	1	1	1	6
All minor roads	22	25	16	22	7	1	4	3	13
All roads									
(Billion vehicle kms)	11.3	1.9	1.7	14.9	1.9	6.5	5.7	14.1	29.1

Vehicle Weights

Vehicle weight is measured by automatic weigh-in-motion (WIM) classifiers that are located at 9 'A' road and 19 motorway sites. WIM classifiers are placed in multiple lanes at these sites bringing the total number of WIM lanes to 55 (26 on A roads and 29 on motorways). WIM classifiers are able to distinguish vehicles by size and axle structure, as standard automatic traffic counters do, but they also record vehicle weight which can be used to calculate the road-wear caused by a passing vehicle.

- The average weight of cars was 1.5 tonnes, the average weight of light vans was 2.6 tonnes, and the average weight of buses was 12.0 tonnes.
- The standard measurement of road wear, used by road designers when considering the potential lifetime of a road surface, is the Equivalence Factor (EF). This is a measure of the relative damage caused by a vehicle compared to the estimated road damage caused by a 'standard axle' (an axle with a load of 8.16 tonnes). This definition is explained further in the glossary.
- Although the average weight of a 6-axle articulated HGV was 53 per cent greater than the average weight of a 4-axle rigid HGV, the former caused, per vehicle, only slightly more road wear (EF of 3.9) than the latter (EF of 3.8). This is because road wear is reduced by spreading loads evenly and avoiding very heavy individual axles.
- The road wear caused by a single 6-axle articulated HGV is approximately equivalent to the road wear caused by 26 thousand cars. Therefore even though cars make up 79 per cent of traffic, they contribute very little to the deterioration of the road surface.

Table 1.6 Average vehicle weights and road wear on motorways and A-roads: 2006

	Average gross vehicle weight	Average road wear per axle	Average road wear per vehicle
<u>Vehicle</u>	(tonnes)	(Equivalence Factor)	(Equivalence Factor)
Cars	1.5	0.0	0.0
Vans	2.6	0.0	0.0
Bus	12.0	0.9	1.8
Rigid HGVs:			
2 axles	6.9	0.2	0.5
3 axles	17.2	0.8	2.3
4 axles	22.4	0.9	3.8
Articulated HGVs			
3 & 4 axles	17.7	0.3	1.1
5 axles	23.9	0.4	1.9
6 axles	34.2	0.6	3.9

- A conservative measure of the proportion of vehicles exceeding the legal maximum weight is the count of those that are 4 or more tonnes over the limit. This allows for any potential measurement error by the WIM classifiers.
- Only 1 per cent of 3 axle rigid vehicles, 3 per cent of 4 axle rigid and 5 axle articulated and 4 per cent of 6 axle articulated HGVs exceeded the maximum limits by 4 tonnes or more. This suggests that the vast majority of HGVs on Great Britain's roads are carrying loads that are not breaking weight limits.

Table 1.7 Percentage of HGVs weighing four or more tonnes over the legal maximum

Vehicle	UK maximum legal gross weight	Percentage 4 or more tonnes over weight ¹		
3 Axle Rigid HGV	26 tonnes	1		
4 Axle Rigid HGV	32 tonnes	3		
5 Axle Articulated HGV	40 tonnes	3		
6 Axle Articulated HGV	44 tonnes	4		

^{1.} Conservative estimate to allow for potential measurement error

Traffic in context

In order to gauge how the changes in traffic we have seen fit into a wider view of transport in Great Britain, some context can be derived from exploring other sources of data.

Growth in vehicle ownership

- Between 1980 and 2006, the number of private and light goods vehicles licensed in Great Britain increased from 16.3 million to 29.6 million, a 82 per cent increase. All motor vehicle traffic increased by 86 per cent over the 26 year period.
- Over the same period of time, the number of licensed buses and heavy goods vehicles has changed little. Motorcycles licences declined in number from 1980 to 1995 but have since increased.

Table 1.8 Motor vehicles licensed by taxation class: 1980 - 2005

	Millions					All Traffic
	Private & light goods	Motorcycles	Buses	Goods vehicles	Other	(1980 = 100)
1980	16.3	1.4	0.1	0.5	0.9	100.0
1985	18.3	1.1	0.1	0.5	1.1	113.9
1990	22.0	0.8	0.1	0.5	1.3	151.1
1995	22.7	0.6	0.1	0.4	1.6	158.0
2000	25.7	0.8	0.1	0.4	1.9	171.8
2005	29.2	1.1	0.1	0.4	2.1	183.7
2006	29.6	1.1	0.1	0.4	2.1	186.2

Source: DfT

Public transport

- The overall use of public transport, measured by the number of passenger journeys a year on buses, railways, light rail systems and the London Underground, increased by 16 per cent from 1995/96 to 2005/06. This compares with an increase in car traffic of 12 per cent over the same period.
- The growth in the use of public transport has not been uniform across
 the regions and across the different modes of travel. For example bus
 patronage outside of London has fallen by 12 per cent over the last 10
 years whereas bus patronage in London has increased by 52 per cent
 and national rail use has increased by 36 per cent.
- Light rail systems have shown the greatest increase in passenger numbers over the last 10 years, growing by 101 per cent. This is due to the opening and extension of tram schemes in various cities such as Manchester, Sheffield and Nottingham. However this mode of transport still only accounted for 2 per cent of all public transport journeys made in 2006.

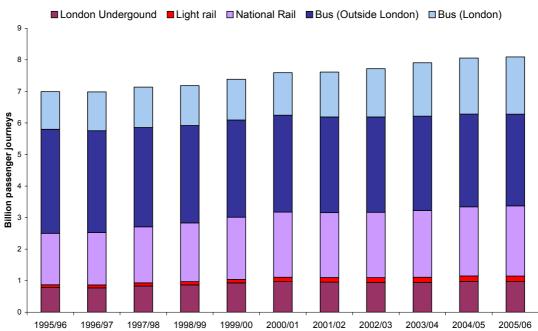
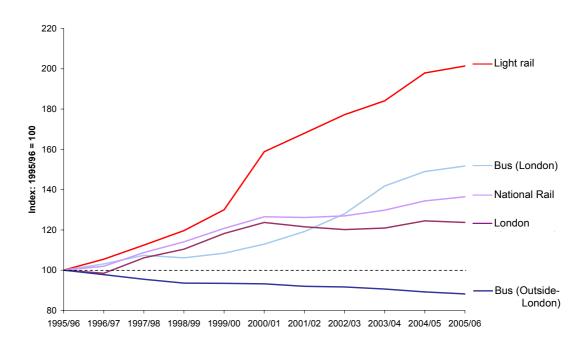


Figure 1.9a Public transport use in Great Britain by mode: 1995/96 to 2005/06

Figure 1.9b Public transport by mode: 1995/96 to 2005/06



Source: Transport Statistics Great Britain: 2006 (DfT) Figures are representative of the financial year.

European comparisons

- Between 1993 and 2003, car traffic in Great Britain¹ (measured in passenger kms) showed the smallest increase, 12 per cent, of all the 15 EU member states (EU membership as of 2003).
- The highest growth in traffic among these 15 countries was in Greece (94 per cent), followed by Portugal (83 per cent), the Irish Republic (71 per cent) and Spain (51 per cent). These high increases were mainly driven by increasing car ownership from relatively lower levels.
- On a per person basis, Luxembourg had the highest volume of car traffic in the EU during 2003 at an estimated 13,300 passenger kms per member of the population. Great Britain had the fourth highest volume per person (11,700 passenger kms) and Greece had the lowest (5,800 passenger kms).

14,000 12.000 10,000 8.000 ģ Belgium Finland France Greece rish Republic Spain Portugal Austria Vetherlands Sweden Great Britain Italy uxembourg Germany Denmark

Figure 1.10a Car traffic volume per person in 15 EU states: 2003 (passenger kms)

Source: EU Transport in Figures (EUROSTAT)

1. Great Britain figures shown instead of United Kingdom as Northern Ireland figures were not available.

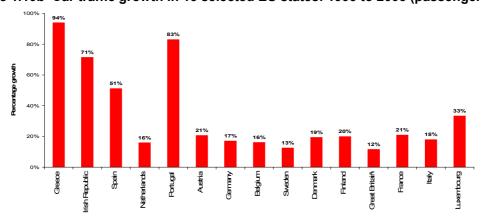


Figure 1.10b Car traffic growth in 15 selected EU states: 1993 to 2003 (passenger kms)

2. Free Flow Vehicle Speeds in Great Britain

- The average free flow speed of cars in 2006 on 40 mph limit roads was 36 mph and on roads with a 30 mph limit the average speed was 30 mph.
- The percentage of vehicles that exceed the speed limit on 30 mph roads has fallen over the last 10 years. The proportion of cars exceeding the speed limit in 1996 was almost three quarters; in 2006 this figure had fallen to a half.
- On motorways, 17 per cent of cars were recorded as travelling at 80 mph or faster, breaking the speed limit by at least 10 mph.
- Very few rigid and articulated heavy goods vehicles exceeded the speed limit of 60 mph on motorways but the majority (over 79 per cent) exceeded the 50 mph limit on dual carriageways and nearly as many (75 per cent) exceeded the 40 mph limit on single carriageways.
- On 40 mph roads, 39 per cent of motorcycles exceeded the speed limit.
 The next highest group were light goods vehicles, 29 per cent exceeding the limit.
- The proportion of motorcycles speeding on 30 mph roads has fallen from 56 per cent in 1996 and 63 per cent in 1998 to 51 per cent in 2006.

Introduction

This section looks at the speed of traffic in free flowing conditions on roads in Great Britain during 2006. Some of the data in this section has already been published as a statistical release on 5th April 2007. Key tables from that release have been updated and can be found along with data tables from previous years, on the DfT web-site.

http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/vehiclespeedsgb/

National administrations in England, Scotland and Wales are responsible for setting speed limits on motorways and trunk roads. Local authorities have the power to impose or vary speed limits on principal roads and on all other local roads. In order to monitor the compliance of drivers with these speed limits the Department collects speed data from traffic counting sites around Great Britain.

The Department monitors traffic speeds and traffic levels at about 190 sites throughout Great Britain using automatic traffic counters. These are generally situated away from junctions, hills or sharp bends, at locations where traffic is likely to be free flowing and not near speed cameras. Therefore, in principle, they provide information on the speeds at which drivers choose to travel when their behaviour is not constrained by congestion or other road conditions. These statistics do not indicate average traffic speeds across the road network. Any sites affected by long term road works are excluded. Of course incidents or congested conditions may arise at any site, and when this happens it will reduce speeds below those in free flowing conditions. This is not believed to have a significant effect on the figures published.

In this chapter the term 'built-up' is used to describe roads to which a 30 mph or 40 mph limit applies; the term 'non-built-up' describes other roads.

The total number of vehicle records which were processed to produce 2006 statistics was about 910 million. In the earlier years of this survey only a sample of records were analysed but from 2002 onwards, all vehicle records recorded at each site were included (except for a few very slow-moving vehicles indicating that conditions at the site were congested).

On non-built-up roads the current speed limits are:

	Motorway	Dual	Single
	word way	Carriageway	Carriageway
Cars, vans and motorcycles	70	70	60
Cars Towing	60	60	50
Buses and Coaches	70	60	50
HGVs (>7.5 tonnes)	60	50	40

Non-built-up roads

Non-built-up roads are motorways, dual carriageways, and single carriageway roads with 60 mph speed limits for cars.

Free flow vehicle speeds on non-built-up roads, by road type and vehicle type.

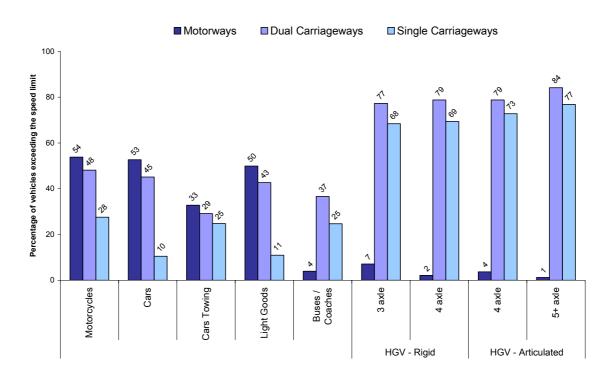
- The average free flow speed of cars travelling on non-built-up roads was 70 mph on motorways, 68 mph on dual carriageways and 48 mph on single carriageways.
- On single carriageway roads, the speed limit for heavy goods vehicles (HGVs) weighing more than 7.5 tonnes is 40 mph. However on these roads the average free flow speed of articulated HGVs in 2006 was 46 mph, just 2 mph less than the average free flow speed of cars for which the speed limit is 60 mph. On both motorways and dual carriageways the average free flow speed of these vehicles was 53 mph.
- Motorcycles had the same average free flow speed as cars on motorways and dual carriageways but were travelling, on average, 5 mph faster (at 53 mph) than cars on single carriageway roads.

■ Motorways ■ Dual Carriageways ■ Single Carriageways 80 0 જી 60 61 60 6⁸ 63 6th 652 ట్రి ట్రి સ્કુ સ્કુ Average Speed (mph) 20 Motorcycles Cars Light Goods Buses / Coaches 2 axle Cars Towing 5 HGV - Rigid HGV - Articulated

Figure 2.1a Average free flow speeds on non-built-up roads in 2006

- On motorways, 53 per cent of cars were travelling at a speed that exceeded the limit of 70 mph. On dual carriageways this figure was 45 per cent and on single carriageways (60 mph limit) just 10 per cent of cars were exceeding the limit.
- Very few rigid and articulated HGVs exceeded the speed limit of 60 mph on motorways but the majority (over 79 per cent) exceeded the 50 mph limit on dual carriageways and nearly as many (75 per cent) exceeded the 40 mph limit on single carriageways.
- Twenty eight per cent of motorcycles exceeded the speed limit on single carriageway roads compared with 10 per cent of cars and 11 per cent of light goods vehicles.

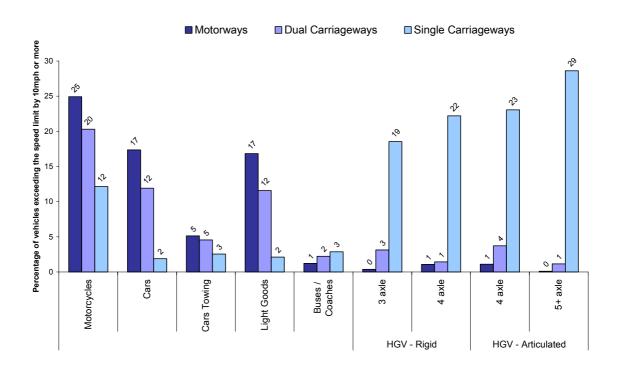
Figure 2.1b Percentage of vehicles exceeding the speed limit on non-built-up roads in 2006



Note: The speed limit for a 2-axle HGV depends on its weight and therefore these data are not presented here or in figure 2.1c.

- On motorways, 17 per cent of cars were recorded as travelling at 80 mph or faster, breaking the speed limit by at least 10 mph.
- Very few HGVs exceeded the speed limit by 10 mph or more on motorways and dual carriageways, but a substantial number did on single carriageway roads. For example, 29 per cent of 5+ axle articulated HGVs exceeded a speed of 50 mph on single carriageways.

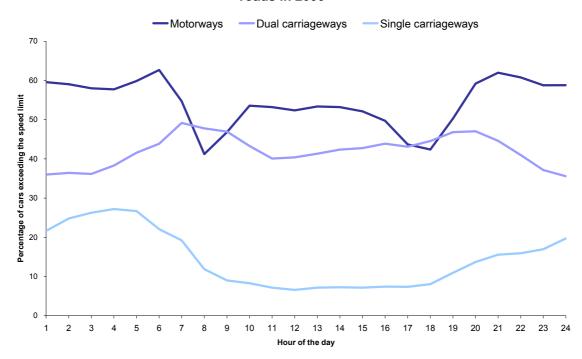
Figure 2.1c Percentage of vehicles exceeding the speed limit by 10 mph or more on non-built-up roads in 2006



Free flow car speeds on non-built-up roads, by time of day.

- On motorways, the percentage of cars exceeding the speed limit was greatest between 5 and 6 am (63 per cent) and between 8 and 9 pm (62 per cent). The times with the lowest proportions of cars exceeding the speed limit were between 7 and 8 am (41 per cent) and between 5 and 6 pm (42 per cent). The drop in speeds at these times is likely to be due to greater congestion in peak periods (see sections 3 and 4).
- On dual carriageways, the percentage of cars exceeding the speed limit was greatest, in the morning, between 6 and 7 am (49 per cent) and, in the evening, between 7 and 8 pm (47 per cent). On dual carriageways, the percentage of cars exceeding the speed limit did not dip during the morning and evening peaks as it did on motorways.
- On single carriageway roads (60 mph speed limit) the percentage of cars exceeding the speed limit was higher during the early morning periods than it was during the rest of the day. At the maximum, 27 per cent of cars exceeded the limit (between 3 and 4 am).

Figure 2.2 Percentage of cars exceeding the speed limit by time of day on non-built-up roads in 2006



Free flow vehicle speeds on non-built-up roads, weekdays and weekends.

- The average free flow speed of all vehicle types on non-built-up roads was as high or higher on weekends compared with weekdays.
- From Monday to Friday, 50 per cent of cars travelling on motorways exceeded the speed limit, at weekends this proportion rises to 60 per cent.

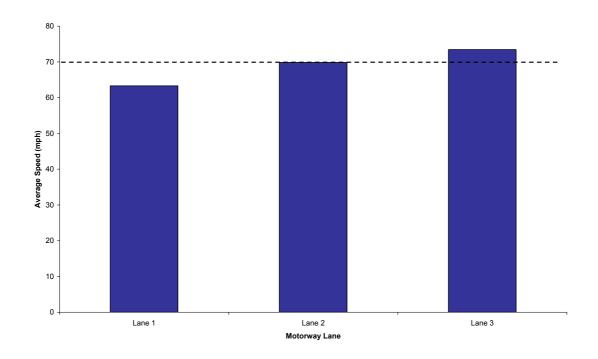
Table 2.1 Weekend and weekday free flow speed comparisons on non-built-up roads in 2006

		Weel	day	Weel	kend
Vehicle typ	e Road type	per cent exceeding limit	Average speed	per cent exceeding limit	Average speed
Cars	Motorway	50	69	60	72
	Dual carriageway	45	68	45	69
	Single carriageway	10	48	12	49
LGVs	Motorway	47	68	60	72
	Dual carriageway	42	68	47	69
	Single carriageway	10	48	14	50
Buses/coache	es Motorway	4	58	3	61
	Dual carriageway	34	57	49	58
	Single carriageway	24	45	31	46
Rigid 3/4 axle	Motorway	4	53	20	56
_	Dual carriageway	78	52	81	54
	Single carriageway	69	43	73	45
Articulated	Motorway	2	53	2	54
	Dual carriageway	84	53	80	53
	Single carriageway	75	45	81	47

Free flow car speeds on motorways by lane.

- The average free flow speed of cars in lane 1 on motorways in 2006 was 63.3 mph, the average speed in lane 2 was 69.8 mph and the average speed in lane 3 was 73.4 mph.
- The speed limit for cars travelling on motorways is 70 mph.

Figure 2.3 Average free flow car speeds by motorway lane: 2006



Built-up roads

Built-up roads are those with 40 or 30 mph speed limits.

Free flow vehicle speeds on built-up roads, by road type and vehicle type.

- The average free flow speed of cars in 2006 on 40 mph limit roads was 36 mph and on roads with a 30 mph limit the average free flow speed was 30 mph.
- On 40 mph limit roads, motorcycles had the highest average free flow speed of all vehicle types at 38 mph.
- The average free flow speed for all vehicle types was at or below the speed limit on both types of built-up road.

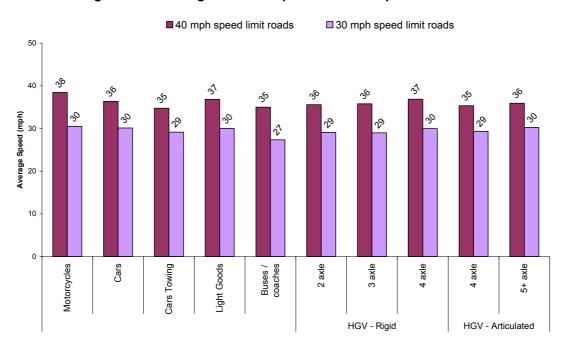
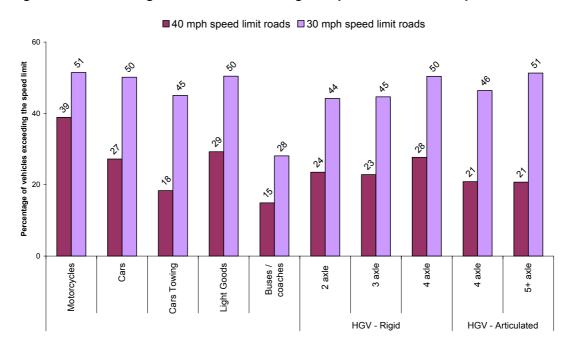


Figure 2.4a Average free flow speeds on built-up roads in 2006

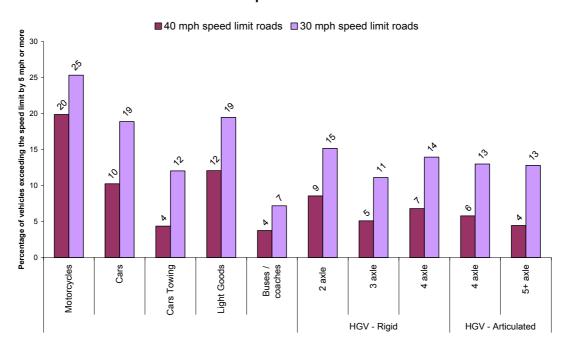
- Fifty per cent of cars exceeded the speed limit on 30 mph roads in 2006, on 40 mph roads 27 per cent exceeded the limit.
- On 40 mph roads, 39 per cent of motorcycles exceeded the speed limit.
 The next highest group were light goods vehicles, 29 per cent exceeding the limit.
- Only 28 per cent of buses and coaches exceeded the speed limit on 30 mph roads, a much smaller proportion than for any other vehicle category.





- On 40 mph and 30 mph roads, the percentages of motorcycles travelling at 5 mph or more over the speed limit were 20 and 25 per cent respectively.
- Thirteen per cent of articulated HGVs with 5 or more axles (the largest vehicle type that we measure) travelled at speeds over 35 mph on 30 mph limit roads in 2006. The equivalent figure for buses and coaches was 7 per cent.

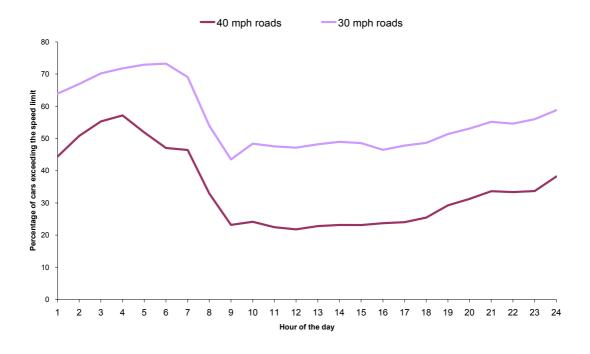
Figure 2.4c Percentage of vehicles exceeding the speed limit by 5 mph or more on built-up roads in 2006



Free flow car speeds on built-up roads, by time of day.

- On both types of built-up road, the percentage of cars exceeding the speed limit was highest in the morning until around 7am. The daily pattern of speeds was very similar throughout the day for both 40 mph and 30 mph roads.
- On 30 mph roads, the percentage of cars exceeding the speed limit was greatest between 5 and 6 am (73 per cent) and was lowest between 8 and 9 am (43 per cent).
- On 40 mph roads, the percentage of cars exceeding the speed limit was greatest between 3 and 4 am (57 per cent) and was lowest between 11am and 12 pm (22 per cent).

Figure 2.5 Percentage of cars exceeding the speed limit by time of day on built-up roads in 2006



Free flow vehicle speeds on built-up roads, weekdays and weekends.

- The average free flow speed of all vehicle types on built-up roads was higher on weekends than on weekdays.
- From Monday to Friday, 49 and 26 per cent of cars exceeded the speed limit on 30 mph and 40 mph roads respectively. At weekends these figures rose to 54 and 30 per cent.

Table 2.2 Weekend and weekday speed comparisons on built-up roads in 2006

per cent / miles per hour

		Weel	kday	Week	end
Vehicle type	Speed limit	per cent exceeding limit Average speed		per cent exceeding limit	Average speed
Cars	30mph	49	30	54	31
	40mph	26	36	30	37
LGVs	30mph	49	30	55	31
	40mph	28	37	35	38
Motorcycle	30mph	50	30	56	32
,	40mph	37	38	43	40
Rigid 2 axle	30mph	44	29	47	30
	40mph	23	35	31	37

Exceeding the speed limit: 1996 – 2006

This section deals with time series data from the last 10 years. Such historic data enables us to identify trends in changing driver behaviour in relation to exceeding the speed limit.

- The percentage of vehicles that exceed the speed limit on 30 mph roads has fallen over the last 10 years. The proportion of cars exceeding the speed limit in 1996 was almost three quarters; in 2006 this had fallen to a half.
- In 1996, 11 per cent of articulated HGVs exceed the speed limit of 60 mph on motorways. In 2006 this figure had fallen to just 2 per cent. However over the same period, the proportion of articulated HGVs exceeding the speed limit (40 mph) on single carriageway non-built-up roads has increased from 72 to 76 per cent.
- Sixty one per cent of 2-axle rigid HGVs were travelling faster than the limit on 30 mph roads in 1996 and this number fell to 46 per cent in 2006. On 40 mph roads however, the proportion of speeding vehicles increased from 16 to 24 per cent over the same period.
- The proportion of motorcycles speeding on 30 mph roads has fallen from 56 per cent in 1996 and 63 per cent in 1998 to 51 per cent in 2006.

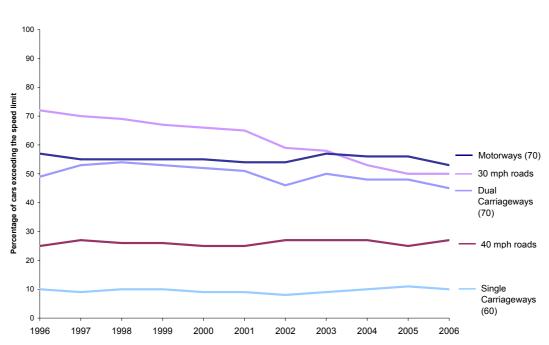
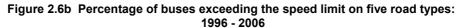


Figure 2.6a Percentage of cars exceeding the speed limit on five road types: 1996 - 2006



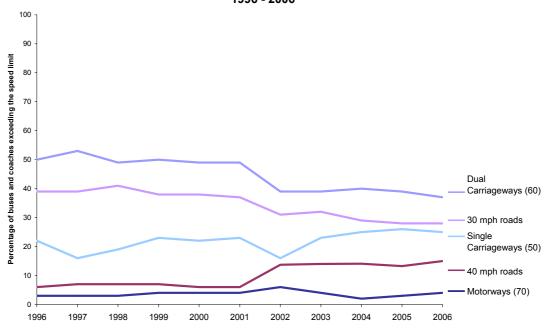


Figure 2.6c Percentage of articulated HGVs exceeding the speed limit on non-built-up roads: 1996 - 2006

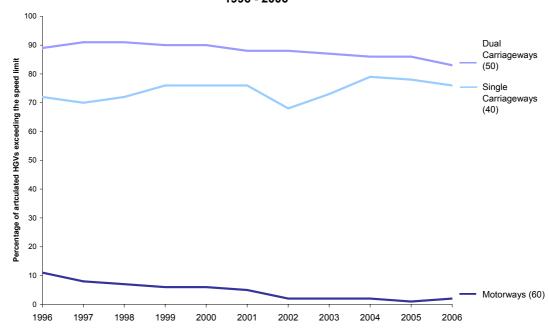


Figure 2.6d Percentage of 2-axle rigid HGVs exceeding the speed limit on built-up roads: 1996 - 2006

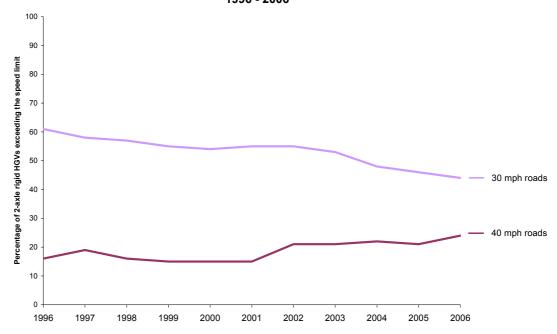


Figure 2.6e Percentage of motorcycles exceeding the speed limit on built-up roads: 1996 – 2006



3. Congestion and Traffic Speeds on the Inter-Urban Road Network

- Average vehicle delay on the slowest 10% of journeys has risen from 3.78 to 4.11 minutes per 10 miles between the baseline year (August 2004 – July 2005) and the latest year (May 2006 – April 2007), an increase of 8.7 per cent. This covers a period of 21 months and represents an annual increase of 5.0 per cent.
- Average delay patterns for Fridays were distinctly different from other weekdays. The morning peak was noticeably lower than other weekdays and the evening peak had a much earlier build-up, starting from mid-day. By 14:00 on Fridays, congestion is at about the same level as in the morning peak on Wednesdays.

Introduction

The Strategic Road Network (SRN) in England consists of all motorways and all purpose trunk A roads (dual and single carriageway) managed by the Highways Agency, as well as the M6 Toll. For monitoring purposes, the network has been split into 103 recognisable routes (for instance A46 Leicester – Lincoln)¹. Currently 91 of the 103 routes are used to monitor network performance due to data quality considerations on the remaining 12 routes.

The Department has a Public Service Agreement (PSA) target to make journeys more reliable on the SRN. Journey time reliability is considered particularly important as it means that road users can plan to arrive at a particular time. The more unreliable the journey becomes, the more difficult it becomes to plan these journeys. The PSA target will be achieved if the average vehicle delay on the SRN's slowest 10% of journeys is less in 2007-08 than in the baseline period².

This chapter contains 'experimental statistics' that are under development and are currently being tested for their ability to meet customer needs. We believe they are robust enough to give a reasonable indication of overall trends. While the series is experimental their quality cannot be assured to the rigorous standards required by National Statistics.

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¹ Each route has two directions, so strictly there are 206 route-directions.

² Baseline period is August 2004 – July 2005 (later for 7 routes, due to data quality issues). Target period is April 2007 – March 2008.

The slowest 10% of journeys

The slowest 10% of journeys are selected for each 15-minute departure time between 06:00 and 20:00 for each day of the week, on each of the 91 routes. The indicator therefore reflects journeys experienced on all types of route on all days at all times of the day.

The PSA indicator is the average vehicle delay, derived from the differences between observed journey times and a reference journey time (the time that could theoretically be achieved when the traffic is free-flowing), weighted by traffic flows for each route of the network.

The methodology is quite complex and a full explanation of the measure, the routes covered and the steps taken by the Highways Agency to reduce congestion on the network are available at

http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/congestiononthestrategicroad5359

Alongside the PSA indicator of delay, the Department is monitoring the average journey time per 10 vehicle miles for the slowest 10% of journeys. This indicator is derived directly from the observed journey times, and is also weighted by traffic flows for each route of the network.

Since 2004 the Department has been using data from the Highways Agency's Traffic Information System (HATRIS) database to monitor congestion levels on the network. The HATRIS database brings together journey time data from several different sources:

- Data from the Highways Agency Motorway Incident Detection Automatic Signalling (MIDAS) inductive loops. MIDAS loops are installed under the road surface at 500 metre intervals on approximately 30 per cent of the motorway network;
- Anonymised data from Trafficmaster Automatic Number Plate Recognition (ANPR) cameras, spaced 4km apart on average, on all principle trunk roads and some motorways;
- Anonymised data from National Traffic Control Centre (NTCC) ANPR cameras spaced approximately 25km apart on all trunk roads and motorways; and
- Anonymised data derived from in-vehicle Global Positioning System (GPS) satellite navigation and traffic advice systems.

Inter-urban speed survey

Prior to 2004, congestion on the SRN was monitored using trunk road speed surveys. The survey methodology involved specially-equipped cars driven around the network recording the distance travelled by the cars and the time taken.

To ensure that the survey car was driving at a speed which was representative of the traffic in which it was travelling, a technique known as the 'floating car' was adopted. This involved the driver attempting to equalise the number of vehicles overtaking the car with the number of vehicles that it overtook.

The Traffic Speeds section in this chapter is based on data collected from the trunk road traffic speed surveys of 1995, 1998, 2001 and 2003 and covers those parts of the network which were surveyed in all four years. Although the scope for comparing changes over time is somewhat limited due to network changes and some missing data, there is still a large part of the network which has been included in all four surveys. Further details on the latest survey conducted in 2003 are available at

http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/trunkroads/

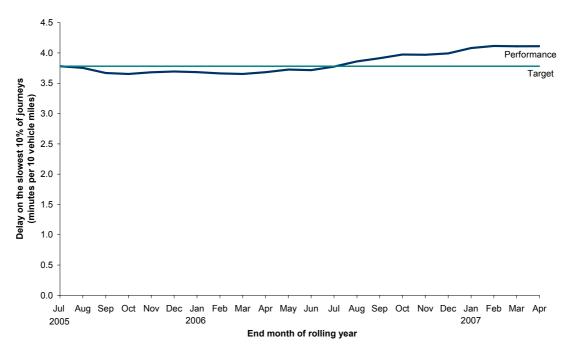
A similar survey over a reduced network is planned for autumn 2007 so that comparisons with new data sources can be made.

Congestion

Journey time reliability measure for the Strategic Road Network

 Average vehicle delay on the slowest 10% of journeys has risen from 3.78 to 4.11 minutes per 10 miles between the baseline year (August 2004 – July 2005) and the latest year (May 2006 – April 2007), an increase of 8.7 per cent. This covers a period of 21 months and represents an annual increase of 5.0 per cent³.

Figure 3.1a Journey time reliability measure for 91 target routes on the Strategic Road Network



• Over the same period, average journey time on the slowest 10% of journeys has risen from 13.4 to 13.7 minutes per 10 miles, an increase of 2.5 per cent. This covers a period of 21 months and represents an annual increase of 1.4 per cent.

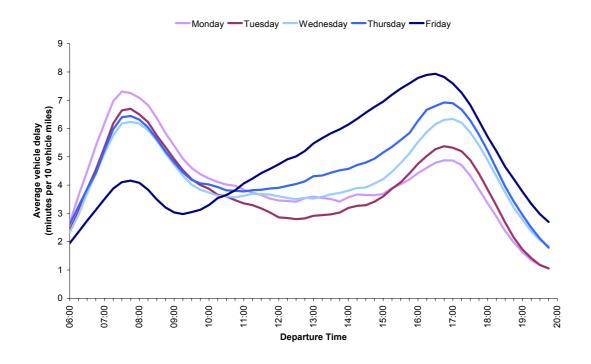
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³ The congestion figures are an update to those last published in the Department for Transport's Annual Report 2007 - Appendix D (http://www.dft.gov.uk/about/publications/apr/ar2007/appendixdpsatargets)

Characteristics of average delay for weekdays during the latest rolling year (May 2006 – April 2007):

- Eighty-five per cent of the delay on the slowest 10% of journeys occurred during weekdays, and almost half (46 per cent) during the weekday peaks.
- During the morning peak, the average vehicle delay on the slowest 10% of journeys generally declined as the week progressed. The opposite effect occurred for the evening peak (Figure 3.1b).
- Mondays experienced the highest morning peak delays of the weekdays for the slowest 10% of journeys, but the lowest evening peak. The morning peak between 07:00 and 10:00 on Mondays contributed 5 per cent of the total delay on the slowest 10% of journeys.
- The highest evening peak delays on weekdays for the slowest 10% of journeys were experienced on Fridays. The evening peak between 16:00 and 19:00 on Fridays contributed 6 per cent of the total delay on the slowest 10% of journeys.
- Average delay patterns for Fridays were distinctly different from other weekdays. The morning peak was noticeably lower than other weekdays and the evening peak had a much earlier build-up, starting from mid-day. By 14:00 on Fridays, congestion is at about the same level as in the morning peak on Wednesdays.

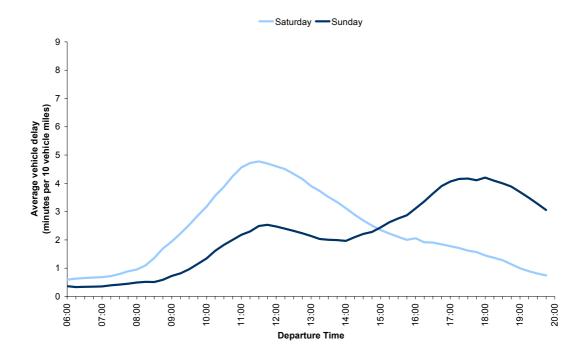
Figure 3.1b Average vehicle delay for the slowest 10% of journeys by day of the week and departure time, May 2006 – April 2007



Characteristics of average delay for weekends during the latest rolling year (May 2006 – April 2007):

- Fifteen per cent of the delays on the slowest 10% of journeys occurred during the weekends.
- The delays in the slowest 10% of journeys on Saturdays peaked once during late morning and then tailed off. On Sundays there was a slight peak in the late morning and a higher peak after 17.00 (Figure 3.1c).

Figure 3.1c Average vehicle delay for the slowest 10% of journeys by day of the weekend and departure time, May 2006 – April 2007



Delay on the slowest 10% of journeys by route

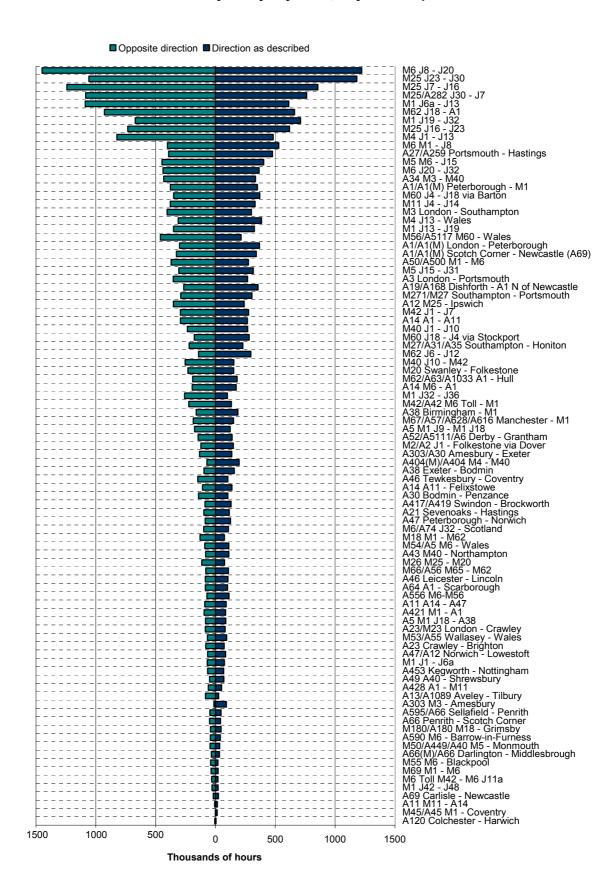
During the latest rolling year (May 2006 – April 2007):

- Of the slowest 10% of journeys on the 91 routes currently being monitored (in each direction):
 - The most congested 20 per cent of the route-directions contribute 54 per cent of the delays;
 - The most congested 50 per cent of the route-directions contribute 85 per cent of the delays;
 - The least congested 20 per cent of the route-directions contribute just 3 per cent of the delays.
- Routes having the greatest impact on total delay for the slowest 10% of journeys are typically the busiest and longest ones⁴. Over this period, the worst ten routes (counting both directions) were:
 - 1. M6 J20 Warrington J8 West Bromwich
 - 2. M25 J23 Barnet J30 Dartford Crossing
 - 3. M25 J16 Uxbridge J7 Redhill
 - 4. M25/A282 J7 Redhill J30 Dartford Crossing
 - 5. M1 J13 Milton Keynes J6a Hemel Hampstead
 - 6. M62 A1 J33 Pontefract J18 Whitefield
 - 7. M1 J19 Rugby J32 Rotherham
 - 8. M25 J23 Barnet J16 Uxbridge
 - 9. M4 J13 Newbury J1 West London
 - 10. M6 M1 Rugby J8 West Bromwich

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⁴ Further details on individual route traffic levels and length can be found at http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/cong estiononthestrategicroad5359

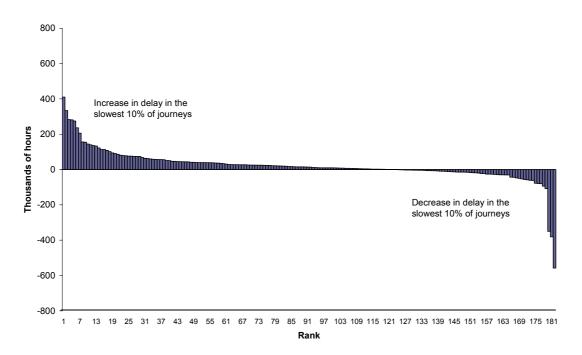
Figure 3.2 Total delay on the Strategic Road Network for the slowest 10% of journeys by route, May 2006 – April 2007



Changes in delay since the baseline year (August 2004 – July 2005)

- Over the monitoring period, there was an increase in delay for the slowest 10% of journeys for 121 of the 182 route-directions, and a decrease in delay for 61 route-directions.
- The five route-directions to show the greatest increases in total delay (measured in hours) are:
 - i) M1 J13 Milton Keynes J6a Hemel Hempstead
 - ii) M25 J16 Uxbridge J7 Redhill
 - iii) M62 A1 J33 Pontefract J18 Whitefield
 - iv) M25 J23 Barnet J30 Dartford Crossing
 - v) M56/A5117 Chester (Wales border) J1 Gatley
- Extensive planned engineering works were carried out on all five routes, which may explain the increase in delay on these routes.
 Similarly, some of the other largest changes in delay for the 182 routedirections might be explained by the start and end of roadworks.

Figure 3.3 Change in total delay in the slowest 10% of journeys for each of the 91 two-way routes, between the baseline year⁵ and May 2006 – April 2007.



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⁵ Baseline period is August 2004 – July 2005 (later for 7 routes, due to data quality issues).

Average vehicle delay on all journeys compared with the slowest 10% of journeys

- The slowest 10% of journeys accounted for nearly a third of the total delays experienced on all journeys in the Strategic Road Network during the latest year.
- The contribution of the slowest 10% of journeys to total delay on all journeys is higher during less congested periods (for example, it is 45 per cent at weekends, compared with 30 per cent for weekdays).
- Average vehicle delay was greater in the morning peak than the evening peak in the baseline and latest years for all journeys, but for the slowest 10% of journeys in the latest year delay was greatest in the evening peak.

Between the baseline year and the latest year (May 2006 - April 2007):

- Average vehicle delay increased across all day types and time periods both for all journeys and for the slowest 10% of journeys, with greater percentage increases for all journeys, but smaller absolute increases. For example, average delay during the week across all time periods increased by 13 per cent for all journeys compared with an increase of 9 per cent for the slowest 10% of journeys.
- The greatest increase in average vehicle delay occurred during the weekday evening peak period, both for all journeys across the network and the slowest 10% of journeys (15 per cent and 13 per cent respectively).
- The weekday morning peak has shown the smallest increase in average vehicle delay for all journeys and the slowest 10% of journeys (9 per cent and 6 per cent respectively).

Table 3.1 Average Vehicle delay by time of day: baseline year and latest year

minutes per 10 vehicle miles / per cent Weekdays Week Weekends All periods AM peak Off peak PM peak All periods All periods Period (7am to 10am) (10am to 4pm) (4pm to 7pm) (6am to 8pm) (6am to 8pm) (6am to 8pm) **ALL Journeys** Baseline¹ 1.16 1.74 1.19 1.57 1.37 0.50 (August 04 to July 05) Latest Period 1.54 0.57 1.31 1.90 1.32 1.81 (May 06 to April 07) Percentage Change 12.9 8.9 11.2 15.3 12.8 13.1 10% slowest Journeys 4.78 3.78 4.93 3.94 4.22 2.38 (August 04 to July 05) Latest Period 4.11 5.24 4.23 5.40 4.60 2.56 (May 06 to April 07) Percentage Change 12.9 9.0 8.7 6.2 7.3 7.7

¹ The baseline period has been calculated over a different period for 7 of the 91 routes

Traffic Speeds

Traffic speeds reported in this section are representative of all types of traffic conditions. This differs from the vehicle speeds in section 2 which are recorded only in free-flowing conditions.

Traffic speeds over time, by road type and time period

- Overall, average traffic speeds on motorways and all purpose trunk roads fell between 1995 and 2003, particularly in the peak periods. Compared with 1995, average speeds in 2003 were 2.5 mph lower during the morning peak, 3.2 mph lower during the evening peak and 0.2 mph lower during the off-peak period.
- The greatest reduction in speed was seen during the evening peak period on motorways where the average speed fell from 64.5 mph in 1995 to 57.9 mph in 2003, a reduction of 10 per cent.
- Between 1995 and 1998 speeds fell for all types of trunk road, for each time period. This trend broadly reversed between 1998 and 2003, with average speeds higher in 2003 than in 1998. However in 2003, motorway and trunk road speeds were close to the 1995 levels for only the off-peak period.
- The highest average traffic speeds in each year were observed on motorways, with single carriageway A-roads having the lowest average speeds.
- For each type of trunk road, average traffic speeds were lower during the peak periods than for the off-peak periods. Differences in speeds between peak and off-peak periods were greatest for motorways and smallest for single carriageway A-roads.

Table 3.2 Traffic speeds on the SRN by road type and time of day: 1995 – 2003

					miles per hour
Road Type	Time Period	1995	1998	2001	2003
Motorways	AM peak	59.7	52.3	55.0	55.7
	Off-peak	64.2	62.6	60.8	63.6
	PM peak	64.5	56.2	59.7	57.9
A roads - dual carriageways	AM peak	50.0	44.8	47.7	48.8
	Off-peak	53.2	50.7	52.3	53.7
	PM peak	50.5	47.5	48.3	50.0
A roads - single carriageways	AM peak	39.2	36.0	37.6	38.4
	Off-peak	39.7	38.8	37.9	39.0
	PM peak	39.2	37.4	38.4	38.0
A roads - all	AM peak	45.7	41.3	43.7	44.7
	Off-peak	47.3	45.5	46.0	47.3
	PM peak	45.8	43.3	44.3	45.0
All trunk roads	AM peak	52.7	46.8	49.4	50.2
	Off-peak	55.4	53.6	53.3	55.2
	PM peak	54.5	49.7	51.8	51.3

Note: These estimated average speeds relate to only parts of network covered in all four surveys

4. Congestion and Traffic Speeds in English Urban Areas

2006 Survey Key findings

- In 2006, average traffic speeds across the major road network of large urban areas were 20.1 mph during the peak periods and 23.9 mph during off-peak periods.
- Unavoidable changes in the road network make direct comparisons between years impossible, but it is possible to compare those stretches of road that have remained unchanged between years. Like-for-like peak speeds across all areas in 2006 were virtually unchanged from 2004. Average off-peak speeds fell from 25.2 mph in 2004 to 24.1 mph in 2006, a fall of 4 per cent.

Introduction

Between May and November 2006, the Department for Transport ran the sixth in a series of traffic speed surveys for urban areas in England; the first was conducted in 1993. The survey covered major roads in the 18 large towns, cities and conurbations in England with populations greater than 250 thousand (excluding London). The key results are based on data collected on weekdays, outside school holidays.

In recent years, the Department has been developing sources of probe vehicle journey time data based on in-vehicle Global Positioning Systems (GPS). This probe vehicle dataset offers an alternative way to estimate speeds in urban areas.

This chapter reports on the results of the urban area speed survey. It also reports the first results of an exercise to reconcile the results of the speed survey with the new probe vehicle journey time data in a selection of urban areas.

More details on the methodology of the speed survey, the factors affecting average speeds, information on statistical precision and information on the probe vehicle data can be found in the technical annex to this chapter, available at http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadstraffic/speedscongestion/

The 2006 urban area speed survey

Average traffic speeds

The composition of surveyed networks varies widely between areas. These differences have a major effect on observed traffic speeds. Therefore, **comparisons between areas should be made with caution**. More details of the factors influencing average speeds can be found in the technical annex.

Table 4.1 shows average traffic speeds observed in each area, during peak and off-peak periods. Average traffic speeds across the entire surveyed urban road network in 2006 were 20.1 mph during the peak periods and 23.9 mph during the intervening off-peak periods.

Table 4.1 - Average traffic speeds by urban area, 2006

				mph
	Peak		Off-p	eak
_		Excluding		Excluding
	All roads	motorways	All roads	motorways
West Midlands	19.3	17.3	22.5	21.0
Greater Manchester	19.2	15.3	26.5	19.6
Leeds / Bradford	20.4	18.1	24.4	21.5
Tyneside	22.3	22.3	27.1	27.8
Merseyside	20.3	17.5	22.4	18.8
Sheffield	17.9	-	21.0	-
Bristol	16.1	14.9	19.3	17.9
Nottingham	17.0	-	21.6	-
Leicester	14.9	-	17.8	-
Stoke / Newcastle-under-Lyme	22.2	_	20.6	-
Teeside	33.9	_	33.5	-
Hull	19.8	_	21.1	-
Bournemouth / Poole	19.3	-	22.2	-
Brighton / Hove	27.5	-	26.8	-
Plymouth	21.1	-	24.0	-
Southampton	16.8	16.1	22.2	21.1
Blackpool	18.9	-	18.3	-
Portsmouth	28.9	19.8	30.2	21.6
All areas	20.1	18.4	23.9	21.5

Note "-" indicates no motorways surveyed in the urban area in question Information on the statistical accuracy of these estimates can be found in the technical annex

- Of the 18 areas surveyed, Teeside had the highest average speeds in both the peak and off-peak periods. This is probably due in part to the high proportion of dual carriageways in Teeside, which make up almost half of the surveyed network. Average speeds in Teeside have been high in all previous surveys.
- Average peak speeds were lowest in Leicester, Bristol, Nottingham and Southampton. Off-peak speeds were also low in Leicester and Bristol, with Blackpool also having relatively low average off-peak speeds.
- Peak period traffic speeds were generally slower than off-peak speeds; on average peak speeds were 3.8 mph slower than off-peak speeds. The

differences between peak and off peak speeds were greatest in Greater Manchester, Tyneside and Southampton. In Stoke / Newcastle-under-Lyme, peak speeds were slightly faster than off-peak speeds.

- Table 4.1 also shows average speeds excluding motorways in areas that contain motorway links. Traffic speeds are high on motorways, so areas where there are motorways in the surveyed network tend to have higher average speeds than they would have otherwise had. Motorways had most influence on average speeds in Portsmouth, where 21 per cent of the surveyed network is motorway.
- For more detail, Table 4.2 below shows the breakdown of the surveyed network by road class and urban area.

Table 4.2 - Distribution of surveyed network by road class and urban area, 2006

	percentage / miles							
	Percentage							
	'A' roads							
		Dual	Single	'B' and	All roads			
	Motorways	carriageway	carriageway	minor roads	(miles)			
West Midlands	10	32	56	2	762			
Greater Manchester	15	12	58	15	1,079			
Leeds / Bradford	10	24	49	17	403			
Tyneside	1	39	53	8	316			
Merseyside	13	38	37	11	309			
Sheffield	0	36	56	8	123			
Bristol	5	23	60	13	168			
Nottingham	0	24	47	29	217			
Leicester	0	43	56	1	106			
Stoke / Newcastle- under-Lyme	0	25	57	17	172			
Teeside	0	49	40	11	160			
Hull	0	29	20	50	113			
Bournemouth / Poole	0	27	<i>4</i> 5	28	130			
Brighton / Hove	0	40	56	4	83			
Plymouth	0	47	17	36	73			
Southampton	4	14	79	2	80			
Blackpool	0	20	47	33	71			
Portsmouth	21	20	38	22	80			
All areas	8	27	52	14	4,446			

Comparison of average traffic speeds on a like-for-like basis, 1999/2000 to 2006

Comparisons of average speeds over time are done on a like-for-like basis; only links that were surveyed in each survey year are included. This is to ensure consistency and to concentrate on real changes in speeds, rather than external influences, such as changes in network composition. Table 4.3 shows average traffic speeds for peak and off-peak periods, between 1999/2000, 2002 and 2004.

Table 4.3 - Comparison of average traffic speeds by urban area, like-for-like¹, 1999/00² – 2006

								mph
	Peak			Off-peak				
	1999/00 2	2002	2004	2006	1999/00 ²	2002	2004	2006
West Midlands	20.9	21.1	20.5	18.9	26.9	27.3	28.4	21.1 ³
Greater Manchester	22.5	23.2	21.0	18.5	33.7	35.7	37.9	35.2
Leeds / Bradford	20.5	20.1	20.4	20.8	26.3	29.1	27.6	27.0
Tyneside	26.8	27.8	24.7	25.5	31.8	34.0	31.0	28.9
Merseyside	20.5	23.7	19.8	18.7	22.3	23.7	23.5	21.1
Sheffield	17.0	18.8	18.6	19.0	19.4	21.2	20.9	19.8
Bristol	24.0	23.2	19.0	20.2	22.5	21.0	22.2	20.5
Nottingham	17.9	15.9	16.4	16.5	23.3	22.0	20.8	20.8
Leicester	17.1	15.6	14.7	15.8	20.3	19.6	19.4	18.9
Stoke / Newcastle-								
under-Lyme	23.0	24.3	16.0	17.8	26.4	25.9	17.2	20.7
Teeside	32.9	36.2	33.1	35.9	37.3	37.4	37.2	36.9
Hull	19.2	18.8	20.0	21.5	23.2	22.4	22.0	21.3
Bournemouth / Poole	20.0	21.0	19.4	19.6	25.6	25.2	23.4	21.9
Brighton / Hove	27.1	27.0	29.6	29.7	28.6	26.4	27.3	27.4
Plymouth	21.8	23.3	22.0	20.3	27.0	25.0	20.7	21.7
Southampton	15.8	16.7	19.5	17.7	22.6	19.9	23.1	22.6
Blackpool	19.6	18.8	19.4	19.7	19.8	18.6	19.7	18.3
Portsmouth	26.7 4	25.8 ⁴	27.5	28.5	35.5 ⁴	29.8 4	32.0	29.7
All areas	21.8	22.1	21.0	20.9	26.3	25.8	25.2	24.1

^{1.} Only links that were surveyed in all years are included in the analysis. Therefore figures for 2006 differ from those presented in Table 4.1.

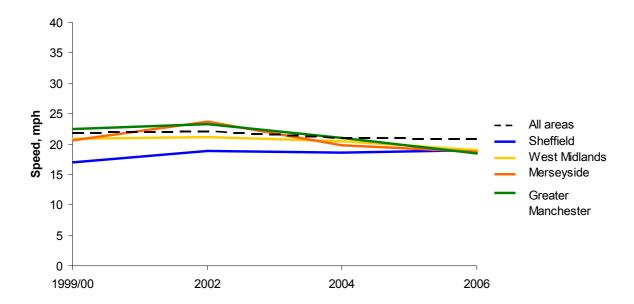
- Average peak speeds across all areas in 2006 were virtually unchanged from 2004. Average off-peak speeds across all areas fell from 25.2 mph in 2004 to 24.1 mph in 2006, a fall of 4 per cent.
- The single largest change between 2004 and 2006 is the fall in off-peak speeds in the West Midlands, from 28.4 mph to 21.1 mph, a decrease of 26 per cent. The fall is caused by a single survey run covering the Sandwell stretches of the M5 and M6, which was much slower in 2006 than in previous years. If this route were excluded from the West Midlands like-for-like comparison, average speeds would be virtually unchanged between 2004 and 2006.

Figures 4.1 and 4.2 below show trends in average peak speeds in urban areas where the longer-term changes are sufficiently large that we can be confident they reflect real changes in average speeds in the area.

^{2.} The 1999/00 speed survey took place between November 1999 and May 2000. Portsmouth and Blackpool were surveyed in 2001.

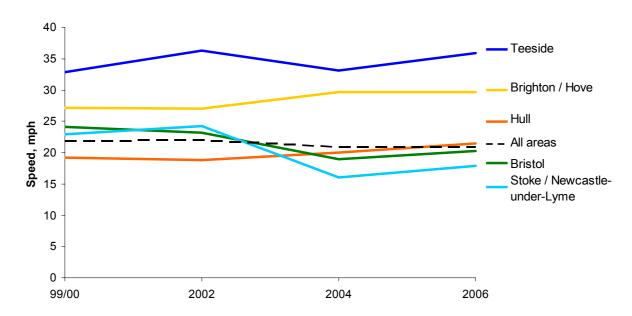
See text below for an explanation of the large change in the West Midlands off peak figure.
 Issues with the flow weights in Portsmouth prior to 2004 mean these earlier years should be used with caution. The effect on the "all areas" figure is negligible.

Figure 4.1 - Average peak speeds in selected large urban areas, 1999/2000 - 2006



 Average speeds during the morning and evening peak fell in Merseyside, Greater Manchester and West Midlands, in line with the national trend of falling average speeds. In contrast, average speeds in Sheffield at peak times have increased since 1999/2000.

Figure 4.2 - Average peak speeds in selected medium urban areas, 1999/2000 - 2006



Average speeds during peak periods fell in Stoke / Newcastle-Under-Lyme by 5.2 mph between 1999/2000 and 2006, the largest fall in any urban area. Teeside saw the largest increase in average speeds of any urban area; peak speeds in Teeside are now 3.0 mph faster than they were in 1999/2000. Brighton / Hove and Hull also saw increases in average speeds.

The distribution of traffic speeds

Figure 4.3 shows the percentage of time spent travelling at different speeds, across all urban areas covered by the speed survey. The data in the graph below are not weighted by traffic flow; all roads surveyed contribute equally.

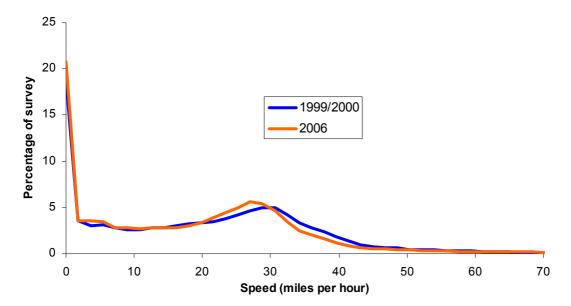


Figure 4.3 - Distribution of time spent at different speeds, peak periods, 1999/2000 and 2006

- In 2006, approximately a fifth of time spent driving at peak times was spent not moving at all, and over a third of time spent driving was below 10 mph.
- Beyond these low speeds, the distribution of speeds built to a small peak at 27 mph. In 2006, about a quarter of time was spent driving at 30 mph or above.
- The chart above also shows the effect of the fall in average speeds since 1999/2000 on the overall distribution of speeds. Slightly more time is spent moving at very slow speeds in 2006 than in 1999/2000, and the small peak that occurred at 27 mph occurs at a slightly higher speed in 1999/2000.

Comparing the speed survey to probe vehicle data

This section of the report compares data from the 2006 urban areas speed survey to journey time data obtained from probe vehicles equipped with GPS devices. It summarises how the probe vehicle data are derived, what the theoretical differences are between the two sources, and reports the initial results of work to reconcile them.

Probe vehicle data

Since February 2004, the Department has been receiving anonymised data from around 40,000 vehicles equipped with GPS satellite navigation and traffic advice systems. These are referred to as "probe vehicles". The data take the form of a series of reported locations for each vehicle, typically every 1-2 minutes.

These data are then processed to work out the routes that the probes followed. From this, we can work out the speed that the vehicles were travelling at each stage. These are then aggregated into average speeds for individual stretches of road. This process is explained in more detail in the technical annex.

Much more information about vehicle speeds and journey times can be obtained from probe vehicles than from a limited speed survey because the number of probes is so large and the basic information about their locations is collected continuously. In contrast, speed survey data are collected from one or more vehicle runs per section of road and time period, taking place over part of the year only. However, since we do not control where probes go, we cannot ensure that particular stretches of road are covered by them.

Theoretical differences between the speed survey and probe data

As described above, the probe vehicle data are collected in a quite different way to the Department's speed surveys. As a result, the properties of the two data sources are potentially quite different. Differences include:

- The probe vehicle fleet is made up of cars, vans and heavy goods vehicles.
 However, the mix is not representative of all traffic, as the proportion of cars in
 the current sample is much lower than in the population as a whole. The speed
 survey data are collected by cars which aim to be "typical" of all traffic.
- Floating car speed surveys seek to maintain their position in the flow of traffic.
 They therefore measure the median speed of traffic while the probe data
 measure the mean speed. In congested conditions when the majority of traffic is
 moving slowly, probe vehicles tend to travel at faster speeds than the speed
 survey, because the mean is higher than the median.
- Floating car surveys are constrained by the speed limit whereas journey time data probe vehicles can exceed the speed limit. This again would make speeds from the probe data faster than the speed survey.

 The speed survey is carried out on predefined routes, with limited turning movements. In contrast, the probe vehicle data include all vehicles traversing a given stretch of road. This will include vehicles travelling at slower speeds as they turn on or off the road. This would tend to make probe data speeds slower than the speed survey.

Method

We considered two urban areas which had 2004 and 2006 probe vehicle data in detail: Birmingham and Wolverhampton. These are both part of the wider West Midlands urban area in the speed survey bulletin. We also considered four other urban areas for which we currently only have 2004 probe vehicle data: Bristol, Leeds, Leicester and Nottingham. We compared data for these areas with information from the 2004 speed survey.

Unless otherwise stated, we derived matching probe data for each speed survey link (a particular stretch of road between two junctions), direction (inbound and outbound) and time of day (am peak, am off peak, pm off peak, and pm peak).

Comparison of areas of congestion

Figure 4.4 below shows relative differences in speeds at peak times from 2006 speed survey and probe vehicle data⁶ for individual speed survey links in Birmingham. Darker colours indicate slower links:

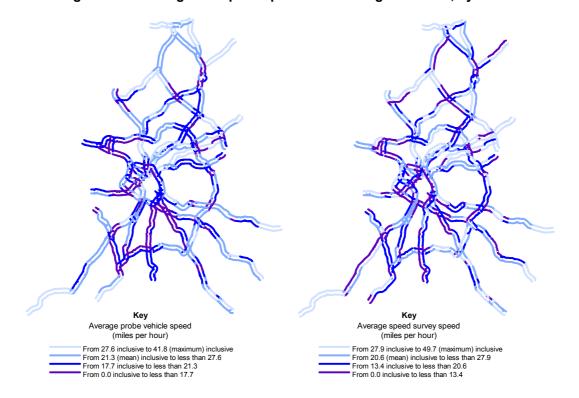


Figure 4.4 – Average 2006 peak speeds on Birmingham roads, by source

70

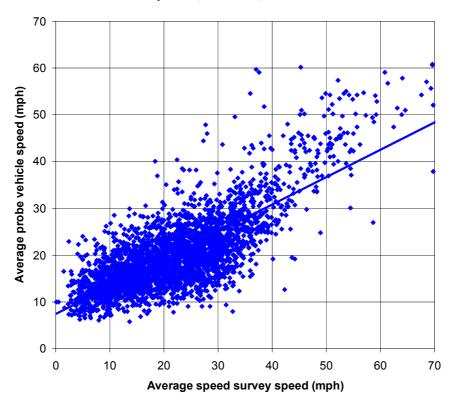
⁶ Note that the probe data here are from May, June and July 2006 on all days when speed surveys were taking place.

 The maps show that, while the absolute speeds given by the speed survey and probe vehicles vary, the two sources generally identify the same areas as having lower speeds.

Low-level comparison of speed survey and probe vehicle data

Figure 4.5 below plots 2004 speed survey speed against probe vehicle speed for matched links. This includes all areas in the comparison (Birmingham, Bristol, Leicester, Leeds, Nottingham and Wolverhampton).

Figure 4.5 – Comparison of Speed survey and probe vehicle data speeds, by link and time period, all areas, 2004



- The graph suggests that a relationship between probe vehicle data and speed survey data exists (R² for the line shown is 0.59). However, at low speeds below 20 mph the relationship seems to be different to that at high speeds. Probe vehicle data tend to give higher speeds than the speed survey at low speeds whilst speeds from the speed survey tend to be higher at high speeds.
- The overall pattern in figure 4.5 holds in individual urban areas as well as for the data in aggregate, although the exact nature of the relationship varies in each. As an example, figure 4.6 shows speed survey speed against probe vehicle speed for matched links in Birmingham and Wolverhampton in 2004, and figure 4.7 shows information for the same areas in 2006. In these cases, R² is lower, with similar values in 2004 and 2006 (0.42 and 0.43 respectively).

Figure 4.6 – Comparison of Birmingham/Wolverhampton speed survey and probe vehicle data speeds, by link and time period, 2004

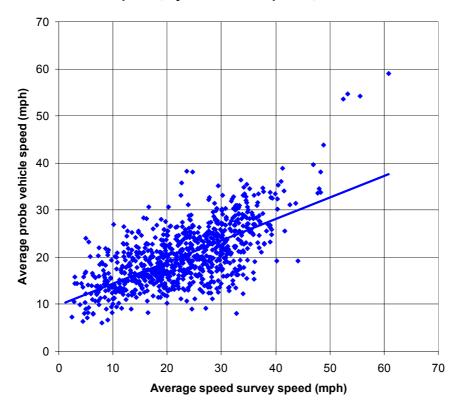
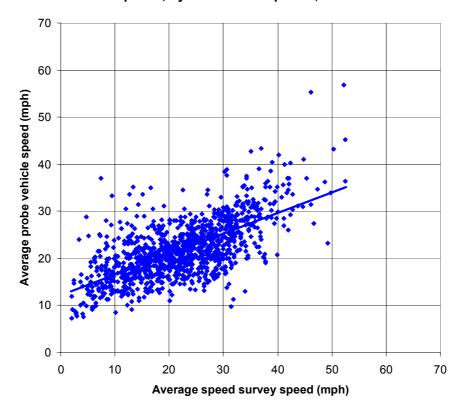


Figure 4.7 – Comparison of Birmingham/Wolverhampton speed survey and probe vehicle data speeds, by link and time period, 2006



Comparison of speed survey and probe vehicle data changes over time

One of the key uses of the Department's estimates of speed is to monitor changes in congestion over time. Figure 4.8 below shows, by link and time of day in Birmingham and Wolverhampton, what the speed survey speeds were in 2004 and 2006.

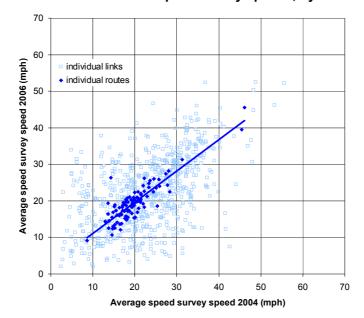


Figure 4.8 - Comparison of 2006 and 2004 speed survey speeds, by link/route and time period

 Figure 4.8 shows that the relationship between 2004 and 2006 speed survey speeds is not very strong. This reflects the fact that the speed survey is not designed to give robust comparisons at link level. The relationship between route-level speeds in 2004 and 2006 (shown in dark blue) is much stronger.

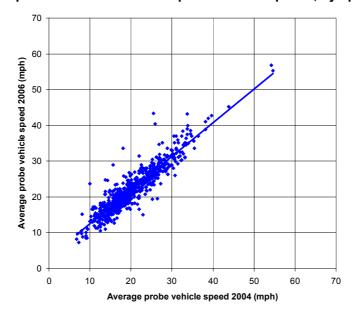


Figure 4.9 - Comparison of 2006 and 2004 probe vehicle speeds, by speed survey link

• Figure 4.9 shows the equivalent graph for probe vehicles. It shows a strong link level relationship between 2004 and 2006 data. This suggests that comparisons of the probe vehicle data over time are less prone to random fluctuations.

Initial conclusions and further work

Journey time data from probe vehicles give different speeds to those from the speed survey. This is expected, as the two sources are different and have different properties. However, the two data sources are clearly related, and at an aggregate level give similar information on the nature of congestion in urban areas.

The Department's study into the differences between data from the speed survey and probe vehicle data is continuing, and a more detailed report on the differences between the two sources will be produced in due course.

Glossary

VEHICLE TYPES

Two-wheeled motor vehicles: Includes motorcycles with sidecars, scooters and mopeds.

Cars and taxis: Includes estate cars, light vans with windows to the rear of the driver's seat, passenger vehicles with 9 or fewer seats, three-wheeled cars, motorised invalid carriages and 4WD 'sports utility vehicles'. Cars towing caravans or trailers are counted as one vehicle.

Larger buses and coaches: Public service vehicles and works buses which have a gross vehicle weight greater than 3,500 kgs.

Light vans: Goods vehicles up to 3,500 kgs. gross vehicle weight. Includes all carbased vans and those of the next larger carrying capacity such as transit vans. Also included are ambulances, pickups, milk floats and pedestrian controlled motor vehicles. Most of this group are delivery vans of one type or another.

Goods vehicles: Goods vehicles over 3,500 kgs gross vehicle weight. Includes tractors (without trailers), road rollers, box vans and similar large vans. A two axle motor tractive unit without trailer is also included.

ROAD CLASSES

Major roads: Include motorways and A roads. These roads usually have high traffic flows and are often the main arteries to major destinations.

Motorways: Major roads often used for long distance travel. They are usually three or more lanes in each direction and generally have the maximum speed limit of 70mph.

A Roads: These are often described as 'main' roads and tend to have heavy traffic flows though not as high as motorways.

Trunk roads: Most motorways and many of the long distance rural A roads are trunk roads. The responsibility for their maintenance lies with the Secretary of State and they are managed by the Highways Agency in England, the National Assembly of Wales in Wales and the Scottish Executive in Scotland (National Through Routes). Other major roads are maintained by local authorities. They are mainly A roads (though the local authorities do have responsibility for some motorways) and tend to be in urban areas. These are sometimes referred to as principal roads.

Minor roads: These are B roads, C roads and unclassified roads and are all maintained by the local authorities

Urban roads: Major and minor roads within an urban area with a population of 10,000 or more. The definition is based on the 1991 ODPM (DTLR) definition of Urban Settlements. The urban areas used for this bulletin are based on 2001 Census data.

Rural roads: All other roads, i.e. those outside areas with a population of 10,000 or more.

Built-up roads: Have a speed limit of 40 mph or less (irrespective of whether there are buildings or not). This definition was originally introduced to identify roads in built-up

areas. However, there has been an increase in the adoption of speed limits of 40mph or less in rural areas in recent years. As a result, the new classification of roads as urban or rural (see above) has been adopted for traffic estimates from 1993.

Non built-up roads: All roads with a speed limit of 40mph or more. As explained above, this classification has now been replaced by the distinction between urban and rural roads.

MEASURES OF TRAFFIC

Annual Average Daily Flow (AADF): The average over a full year of the number of vehicles passing a point in the road network each day.

Vehicle kilometre: One vehicle times one kilometre travelled (vehicle kilometres are calculated by multiplying the AADF by the corresponding length of road). For example, 1 vehicle travelling 1 kilometre a day for a year would be 365 vehicle kilometres. This is sometimes known as the volume of traffic.

Rounding of figures

In tables and charts where numbers have been subject to rounding, there may be an apparent slight discrepancy between the sum of the constituent items and the total as shown.

MEASURES OF ROAD WEAR

Standard Axle: A vehicle axle with a load of 8.16 tonnes.

Equivalence Factor: The pavement damaging effect of an axle in relation to the damage created by a *standard axle*. The equivalence factor for a vehicle is the sum of the equivalence factors for each of it's axles. The equivalence factor for each axle can be calculated using the formula:

 $EF = (axle load in tonnes/8.16)^{4.5}$

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Transport Statistics Users Group

The Transport Statistics Users Group (TSUG) was set up in 1985 as a result of an initiative by the Statistics Users Council and the Chartered Institute of Transport (now known as The Institute of Logistics and Transport). From its inception it has had strong links with the Department for Transport. The aims of the Group are:

- to identify problems in the collection, provision, use and understanding of transport statistics, and to discuss solutions with the responsible authorities;
- to provide a forum for the exchange of views and information between users and providers of transport statistics;
- to encourage the proper use of statistics through publicity and education.

The Group holds regular seminars on topical subjects connected with the provision and/or use of transport statistics. Recent seminars have included:

- The International Passenger Survey (IPS) and its use by Government and travel sector
- Transport Survey Quality
- Urban Transport Bench Marking
- Maritime Statistics: seafarers and port statistics
- Rail Safety
- Cycling statistics

A newsletter is sent to all members about four times a year. Corporate membership of the Group is £50, personal membership £22.50, and student membership £10. For further details please contact:

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The TSUG has contributed to the production of the *Transport Yearbook 2006*. This contains information on sources from governmental and non-governmental organisations, including some European sources. One copy is supplied free to TSUG members. Non-members can purchase a copy from The Stationery Office.

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