

An introduction to the Department for Transport's congestion statistics

This brief introduction to the Department's congestion statistics contains useful information in relation to the following areas:

1. Definition of congestion
2. Effects of increased congestion
3. Measuring the effects of congestion
4. Publication arrangements
5. Uses of statistics
6. Users' experiences of the statistics
7. Further information

1. Definition of congestion

- 1.1 Traffic congestion is an inherently difficult concept to define as it has both *physical* and *relative* dimensions.
- 1.2 At its simplest, it can be explained in *physical* terms as the way in which vehicles interact to impede each others' progress. These interactions and their influence on individual journeys usually increase as demand for the available road space approaches capacity or when capacity itself is reduced through road works or closures for example. In addition, one-off events such as bad weather or road traffic accidents can also have a significant bearing on congestion.
- 1.3 However, this purely *physical* definition ignores the fact that congestion can mean very different things to different people. For example, a person living in a rural area might regard an unusually long queue of traffic experienced on their daily commute as severe congestion, while someone living in an urban area might experience much longer hold-ups on a daily basis and regard the same length queue as being almost totally uncongested. In *relative* terms, congestion can therefore also be defined in terms of the difference between users' expectations of the road network and how it actually performs.

2. Effects of increased congestion

- 2.1 Regardless of whether it is defined *physically* or *relatively*, the effects of *increased* congestion are typically characterised by:
 - Slower speeds
 - Longer journey times
 - Increased queuing at junctions or bottlenecks
 - Increased stopping and starting
 - More time spent stationary
 - Less predictable journey times

- 2.2 As a result of these effects, congestion also has both economic and environmental impacts.
- 2.3 Although increased demand for the road network can often be driven by economic growth, the presence of congestion can also hold back further growth as more time is spent travelling at the expense of other productive activities. In addition, the inability to accurately predict journey times due to congestion can result in wasted time as individuals either arrive late for appointments or arrive early by allowing too much time for their journey.
- 2.4 Environmentally, increased congestion can lead to increased pollution and carbon emissions as vehicles spend more time stationary or at very low speeds where engine efficiency is lower. In addition, greater levels of congestion can result in increased wear and tear to vehicles due to the high frequency of braking and acceleration that often occur in slow moving traffic.

3. Measuring the effects of congestion

- 3.1 The Department currently monitors the effects of congestion through the use of two sets of statistics.

Average morning peak speeds

- 3.2 This measure estimates the average speed achieved by vehicles during the weekday morning peak, 7am to 10am. Any weekdays falling during school holiday periods or on bank holidays are also excluded so that the measure reflects conditions when demand for the network is highest.
- 3.3 The data underpinning the measure are based on in-vehicle Global Positioning Systems (GPS) equipped in a fleet of probe vehicles, and also draw upon the Department's traffic estimates so that busy roads receive a greater weighting in the measure than quiet roads.
- 3.4 The statistics are currently only available for those 'A' roads in England that are managed by local authorities. These local 'A' roads account for around nine per cent of all roads in England, but carry around a third of all traffic
- 3.5 Being a measure of average speed during one of the busiest time periods, these statistics allows users to assess the general trends in the level of *physical* congestion on these roads over time. Reductions in the speeds reported suggest that average congestion levels have increased over the period while increases in speeds suggest general congestion levels have fallen.
- 3.6 Users should, however, exercise caution when assessing the statistics over short periods of time when temporary factors such as road works or bad weather may have influenced the speeds reported. This is

particularly important when interpreting the data for relatively small areas where a small change on one or two roads can have a large effect on the overall average speeds reported.

- 3.7 In addition, users should not take a direct comparison of the average speeds reported for different local authorities or regions as a measure of the relative levels of congestion within these areas. Physical differences in the types of roads in these areas and their speed limits will also have a large bearing on driving speeds.

Journey time reliability

- 3.8 This measure estimates how reliable individual road users' journeys are by comparing the current journey times experienced on the network with historic averages for each stretch of road.
- 3.9 These historic journey times are also referenced to each type and time of day so a journey that takes place between 9:00am and 9:15am on a normal working Monday, for example, will be compared to all journeys that took place between 9:00am and 9:15am on working Mondays over the previous year.
- 3.10 The measure is expressed in terms of the percentage of 'journeys' that are 'on time', with:
- A 'journey' representing travel between adjacent junctions on the network
 - An 'on time journey' being one that is completed within a set reference time, based on the historic data for that stretch of road
- 3.11 The data underpinning the measure are based on a combination of sources, including Automatic Number Plate Recognition (ANPR) cameras, in-vehicle GPS and inductive loops built into the road surface.
- 3.12 The statistics are currently only available for motorways and 'A' roads managed by the Highways Agency, known as the strategic road network. These strategically important roads account for around two per cent of all roads in England, but carry around a third of all traffic.
- 3.13 As a measure that is based on comparing current network performance to road users' previous experiences, these statistics are very useful in monitoring the *relative* aspects of congestion. However, they do not directly measure whether congestion, in a *physical* sense, has improved or deteriorated over time.
- 3.14 For example, journeys on a particular stretch of road could be very slow moving at certain times of the day with lots of congestion evident. However, if the effects of this congestion were fairly predictable and journey times were always of, or around, a similar value, these journeys may be considered to be reliable. Similarly, journeys on another stretch of road could be fairly fast moving on average but equally may be

considered unreliable if conditions vary wildly from day to day, with some journeys experiencing very little congestion while others are affected severely.

- 3.15 It is also important to note that, due to the variety of different data sources used to generate these statistics, only aggregated reliability data for the complete network are currently presented in the statistics. The reliability data below this level (for individual routes or between individual junctions) are influenced by source bias and are currently not sufficiently robust for publication as official statistics. A programme of work is currently underway to address these issues.

4. Publication arrangements

- 4.1 The two measures outlined above are published within separate statistical releases.
- 4.2 The first, *Congestion on Local Authority Managed 'A' Roads*, contains the latest estimates of weekday morning peak speeds on these roads. It is published on a quarterly basis in February, May, August and November each year. The statistics released in the first three of these quarters are marked as provisional as the most up to date traffic flow data are not available at that point. The statistics released in November use the most up to date information and are therefore marked as final.
- 4.3 The second, *Reliability of Journeys on Highways Agency's Motorway and 'A' Road Network*, reports the latest estimates of journey time reliability on these strategically important roads. It is updated on a monthly basis with provisional reliability estimates for the network which are then finalised within the following monthly release. This allows time for further checks to be carried out on the raw data sources underpinning the measure. Provisional estimates are unlikely to change when they are finalised the following month. If any changes are required these are most likely to relate to a small section of road and result in a small change of the order of 0.1 percentage points.
- 4.4 More detailed statistics from each release are also published in the tables described overleaf:

Tables published alongside *Congestion on Local Authority Managed 'A' Roads* (congestion) and *Reliability of Journeys on Highways Agency's Motorway and 'A' Road Network* (reliability)

Statistical release	Table name	Update frequency	Table reference
Reliability	Percent of journeys on Highways Agency motorways and A roads deemed on-time: monthly from April 2010	Monthly	CGN0104
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads: England, monthly from 2006/07	Quarterly	CGN0205
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads: by local authority in England, quarters ending from November 06	Quarterly	CGN0206
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads: by region in England, quarters ending from November 06	Quarterly	CGN0903
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads: by local authority in England, annually from 2006/7	Annual	CGN0201
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads: by region in England, annually from 2006/7	Annual	CGN0901
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on Transport for London (TfL) managed 'A' roads: quarters ending from November 06	Annual	CGN0208
Congestion	Average vehicle speeds (flow-weighted) during the weekday morning peak on Transport for London (TfL) managed 'A' roads: annually from 2006/7	Annual	CGN0207
Congestion	Average vehicle speeds (un-weighted) during the weekday morning peak on locally managed 'A' roads: by local authority in England, annually from 2006/7	Annual	CGN0203
Congestion	Average vehicle speeds (un-weighted) during the weekday morning peak on locally managed 'A' roads: by region in England, annually from 2006/7	Annual	CGN0902

Notes:

1. Quarterly updates occur in February, May, August and November
2. Annual updates occur in November

5. Uses of statistics

- 5.1 The statistics about congestion on locally managed 'A' roads are mainly used by local authorities to monitor average peak-time speeds on the roads under their control. Some local authorities use the statistics more widely, for example to help monitor the performance of bus services or to identify congestion 'hotspots'. The statistics also provide useful evidence for national policy makers about the overall level of congestion on the local 'A' road network and where any particular issues lie.
- 5.2 The reliability statistics are used predominantly by the Highways Agency and policy makers within the Department in assessing the overall level of reliability on the Strategic Road Network. While not currently suitable for official statistics release, the detailed reliability data for individual stretches of road are also used operationally by the Highways Agency. The overall aggregated reliability statistic is one of a number of indicators in the Department's [2012-2015 Business Plan](#). These indicators are intended to help the public assess the effects of our policies and reforms on the cost and impact of public services.
- 5.3 Further to this, both the reliability and congestion statistics are also useful to academic researchers, the media and the general public in providing an objective view as to the current levels of congestion on the network – both nationally and in specific local authorities. The raw journey time data underpinning the reliability statistics are also published on a monthly basis on data.gov.uk for academic research and other related purposes.

6. Users' experiences of the statistics

- 6.1 The Department engages with users of congestion statistics in a number of ways. These include:
- Attending, and occasionally presenting at, user groups such as the [Transport Statistics User Group](#) (TSUG) and the [Transport Statistics sub-group of the Central and Local Information Partnership](#) (CLIP-TS).
 - Sending regular updates to, and seeking views from, local government users of the statistics
 - Regular discussions as to requirements with policy colleagues in the Department and the Highways Agency
 - Including a continuous request for feedback section within each release of congestion statistics (via congestion.stats@dft.gsi.gov.uk)
 - Undertaking and recording detailed discussions with previously unknown users of the statistics when they contact the Department with queries or to request data

- 6.2 Over recent years, the Department has made a number of changes to the congestion statistics in response to feedback received from users. These include:
- Introducing quarterly updates of the local congestion statistics from February 2011
 - Producing average speed statistics for local roads on both a 'miles per hour' and 'minutes per mile' basis from February 2011
 - Providing local authorities with the underpinning code, queries and lookup tables to enable them to recreate the published statistics from May 2011
 - Providing links to the national traffic and road condition statistics within the congestion statistics releases from May 2011
 - Publishing a separate analysis of speeds on roads managed by Transport for London (TfL) from November 2011
- 6.3 In addition, the Department is currently exploring the following areas in response to user feedback:
- Whether a complementary set of statistics could be developed to monitor the delays experienced on the local 'A' road network
 - Whether the current statistics for local roads could be expanded to cover additional time periods, such as the evening 'peak'
 - Whether detailed congestion hot-spot maps could be published for each local authority

7. Further information

- 7.1 Further information on the Department's congestion statistics, including the statistics themselves and related technical documents, are available at: <http://www.dft.gov.uk/statistics/series/congestion-and-reliability/>
- 7.2 Alternatively, if you wish to contact a member of the congestion statistics team directly, please email us at congestion.stats@dft.gsi.gov.uk