Department for Transport

Travel time measures for the Strategic Road Network, England: October to December 2015*

This release presents statistics using new travel time measures for the Strategic Road Network (motorways and 'A' roads managed by Highways England[1]). This series was first published in December 2015. It contains statistics on average speed and on average delay. The release also incorporates statistics on the reliability of travel times on the Strategic Road Network using a new measure called the Planning Time Index. This replaces the previous 'On Time' Reliability Measure, for which we published statistics up to March 2015.

Key statistics

For individual months:

- The **average speed on the Strategic Road Network (SRN)** is estimated to be **58.9mph in October** and **57.9mph in November**.
- The **average delay on the SRN** in England was **9.4 seconds per vehicle per mile in October** and **10.2 seconds per vehicle per mile in November**.
- For the **reliability of travel times on the SRN** in England, **71% and 77% of additional time was needed on average on individual road sections to ensure on time arrival in October and November respectively**.

Statistics for December 2015 have not been published in this release. Because of changes in the way the underlying data are captured, processing protocols are still bedding down. As a result, there has not been sufficient time to fully quality assure the underlying data. It is our intention to publish the statistics for December as soon as they have been fully quality assured.

Context

This new suite of measures was developed as part of the Road Investment Strategy (RIS). The RIS sets out a long-term programme for England's Strategic Road Network, and the stable funding platform needed to plan ahead effectively.

In line with best practice, an introductory analysis of these new travel time measures was published in July 2015 to inform users and seek feedback. Statistics in this release are not directly comparable with those published in the analysis, however, due to changes in the way the underlying data is captured and processed.

To support the development of these statistics, we welcome any feedback that you have, particularly on the presentation and commentary of the new travel time measures in this release. Please contact us using the details at the bottom of this page for any feedback you have, or if you would like further information.

*incorporating reliability on Highways England roads

1 Highways England, a government-owned strategic highways company, came into being on 1st April 2015, following the transformation of the Highways Agency, previously an Executive Agency of the Department for Transport

Introduction

Highways England's network of motorway and 'A' roads accounts for around 2% of all roads in England, but carries around a third of all traffic.

The travel time measures calculated here are based on raw data from cars. These are estimated using in-vehicle Global Positioning Systems (GPS) and traffic flows estimated using automatic traffic counters.

In this publication

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Average speed on the SRN

DfT's congestion statistics

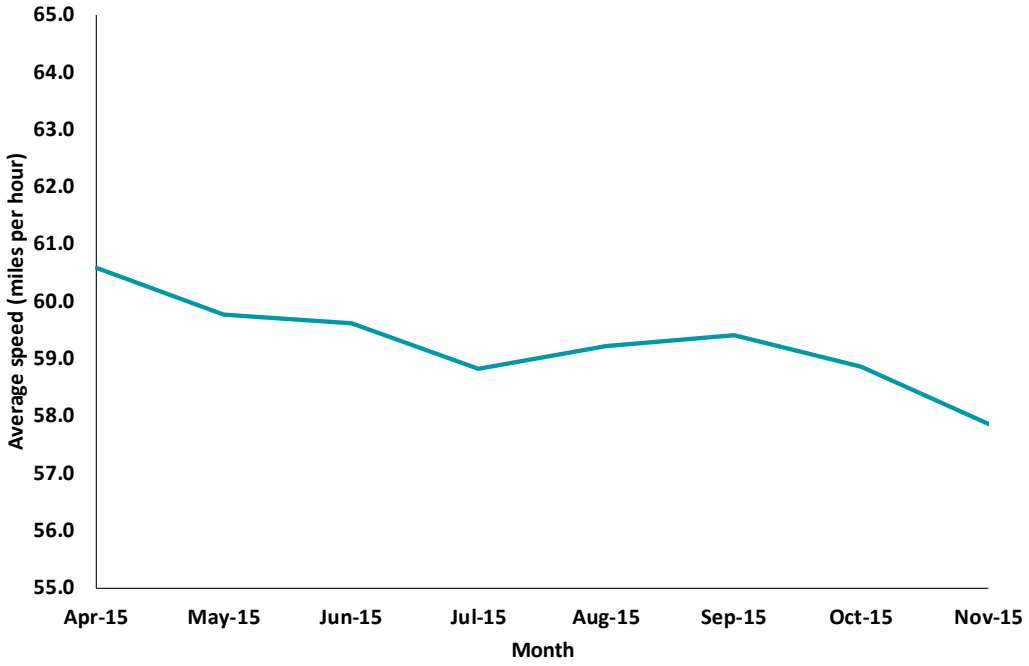
For further information, a concise introduction to the Department's road congestion and reliability statistics is available.

This measure reflects the average speed of cars on the Strategic Road Network across the full 24 hours of the day. The measure weights speed observations from a sample of vehicles by associated traffic flows so that it is representative of traffic volumes on the roads in different locations and at different times of day.

National overview of average speed

Looking at estimates of speed for individual months, average speed on the SRN in October was 58.9mph. In November the average speed on the SRN was 57.9mph.

Figure 1: Average car speed on the Strategic Road Network in England: monthly from April 2015 (Table CGN0401)



Note

The average speed and average delay values presented in this release are calculated across all 24 hours of the day and across the entire Strategic Road Network.

The reliability values presented in this release are calculated across daytime hours (6am to 8pm) and across the entire Strategic Road Network. Daytime hours is the period where network demand (and sample sizes) is at its highest.

As such, in all cases, it would not be appropriate to use these averages to represent 'typical' speeds, typical delays or typical reliability on any individual road section or time of day.

Initial analysis suggests that the monthly trend in average speed is similar to that observed in previous years (see July analysis paper) and, with this in mind, is likely to be as a result of seasonal effects (e.g. traffic levels or weather).

Figures presenting average speed on the network over 12 month rolling annual periods will be published from the period April 2015 to March 2016 onwards.

Average delay on the SRN

Free flow times

Free flow travel times, which apply to both the average delay and reliability measures, are currently calculated using the speed limit, for each individual road section.

Delay (or 'time lost') is calculated by subtracting derived 'free flow' travel times from observed travel times for individual road sections. Average delay is then evaluated by adjusting for vehicle numbers and road length, so that it is presented on a seconds per vehicle per mile basis. The national figure is calculated by aggregating delay estimates from individual road sections and weighting observations by associated traffic flows so that it is representative of traffic volumes on the roads (as for average speed). It is presented across all 24 hours of the day.

Average delay is commonly used as a measure of relative congestion. One advantage it has over the average speed measure is that it takes account of different free flow speeds (associated with different speed limits) allowing road sections to be compared more easily.

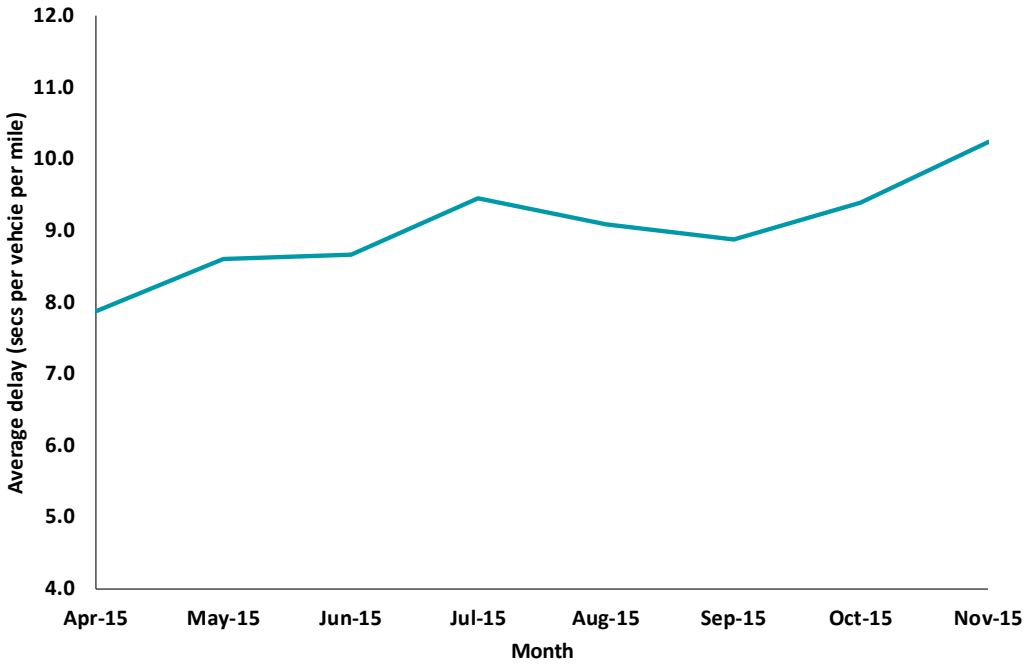
National overview of average delay

Looking at estimates of delay for individual months, there was an average delay of 9.4 seconds per vehicle per mile for the month of October on the SRN.The average delay for the month of November was 10.2 seconds per vehicle per mile.

Geographical network

These travel time measures are based on a new geographic representation of the Strategic Road Network, which was introduced at the start of April 2015.

Figure 2: Average delay on the Strategic Road Network in England: monthly from April 2015 (Table CGN0402)



Annual performance

Figures presenting average delay on the network over 12 month rolling annual periods will be published from the period April 2015 to March 2016 onwards.

Initial analysis suggests that the monthly trend in average delay is similar to that observed in previous years (see July analysis paper) and, with this in mind, is likely to be as a result of seasonal effects (e.g. traffic levels or weather).

Example

As an illustrative case, consider an individual road section with a PTI of 60%, for a given month. If the travel time for this section in free flow conditions is 10 minutes, 95% of users leaving 16 minutes to traverse that road section (during that month) would have arrived on time. Equivalently, users leaving 16 minutes to traverse the same road section, would have been on time 19 times out of 20 in the month.

Monthly trends

Initial analysis suggests that the monthly trend in reliability is similar to that observed in previous years (see July analysis paper) and, with this in mind, is likely to be as a result of seasonal effects (e.g. traffic levels or weather).

Annual performance

Figures presenting reliability of travel times on the network over 12 month rolling annual periods will be published from the period April 2015 to March 2016 onwards.

Reliability on the SRN

The measure of reliability presented in this paper is the Planning Time Index (PTI). The PTI tells us about the predictability of travel times during the daytime (6am-8pm), and aims to measure the additional time (compared to free flow conditions) that drivers need to leave on individual road sections (broadly defined as sections of road between adjacent junctions on the network) to ensure that they arrive on time. This measure is the ratio of the 95th percentile travel time to the free flow travel time. The PTI can also be presented as a percentage, as in the analysis below.

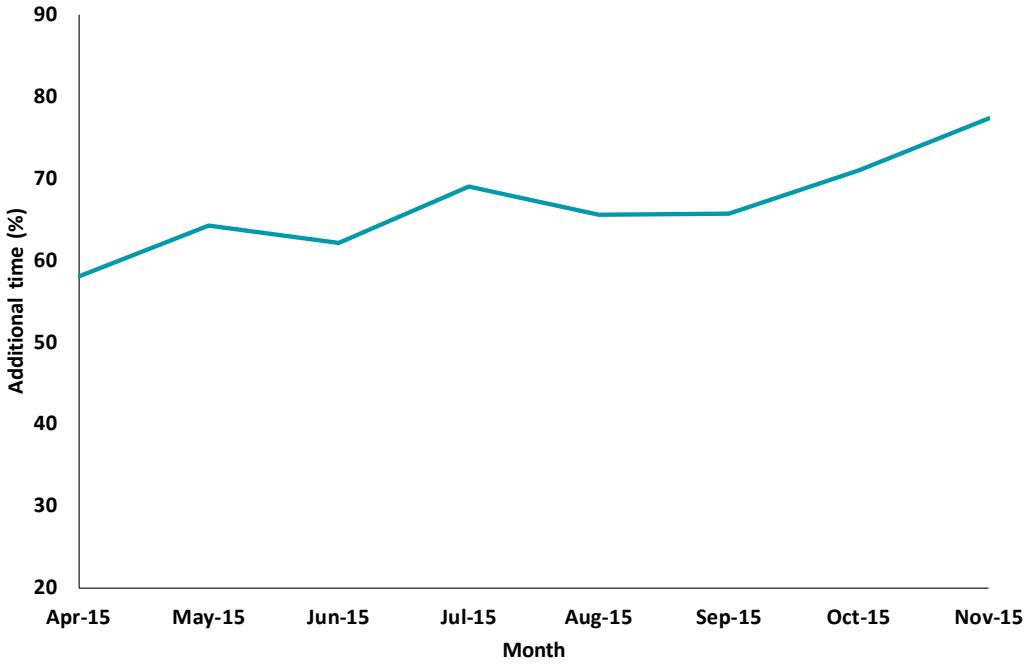
Reliability on the SRN as a whole is calculated by averaging the PTI across individual road sections, weighting by traffic flows for each section. It does not represent the reliability of complete journeys, across several road sections.

Reliability for the SRN as a whole

Looking at estimates of reliability for individual months, 71% of additional time needed to be left on individual road sections on average to ensure on time arrival in October for the SRN. In November, 77% of additional time needed to be left to ensure on time arrival.

It should be emphasised that the PTI compares observed travel times with free flow times, rather than with expected travel times. Therefore, if a user rarely experiences free flowing conditions on an individual road section during the daytime, a PTI of 60%, may reflect a fairly typical travel time to them.

Figure 3: Reliability of travel times on the Strategic Road Network in England: monthly from April 2015 (Table CGN0403)



Road Investment Strategy

The 'Road Investment Strategy' (RIS) sets out a long-term programme for England's Strategic Road Network, and the stable funding platform needed to plan ahead effectively. As part of the RIS, the Performance Specification sets out what Government wants from Highways England over the course of the first Road Period 2015/16 to 2019/20.

The Performance Specification includes a number of performance measures, supported by performance indicators. The three travel time measures presented in this release are all performance indicators identified in the Performance Specification, or in the case of Average speed, identified and developed by Highways England. Each measure is defined in the Operational Metrics Manual.

Performance Indicators for the first Road Period (April 2015-March 2020)

As set out in the Performance Specification, Encouraging Economic Growth and Supporting the Smooth Flow of Traffic are two of the eight key areas of performance that the Department for Transport has asked Highways England to focus on during the first Road Period.

Average delay is the Key Performance Indicator for Encouraging Economic Growth.

Average speed and reliability are two of the Performance Indicators for Supporting the Smooth Flow of Traffic.

Methodology and technical detail

1. Users should exercise some caution when interpreting the statistics in this release, particularly when looking over short periods of time. Travel times (and the measures in this release) are likely to be affected by a range of factors such as traffic levels, weather, roadworks, or changes to speed limits.

2. The underlying datasets used to produce the analysis in this paper are similar to those used for the 'On Time' Reliability Measure (OTRM), the previous (reliability) statistics that DfT published for the SRN. The data are based on travel times estimated using Global Positioning Systems (GPS) and traffic flows using estimated using Highways England automatic traffic counters.

3. All measures in this release use travel times from car observations only. This greatly reduces the risk that observed changes in any of the travel time measures are due to changes in the vehicle mix of the sample. Up to 50,000 cars each month are used to calculate the measures. This is less than the number used for the previous OTRM statistics (where cars, vans and HGVs were used). All measures are weighted by associated expected traffic flows to ensure that they represent traffic volumes on the roads in different locations and at different times of day.

4. All measures use real, observed travel time data with a good temporal match where available. For the Average speed and Average delay measures, where no data of this quality are available for a particular section of road and time period, travel times are imputed using corresponding monthly day-time and night-time averages for individual road sections. For all measures, where there is insufficient data for individual road sections, national day-time and night-time averages, for each road type ('A' road single carriageway, 'A' road dual carriageway and motorway) are used. Imputation figures, across the SRN as a whole for speed and delay, can be found here.

Request for feedback

We are keen to receive feedback from users of transport statistics. If you have any comments about how the statistics in this release are presented or analysed, please contact us using the details listed on the front page of this release.

In particular, we are keen to hear any feedback you have on the presentation of sub-national statistics for these travel time measures. Is there anything in particular you would like us to publish? And how would you like it to be published? Please contact us using the details listed on the front page of this release.

5. The new travel time measures published from April 2015 show higher imputation levels than those recorded for the previous OTRM measure. This is due to a combination of factors, including the use of cars only, the change in geographical representation of the SRN, and a reduction in the sample size of cars from August 2015.

6. For the Average delay and Reliability measures, free flow travel times are currently evaluated using speed limits for individual road sections. Once sufficient data is available, it is our intention to evaluate 85th percentile speeds of car observations, 'capped' to the road section speed limits, as the definition for free flow. This is consistent with the approach used in 'Analysis of Travel Times on the SRN', published by DfT in July 2015.

7. The Department for Transport publishes a separate statistics series on free flow vehicle speeds on Great Britain's roads. That series focusses more on the speeds at which drivers choose to travel and their compliance with speed limits. Free flow speeds presented in that series are calculated in a different way and using a different data source to the free flow speeds used for the statistics in this release.

Next update

Statistics for December 2015 will be published as soon as they have been fully quality assured. Tables CGN0401, CGN0402 and CGN0403 will each be updated at this point.

The next release in this series is expected to be published in May 2016. This will contain monthly data for the period January to March 2016, along with twelve month rolling averages for the period April 2015 to March 2016.