



Department  
for Transport

## Travel time measures for the Strategic Road Network, England: January to March 2016



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### 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 times used to calculate the measures in this release are estimated using in-vehicle Global Positioning Systems (GPS) observations from a sample of fleet cars.

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This release presents statistics using new travel time measures for the [Strategic Road Network](#) (motorways and 'A' roads managed by Highways England<sup>1</sup>). It contains statistics on average speed, average delay and reliability. This statistical series was first published in December 2015, and included monthly figures from April 2015 onwards. This release presents the first 'annual' figures in this series, for the period April 2015 to March 2016.

### Key statistics

For the year ending March 2016 (i.e. the period from April 2015 to March 2016):

- The **average speed on the Strategic Road Network (SRN)** is estimated to be **59.3mph**.
- The **average delay on the SRN** was **8.9 seconds per vehicle per mile compared to free flow**.
- For the **reliability of travel times on the SRN**, **66% of additional time was needed compared to free flow**, on average, on individual road sections to ensure on time arrival.

### 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.

Prior to this new suite of measures, statistics on the reliability of journeys on Highways England roads were published up to March 2015. Reliability was calculated using the ['On Time' Reliability Measure](#), a different measure of reliability to the new Planning Time Index.

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 with any feedback you have, or if you would like further information.

<sup>1</sup> 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

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## DfT's congestion statistics



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

### 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.

## Average speed on the SRN

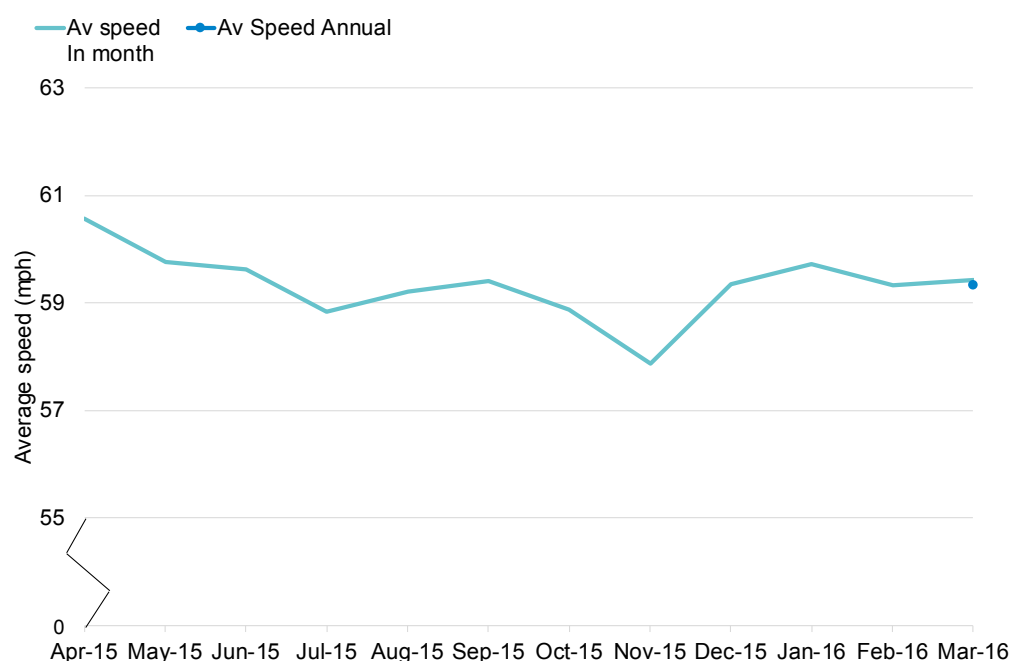
This measure reflects the average speed of cars on the Strategic Road Network across the full 24 hours of the day. The measure weights speed observations from a sample of vehicles by associated traffic flows so that it is representative of traffic volumes on the roads in different locations and at different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

### National overview of average speed

For **the year ending March 2016**, the **average speed on the SRN** is estimated to be **59.3mph**. This is the first annual figure in this series.

Looking at estimates of speed for individual months, the average speed on the SRN in January was 59.7mph. In February the average speed was 59.3mph and in March the average speed was 59.4mph.

**Figure 1: Average speed on the Strategic Road Network** (Table [CGN0401](#))



Initial analysis suggests that the monthly trend in average speed is similar to that observed in previous years (see '[Analysis of Travel Times on the SRN](#)', published in July 2015) and, with this in mind, is likely to be largely a result of seasonal effects (e.g. traffic levels or weather).

## What is average delay?

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 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 and on a seconds per vehicle per mile basis.

## Free flow times

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

## Average delay on the SRN

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.

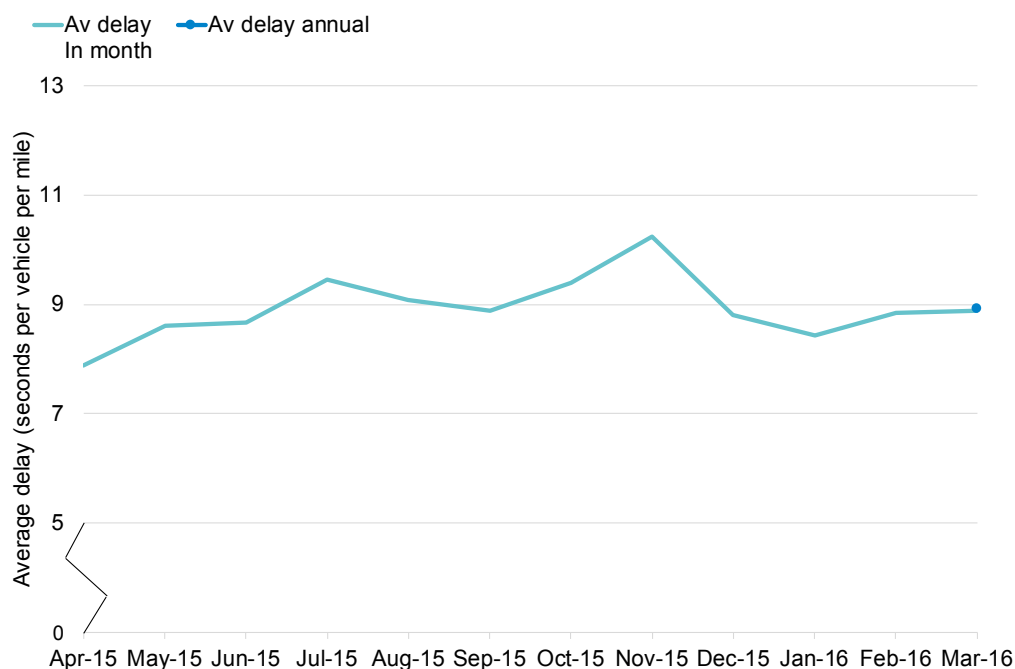
It is important to note that road users often do not expect to encounter free flow conditions (particularly during peak times) and consciously build in additional time for their journey based on their own experience. As a result, drivers may perceive delay relative to their expected (or average) journey time rather than free flow conditions.

## National overview of average delay

For the year ending March 2016, the average delay on the SRN was **8.9 seconds per vehicle per mile (spvpm)** compared to free flow. This is the first annual figure in this series.

Looking at estimates of delay for individual months, the average delay on the SRN in January was 8.4spvpm compared to free flow. In February the average delay compared to free flow was 8.8spvpm, and in March it was 8.9spvpm.

**Figure 2: Average delay compared to free flow on the Strategic Road Network** (Table [CGN0402](#))



Initial analysis suggests that the monthly trend in average delay is similar to that observed in previous years (see analysis paper, July 2015) 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 analysis paper, July 2015) and, with this in mind, is likely to be as a result of seasonal effects (e.g. traffic levels or weather).

## 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. The PTI does not represent the reliability of start to end journeys, across several road sections.

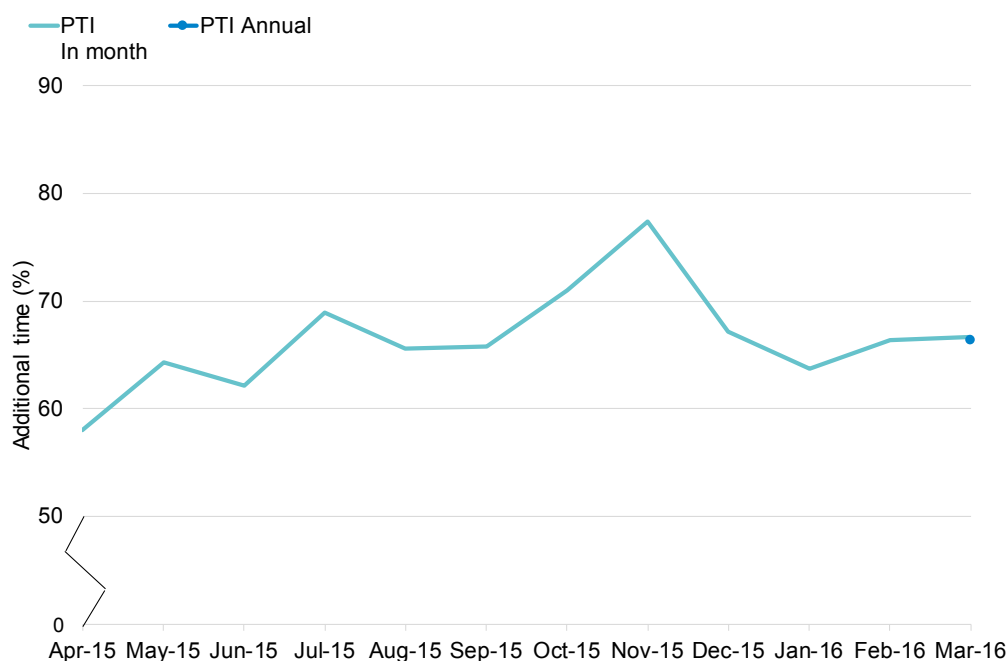
### Reliability for the SRN as a whole

For the **year ending March 2016**, **66% of additional time needed to be left compared to free flow**, on average, on individual road sections of the SRN to ensure on time arrival.

Looking at estimates of reliability for individual months, 64% of additional time needed to be left on individual road sections of the SRN on average to ensure on time arrival in January. In February, 66% of additional time was needed, and in March, 67% of additional time was needed.

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, 60% additional time compared to free flow on that road section, for example, may reflect a typical travel time to them.

**Figure 3: Additional time needed compared to free flow to ensure on time arrival on the Strategic Road Network** (Table [CGN0403](#))



## Background information

### 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](#).

### Single Departmental Plan

In February 2016, the Department for Transport published its [Single Departmental Plan](#). This document set out the main priorities and commitments of the Department from 2015 to 2020. The main objectives identified by the Department for the period include Boosting Economic Growth and Opportunity; Building a One-Nation Britain; Improving journeys; and Safe, Secure and Sustainable Transport.

Average delay on the Strategic Road Network is one of the performance indicators for the "Improving Journeys" objective.

### 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. To introduce the new travel time measures in this release, '[Analysis of Travel Times on the SRN](#)' 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.
3. 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.

### 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.



## 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.

## National Statistics



National Statistics are produced to high professional standards set out in the National Statistics [Code of Practice](#). They undergo regular quality assurance reviews to ensure they meet customer needs.

Details of ministers and officials who receive pre-release access to these statistics up to 24 hours before release can be found [here](#).

4. 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.

5. 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. 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 for these measures. For the reliability measure, national daytime (6am-8pm) averages, by road type, are used to impute individual road sections with fewer than 100 car observations, during the daytime, in the month. Imputation figures, across the SRN as a whole, can be found [here](#).

6. The average speed and average delay 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.

7. For the Average delay and Reliability measures, free flow travel times are currently set to the 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.

8. The Department for Transport publishes a separate statistics series on [free flow vehicle speeds](#) on roads in Great Britain. 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

The next release in this series is expected to be published in August 2016. This will contain monthly figures, and twelve month rolling annual figures, for the period April to June 2016.