# Free Flow Vehicle Speeds Estimates

## Methodology Note

The Department for Transport publishes estimates of free flow vehicle speeds in Great Britain on an annual basis. The estimates are published approximately six months following the end of the reference year. These estimates are designated National Statistics.

### Data collection

Free flow vehicle speeds are based on data collected from a national network of around 180 Automatic Traffic Counters (ATCs). ATC sites count traffic continuously as well as recording the physical properties of passing vehicles (which are used to classify traffic by vehicle type), and also the speed at which the vehicles travel.

To produce estimates on the speeds of vehicles in free flow conditions, data are only used from ATC sites at locations which experience traffic that is typically not restricted in anyway. External factors which might restrict driver behaviour, such as junctions, hills, sharp bends and speed enforcement cameras, are not present at these sites. Therefore free flow speeds estimates are based on traffic speed data collected from a sample of 96 Automatic Traffic Counters (ATCs) from the national network of around 180 ATCs.

At each site, the actual speed of each vehicle is captured which provides data for the number of vehicles travelling at each different speed. The observations from each ATC site are grouped together, resulting in a total number of vehicles for every different speed across Great Britain.

Therefore, at the end of the year, we have the total number of vehicles travelling at each different speed, for each of the following different vehicle types:

- Motorcycles
- Cars
- Cars towing
- Light goods vehicles
- Buses and coaches
- 2 axle rigid HGVs
- 3 axle rigid HGVs
- 4 or more axle rigid HGVs
- 3 or 4 axle articulated HGVs
- 5 or more axle articulated HGVs

Free flow speeds are published by the above ten different vehicle types. For cars, where the number of observations in the sample is much higher than other vehicle types, we also record and publish the speeds of vehicles at every hour of the day.

The aggregated observations are used to produce estimates by five different road types:

- Motorways
- Non-urban dual carriageways
- Non-urban single carriageways
- Roads with a speed limit of 40 mph
- Roads with a speed limit of 30 mph

## Calculation of the estimates

The average speed for each vehicle type is calculated by weighting the speeds travelled by the number of vehicles observed. Similarly, we can calculate the percentage of vehicles exceeding the speed limit using data which is weighted by the number of observations. This is done by summing the number of observed vehicles as speed increases, and calculating the proportion of vehicles exceeding the speed limit.

To calculate the number of cars exceeding the speed limit at each hour of the day we take the number of cars observed exceeding the speed limit in an hour, and then divide this by the total observed travelling in that hour. These, however, are not weighted by observations at each speed.

## Sample Size

The automatic traffic counters are selected so they match the criteria that traffic measured is free flowing; this means our sample size is reduced. The number of individual vehicles observed in the production of the 2010 free flow statistics was 755,169,050 vehicles.

Due to the geographical distribution of the ATC sites, the data cannot be localised. We can produce estimates for Great Britain but do not know the average speeds vehicles choose to travel in regions or local authorities. We do not know the speeds of vehicles on specific roads as the data comes from a sample of suitable roads.

## Heavy Goods Vehicles

We produce the speeds of rigid HGVs with 2 axles, 3 axles and 4 axles, and for articulated HGVs with 3 or 4 axles, and 5 or more axles. In tables SPE0103 and SPE0104 we present the average speed of all articulated HGVs on non-built-up roads and all rigid HGVs on built-up roads, these are weighted averages.

For example, the number of 3 or 4 axle articulated HGVs and the number of 5 or more axle articulated HGVs are multiplied by their respective average speeds. These are then added together, and the total divided by the total number of articulated HGVs (so, 3 or 4 axle and 5 or more axles combined) to get the average speed of articulated HGVs. The same is done for rigid HGVs.

## Corrections

In table SPE0103 in the section on motorways the percentage of buses and coaches exceeding the speed limit in the years 2007, 2008 and 2009 were incorrect at the time of each year's publication; this was due to a computer error. The figures for all years are correct in the 2010 publication onwards.