The 85th Percentile Speed

Definition and Use

The 85th percentile speed is a widely used traffic statistical metric. It provides an accurate estimation of traffic conditions and helps identify poor road design and unfitting speed limits.

The 85th percentile speed is the pace adopted by reasonable people, according to each road environment. We assume that most drivers are prudent while trying to reach their destination as fast as possible.

Also called the "operating speed", this parameter can be seen as the maximal safe speed for travelling at a certain location. However, it should not be confused with the speed limits indicated by road signs.

Many traffic engineering literature and textbooks (eg AS1742.4) define the 85th percentile speed as:

> "***The speed at or below which 85% of all vehicles are observed to travel under free-flowing conditions past a nominated point.***"

Free-flowing Conditions

A vehicle is considered to be operating under free-flowing conditions when the preceding vehicle has at least 4 seconds headway.

Question:

Do you always use a 4-second headway filter for your 85th percentiles?

If you answered "no", then your 85% speed values are probably incorrect or, at least, not complying with traffic analysis standards.

Congestion Effects

If a road experiences traffic congestion, then motorists are unable to travel at their desired operating speed. If these impeded vehicles are included in the 85th percentiles of a dataset, then its speed statistics won't reflect the road's true operating speed.

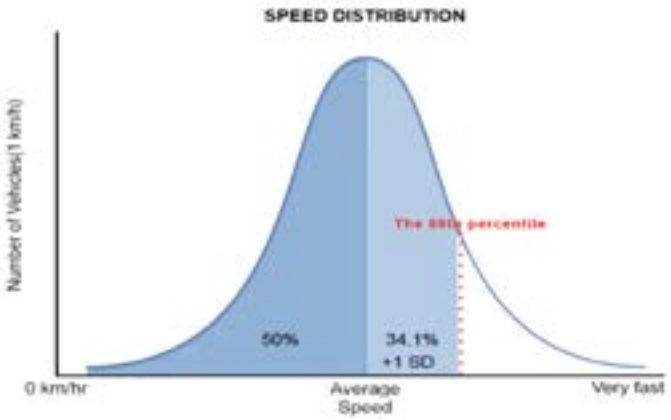
> ***Without using a headway filter and thus, including vehicles stuck in traffic into the analysis, the 85% speed values will be lower than in reality.***

Using a headway filter of at least 4 seconds will provide a much clearer picture of the real road environment and much greater insight into safety and amenity issues.

Determining the 85% speed value

The 85th percentile value is calculated starting with the assumption of normal distribution of travelling speeds. Half of the vehicles will have an operating speed below the average and 1 standard deviation of vehicles will travel at a higher, but still safe speed.

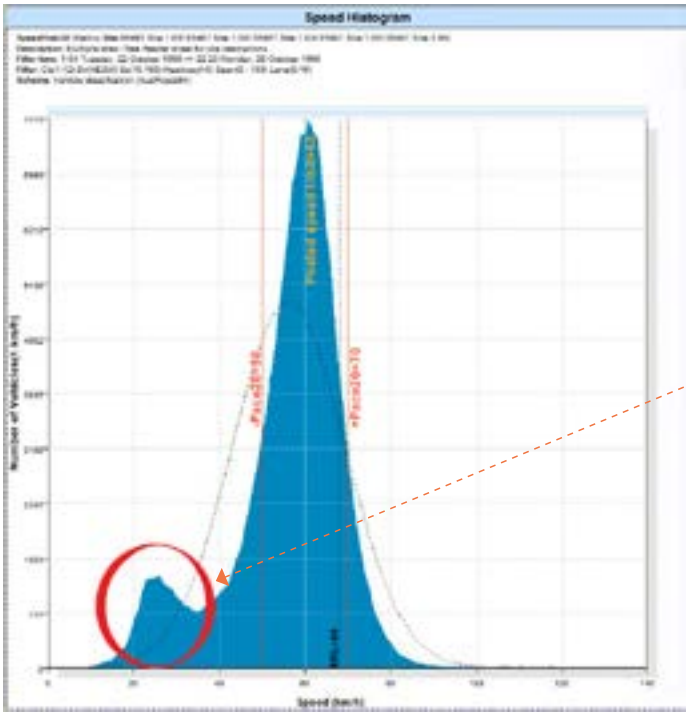
The operating speed will approximately be equal to 84.1% (50% + 34.1). To ease the calculation, the value was conventionally rounded to 85%.



MetroCount®

The 85th Percentile Speed in MTE®

To determine the operating speed of a road, we begin by creating a speed histogram of our data.



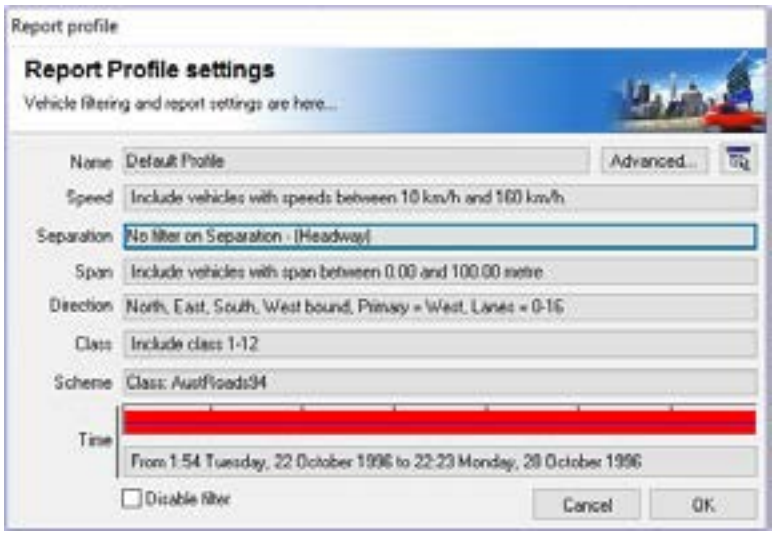
All Vehicles (no Headway filter)
Total vehicles: 7771
Posted speed limit: 60km/h
85% speed: 68km/h

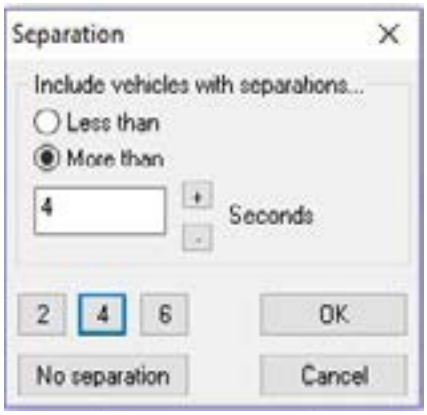
The speed limit at this location is 60 km/h and the 85th percentile value is 68 km/h. However, note the significant number of vehicles travelling at a speed below 30 km/h, indicating congestion!

Our Speed Histogram indicates congestion and thus, the 85th percentile value is lower than in reality. To determine the real operating speed, we'll have to apply a 4-seconds headway filter.

How to remove congestion in MTE

1. Right-click inside the Speed Histogram and select *Local Profile*
2. Select the *Separation* field and click *Advanced*
3. In the *Separation* window, change the seconds' value from 0 to 4
4. Click *OK*





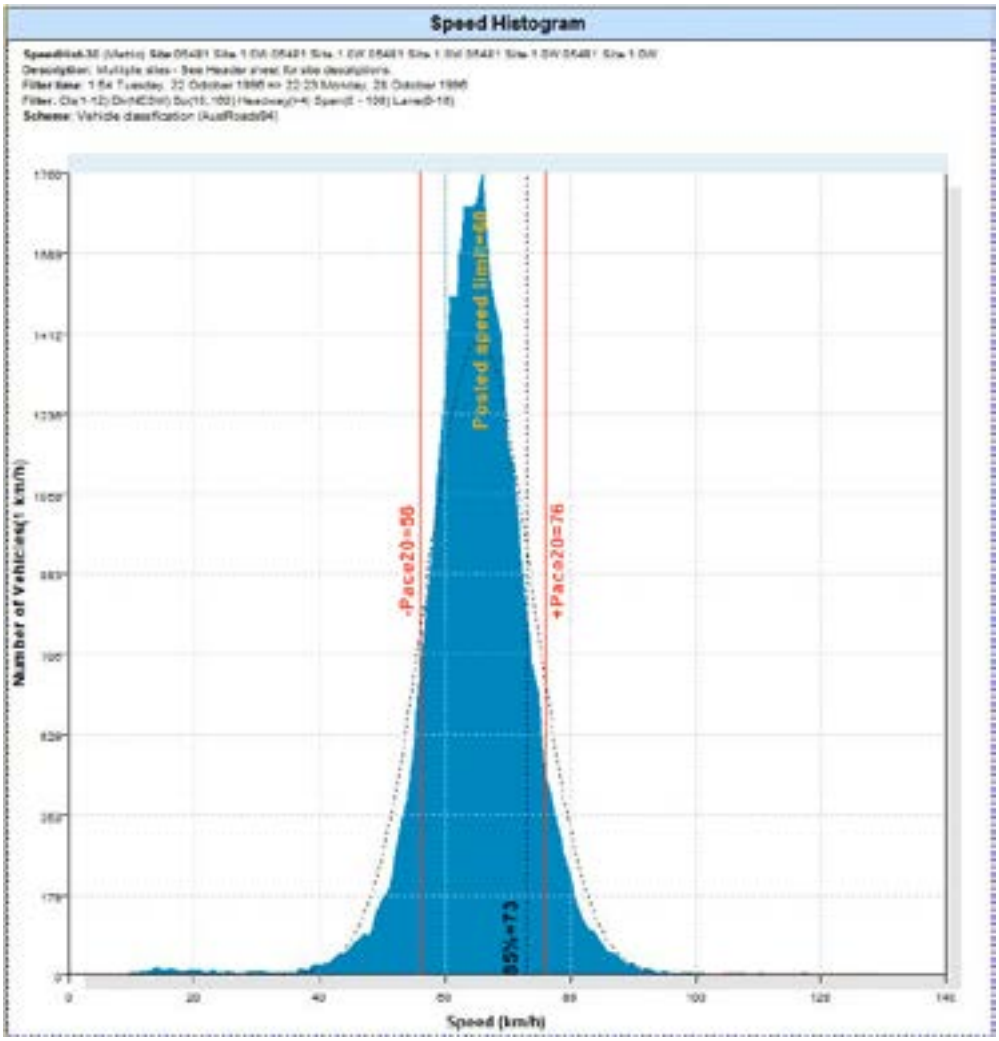
Australia
+61 8 9430 6164
sales@metrocount.com

United Kingdom
+44 208 782 8999
uksales@metrocount.com

United States
+1 301 497 6101
usasales@metrocount.com

Netherlands
+31 10 268 01 84
nlsales@metrocount.com

Applying a headway filter to the initial dataset will result in a standard free flowing 85th percentile speed histogram, indicating an accurate value of the operating speed.



Free Flowing Vehicles (Headway filter > 4s)

Total vehicles: 1776
Posted speed limit: 60km/h
85% speed: 73km/h

The MetroCount tube and piezo counters capture the speed of every vehicle. Thus, the 85th percentile speed value is always calculated for every vehicle.