

WLTP DHC subgroup	
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Title	Proposed methodology for assessing the suitability of existing in-use driving data through comparison with newly collected data
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Objective: assessment of existing in-use driving data on their suitability for the WLTP-DHC in-use driving data analysis

Introduction

The development of the harmonized driving cycle under WLTP-DHC is being carried out with a view to have a worldwide harmonized test procedure developed and put in place from 2014 onwards. For this purpose contracting parties of UNECE-GRPE are preparing campaigns for the collection of new in-use driving data in order to have the most updated information on real-world driving patterns for the design of the new WLTP.

This being the background, it would be worth to give some consideration also to the huge amount of already existing in-use driving data, and to make an assessment as to whether they could be taken into account for the data analysis that will be undertaken to develop the new worldwide harmonized test procedure. If existing in-use driving data are assessed to be suitable for that purpose, they could increase the statistical relevance of the data analysis exercise.

The suitability of existing in-use driving data should be assessed based on clear criteria and upon an agreed methodology. This paper provides information on how the EC considers such a methodology could be developed and used in Europe. The methodology would be based on a multiple-comparison phase followed by a statistical evaluation of the results.

A presentation showing a practical example of the proposed methodology complements this paper.

Methodology

1. *Definition of comparable vehicle samples* (per type, usage, region),

The starting point for this validity check is to find a sample in the existing data set to be compared to a sample of similar characteristics in the new data set. “Similar characteristics” means for example that the two data sets should refer to the same vehicle class (ex. Passenger cars), same city/region, same period of the year.

2. *Share of road categories (urban, rural, motorway)*

The first comparison step between existing and new data should be carried out, where possible, with reference to the share of road categories (driving time spent and distance driven). Differences in average time spent and average distance driven in each road category between existing and new data should not be automatically seen as an indication that the existing data would not be suitable for further analysis. This same concept applies to all the following five points on which the comparison is based. In other words the validity check should not be made on the basis of the result of a single comparison step but on the assessment of the **whole comparison exercise**.

3. *Vehicle speed distributions (urban, rural, motorway)*

Average vehicle speed is usually associated with the presence of speed limits and with traffic conditions, but other factors can have a strong influence on it, for example new traffic management measures (e.g. traffic light control programs, access control measures, etc.), new roads (including both new road layouts and/or better quality of roads), which might be present in the new in-use driving data collection, not in the existing data, etc.

4. *Short trip analysis (e.g. RPA versus Average Speed)*

Diagrams showing the distribution of the Relative Positive Acceleration (RPA) versus average speed of the compared samples from the existing and new in-use driving data sets, together with the comparisons referred to in points 5, 6 and 7, provide useful information and could indicate whether a real change of driving behavior can be observed between existing and new data, or if driving behaviors remains similar and thus the existing data can be used for further analysis in developing the drive cycle.

5. *Differences in driving behavior and their potential linkage to vehicle design, i.e. higher power to mass ratios (RPA versus Power-to mass ratio)*

The meaning and relevance of this comparison is well illustrated in the presentation accompanying this paper.

6. *Differences in the distributions of short trip durations (urban, rural, motorway)*

(see point 5)

7. *Differences in the distributions of stop durations for old and new data*

(see point 5)

Once these comparison steps have been carried out, the validity and suitability of the existing data should be assessed in the light of the following criteria.

- ***Share of road categories and vehicle speed distribution***

Considering the most common definition of road categories (urban, rural, motorway) the comparison between new and existing data should be made to see if and what kind of evolution has taken place. Differences in average speed and distance driven are usually associated with traffic variations, but they could also be due to an evolution of road infrastructure (e.g. new traffic management measures, traffic light control programs, access control measures, etc.). Thus the validity of existing in-use driving data cannot be ruled out only on the basis of this initial comparison.

- ***Short trip analysis (RPA, durations, stops) and evolution of driving behavior***

The existing in-use driving data may not always provide sufficient information to allow to make the distinction among road categories and their relative share.

For this reason the comparison between new and existing data should be mainly based on the analysis of:

- a) the statistical distribution of RPA versus average speed
- b) the changes in driving behavior
- c) differences in the distributions of short trip durations and stop durations.

These are the most important indicators of a real evolution of the new in-use data with respect to existing in-use driving data. In case of a statistically significant difference between the two data sets, the result of the comparison exercise would indicate that the existing in-use driving data considered may not be suitable for being used for further analysis (from a WLTP-DHC perspective).