



Using KPIs to assess speeding

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Introduction

Speed is a major factor in overall road safety performance. Excessive and inappropriate speed is accountable for about one third of fatal collisions and is an aggregative factor in most collisions (ETSC, 2019).

In addition to speed in absolute terms, differences in speed (or variation) also have an influence on crash rate. Speed differences result in more encounters among road users and also in more lane-changing and overtaking manoeuvres; both increase the risk of crashes (European Commission, 2021).

Research methodology

The EU road safety policy framework 2021-2030 includes a list of Key Performance Indicators (KPIs) to be connected to target outcomes. One of them is related to speed, namely the percentage of vehicles travelling within the speed limit (European Commission, 2020). The Trendline project focuses on data collection, data analysis, delivery of road safety KPIs and using these within road safety policies. Additional KPIs related to speeding are proposed to serve as complimentary indicators to the basic speed KPI proposed by the EC.

Additional speed KPIs were identified based on the international literature and after consultation with experts on the field. The minimum methodological requirements to qualify for the speed KPIs are set taking into account the minimal requirements set by the EC for KPI Speed in the Commission Staff Working Document SWD (2019) 283. The requirements are quantified and specified for each of the parameters involved.

Results

The suggested speed KPIs are:

1. the percentage of vehicles travelling within the speed limit (minimum requirement)
2. the speed below which 85% of drivers are driving (V85) (additionally requested)
3. the average speed (including standard error and standard deviation) (additionally requested)
4. the percentage of vehicles travelling 10km/h or 20km/h or 30km/h faster than the speed limit (alternative speeding indicator)



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5. speed variation expressed by the difference between the lowest and highest 10% of speeds per road type or area type or speed limit or vehicle type (alternative speeding indicator).

The minimum requirements set in the respective Trendline methodological guidelines for the calculation of the suggested speed KPIs are summarized as follows:

	Minimum requirement	Optional
Traffic conditions	<ul style="list-style-type: none"> • Free-flow traffic 	<ul style="list-style-type: none"> • Non-free flow traffic data
Location	<ul style="list-style-type: none"> • Random selection • Representative of entire national road network • Covering the whole geographical area of the country • Measurements should not take place near fixed or mobile speed cameras • A minimum traffic flow of at least 10 vehicles passing per hour is required • Locations where the speed limit was changed up to 6 months before the measurements or in between measurements and data analysis should be excluded 	<ul style="list-style-type: none"> • Stratification by Regions
Road type	<ul style="list-style-type: none"> • Motorways • Rural roads (defined as roads outside built-up areas, but no motorways) • Urban roads (defined as roads inside built-up areas) 	<ul style="list-style-type: none"> • Differentiate between single and dual lane roads for rural and urban roads • Differentiate between speed limits within rural and urban roads
Vehicle type	<ul style="list-style-type: none"> • Passenger cars 	<ul style="list-style-type: none"> • Motorcycles • Vans and light trucks • Heavy trucks • Buses
Time period	<ul style="list-style-type: none"> • Weekdays • Daylight hours • Spring/autumn 	<ul style="list-style-type: none"> • Weekend • Night-time hours
Weather	<ul style="list-style-type: none"> • Good conditions 	
Sample size	<ul style="list-style-type: none"> • Min 2000 observations • Min 500 observations / road type • Min 10 locations / road type • The proportion of observations at each of the three road types should be at min 20% 	



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The guidelines provide detailed information on the following requirements for representative speed measurements, analysis and delivery of results:

- Free flow traffic
- Adequate observation equipment: (Choice of measurement method; Requirements for the measuring equipment; Minimum requirements; Unobtrusiveness of the equipment; Out-of-road devices; In-road devices; Hand-held devices)
- Observation site selection (Location selection; Sampling of locations; Minimum sample size)
- Stratifications and subpopulations (Road types; Vehicle types; Time periods (time of day, day of the week, month); Region; Weather)
- Data analysis and results (Post stratification weights and statistical analysis; Expected results, data delivery and metadata)

Discussion and conclusions

The suggested speed KPIs include both traditional and novel options. When combined, they allow for a more profound understanding of the actual situation on the road in terms of speed. Thus, they can help better understand existing problems and select the most appropriate measures.

Costs of data collection may be considerable, therefore, existing sources of useful data should be fully exploited. Consequently, the requirements concerning the sample of field measurements should be adjusted accordingly.

References

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