



Road user behaviour on pedestrian crossings and intersections: How to transform it into the compliance KPIs?

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Road safety key performance indicators (KPIs) are indicators that provide information about factors that are associated with crash and injury risks. The current project Trendline brings together 25 EU Member States for data collection, data analysis, delivery of road safety KPIs and for using these within road safety policies. In addition to the ‘standard’ KPIs, which are recommended by the European Commission (e.g. speeding, seat belt use or drink driving), the consortium is developing and testing 10 ‘experimental’ KPIs, including road users’ compliance with traffic rules on unsignalized and signalized pedestrian crossings and intersections.

Compliance with traffic rules is frequently associated with enhanced traffic safety. This is why it makes sense to use compliance in the sense of an ‘intermediary objective’ or a KPI. Several studies have confirmed that the progress in safety has been fastest in countries that have prioritized compliance with key traffic safety rules.

Observational research focusing on road users’ behaviour has a long history. However, the traditional approach often employed in such studies, including manual observations, surveys or video recordings, may not entirely align with the objectives of KPIs in terms of coverage, technology and collected information, as outlined in Table 1.

Table 1. Overview of some differences between current studies and KPI requirements

Aspect	How it is commonly addressed	What is needed for KPIs
Coverage	Usually rather local focus (one or few locations), mostly on intersections in urban areas.	Wider coverage (urban/rural, intersections/segments) is necessary to enable generalizability on a regional or national level.
Technology	Video recording and video analysis are often used, including the calculation of quantitative risk metrics. However, it is never fully automated and requires quite expert skills. More cameras are needed for complete spatial coverage.	Human observers are preferred, allowing standardized data collection even by non-experts. Observers may adapt their location and perspective if necessary. However, their reliability needs to be assured.
Collected information	Video record allows repeated observation in the office and the collection of additional information. However, it may not enable seeing specific details. In addition, video recording needs to follow GDPR.	Human observers are capable to monitor and record details, such as eye contact between pedestrians and drivers. However, the amount of collected data (in real time) needs to be feasible.



Our objective is to transform the complex behaviour of pedestrians and drivers, specifically their compliance with traffic rules, into KPIs. Existing experience with compliance KPIs is rare, but issues with variations in time and space (i.e., reliability and comparability) were noted. Thus, it is a challenge to develop a methodology that is cost-effective and results in indicator values that are reliable and comparable within and between countries.

Following the literature review and considering the options summarized in Table 1, we concluded that the compliance KPIs should be based on data collected by human observers on ‘standardized’ locations free of confounding location-specific factors, considering both pedestrians and drivers/vehicles, distinguishing individual road users, as well as groups of pedestrians and focusing on peak hours, not only intersections but also the road segments.

Data collection includes four parts, as displayed in Fig. 1:

- unsignalized: pedestrian-vehicle interactions, driver compliance with priority rules,
- signalized: red-light compliance by both pedestrians and drivers.

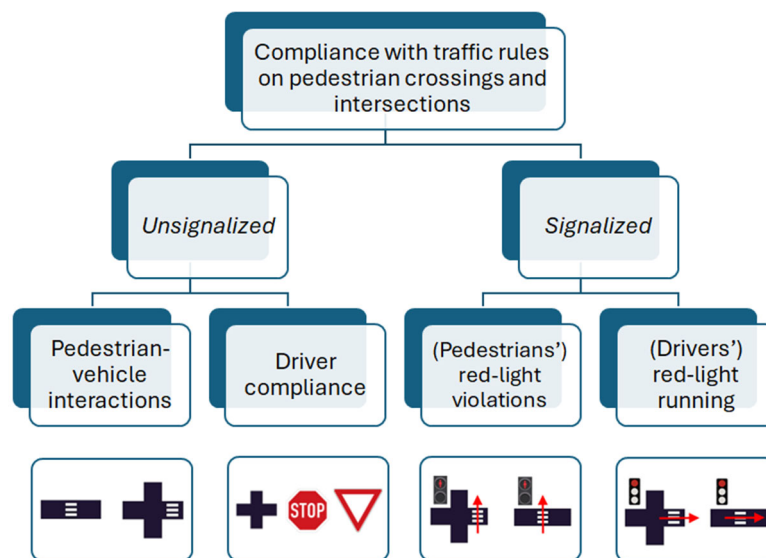


Fig. 1 Overview of the tested compliance KPIs

The final KPI will be defined as the percentage of compliant pedestrians/drivers, broken down by age, gender, user/vehicle type and other characteristics.

The presentation will synthesize the lessons gleaned from our literature review, project meetings and hands-on pilot testing in Czechia, Hungary and Portugal. This comprehensive endeavour not only provided practical experience but also rigorously assessed the feasibility and reliability of our data collection and analysis methodology. Furthermore, within the project, we will develop several guidelines aimed at standardizing procedures and promoting best practices in implementing compliance KPIs across diverse contexts. These guidelines have the overarching goal of facilitating their widespread adoption and ensuring consistency in measurement and evaluation methodologies. We also aim to present some preliminary results from the testing in the different countries, offering insights into early findings.