
Road safety management in municipalities cannot progress without data and modern technologies

Marta Petrova
Chairperson of State Agency Road Safety, Bulgaria
23 October 2026

The challenge faced by municipalities in managing road safety

Bulgarian municipalities, as road managers, face tremendous difficulties in planning investments and maintenance of road infrastructure. Pursuant to Article 167c of Road Traffic Act, mayors organize, coordinate, manage, and monitor road safety policy at municipal level, plan and report measures in annual municipal programs and reports under the National Road Safety Strategy, the action plans for its implementation, and the methodological guidelines of State Agency for Road Safety (SARS). SARS on its turn draw up and approve guidelines, criteria and methodological guidance. Traditionally, municipal road infrastructure assessments in Bulgaria were conducted through fragmented inspections, paper-based records, and non-standardized reporting practices. In addition, municipalities experience shortages of trained staff, methodology and technology for data collection and its automation, as well as a model for assessing the risk of road accidents in order to prioritize investments and to ensure resource efficiency.

Why traditional approaches are insufficient

These challenges required new approach for municipal road safety, with certain level of creativity to change fundamentally the way municipalities collect, analyze, and use road safety information, thus allow local authorities to move from reactive maintenance practices to proactive, evidence-based road safety management and investment planning. Staying away from the traditional road safety management requires introduction of a systematic, data-driven approach to identifying, assessing, and prioritizing road infrastructure safety needs across the entire municipal road network.

The Bulgarian experience and lessons learned

In response to these limitations SARS developed, introduced in practice and further elaborated overall methodology and technology in municipalities for standardized electronic GIS-based road survey, documentation of spatial georeferenced data, and risk assessment to prioritize road infrastructure safety needs in municipalities. This covered road surfaces, signs and markings, drainage, roadside space, road restraint systems, sidewalks, intersections, pedestrian crossings, public transport stops, pedestrian underpasses/overpasses, cycle tracks, schools and kindergartens, bus/railway stations. A mathematical risk assessment model was developed for municipal road network, calculating an aggregated risk parameter of road accidents with three factors - accidents occurrence, traffic volumes, and quality of road elements affecting road safety. Thus, based on risk parameter at a specific street/road section, the corresponding measures could be prioritized in the municipal investment process (in an environment of scarce public resources) and road safety programs, serving the purpose of planning activities where the need is most pressing and persisting.

The project introduced an innovative GIS-based digital survey system that enables municipalities to collect georeferenced road safety data directly in the field using a unified methodology and electronic tools. A particularly creative element is the integration of infrastructure condition data, traffic volumes, and crash history into a single mathematical risk assessment model. This transforms large volumes of data into a practical risk indicator that helps municipalities identify and prioritize the road sections

where safety interventions are most urgently needed. The combination of digital technology, automation, risk-based prioritization, and nationwide participation has created a comprehensive and continuously updated road safety knowledge base in Bulgaria. For the first time, municipalities have access to GIS-based road safety inventories, automated infrastructure condition reports, risk assessments, and the Municipal Road Safety Index. In the long run these tools support objective decision-making and help direct limited resources to locations with major road safety needs. In the national context this initiative is the most complex and comprehensive road safety data collecting and processing carried out between local and central authorities.

Several critical lessons learned should be outlined, providing further ground for development and exchange of knowledge and experience, including in European context:

- The majority of the municipalities have limited previous experience with digital road infrastructure inventories, so significant efforts are required to build knowledge and capacity with extensive training programs, guidance materials, and continuous technical support to municipal staff;
- Achieving consistency and standardization of data collection across large number of municipalities with varying levels of technical expertise, resources, and organizational capacity requires considerable individual assistance during survey;
- Data quality assurance is always a key issue - given the scale of the survey and the large volume of road infrastructure data, numerous data validation, error corrections and follow-up reviews have to be carried out. Continuous improvements should be made to the electronic survey system to reduce inconsistencies, to eliminate reporting errors and to facilitate more efficient data verification;
- Maintaining high level of municipal participation and survey coverage requires ongoing communication and coordination to achieve the reported high rate of survey coverage;
- The main success factor for this and other similar initiatives was the continuous coordination with all final beneficiaries/municipalities and the respective regional authorities;
- The approach is highly transferable because it does not depend on unique local conditions and can be adapted to different administrative structures, incl. all municipalities which are lagging behind in survey rate.

Policy recommendations and future priorities

National governments should continue to support municipalities through standardized road safety data collection methods, digital GIS-based inventories, and risk-based prioritization frameworks. Such tools can help local authorities make evidence-based investment decisions, improve the efficiency of limited resources, and strengthen the implementation of Safe System principles at municipal level.

The approach could serve as a flagship initiative in the national context as this is the most complex and comprehensive road safety data collecting and processing carried out between local and central authorities.

In a mid-term perspective, it should be explored how to feed the tools into next generation of the Network Wide Road Safety Assessment (NWRSA), incl. in the development of the respective methodologies and GIS applications related to rural/municipal road safety.

This column is written in a personal capacity and reflects only the views of the author.