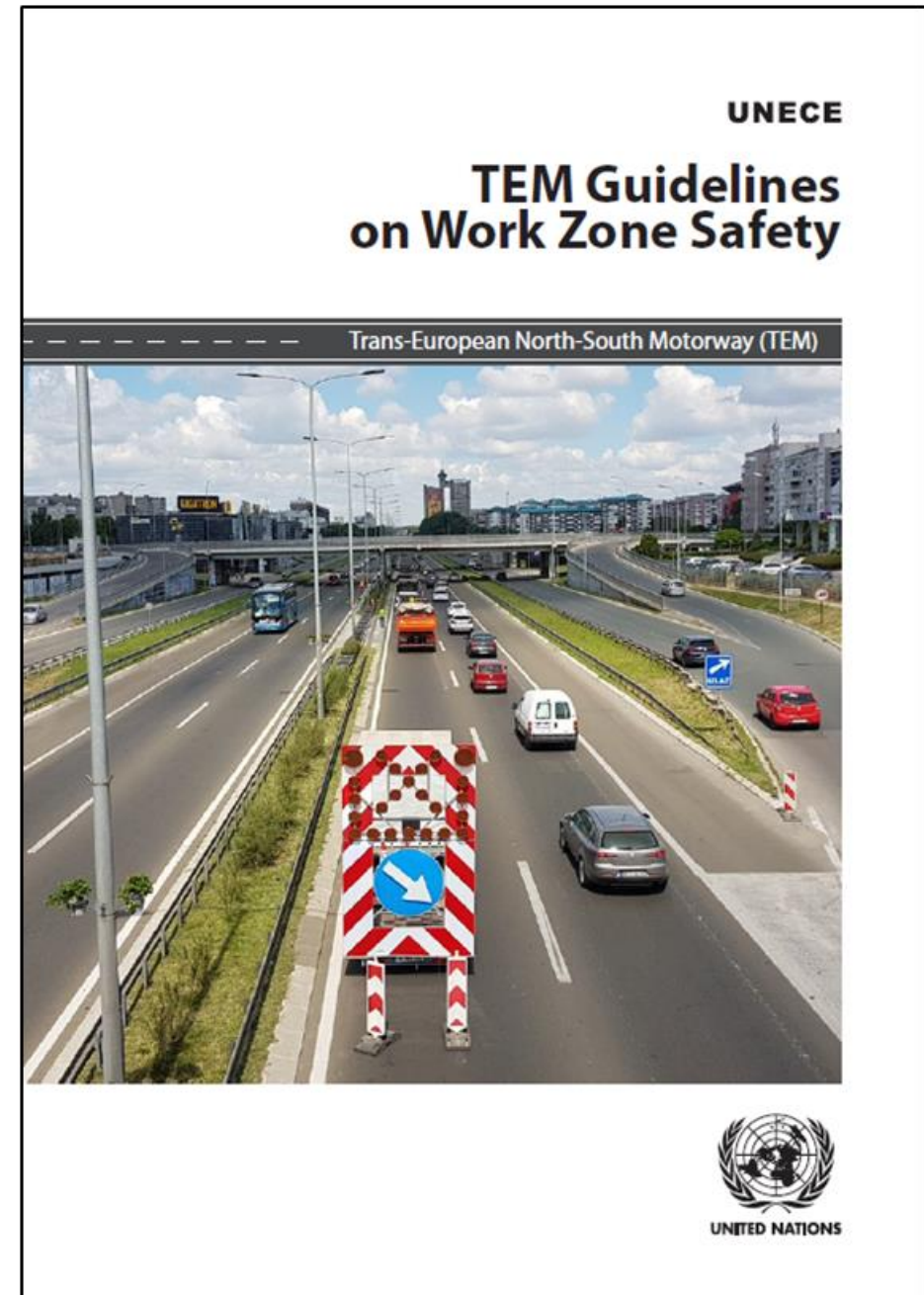


TEM Guidelines on Work Zone Safety

Vision Zero for the Balkans
Sofia, Bulgaria
01 June 2022

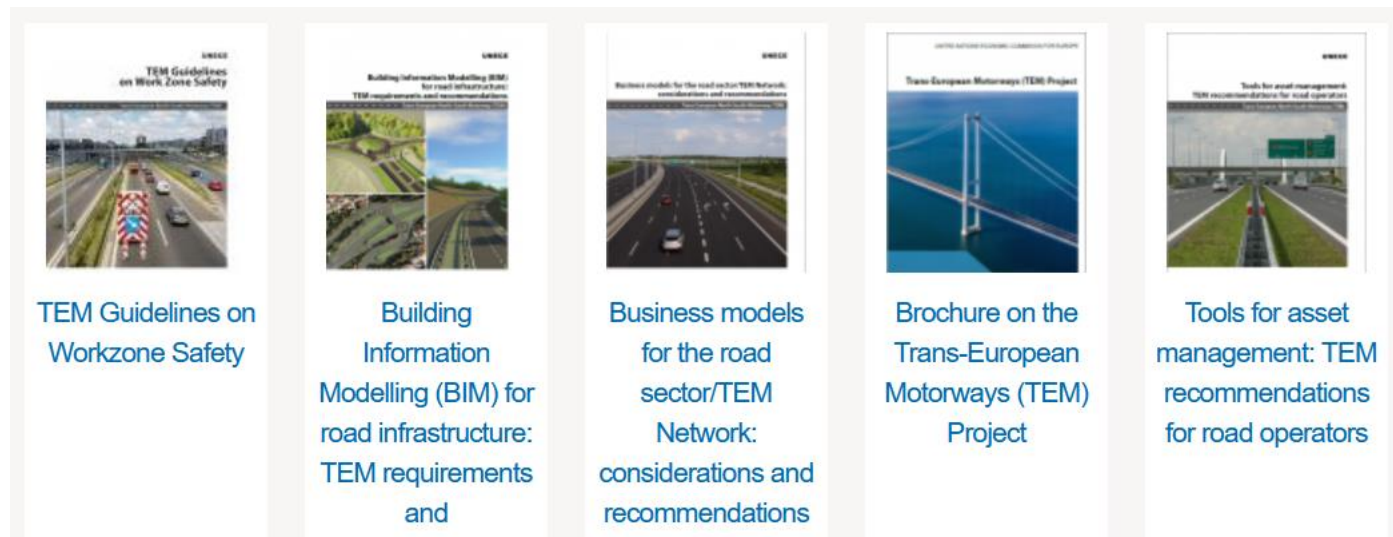
Nenad Nikolic
Regional Adviser
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UNECE

TRANSPORT



Trans-European North-South Motorway project

- Established in 1977
- 11 active Participating Governments including Bulgaria
- 2-3 reports annually related to roads/motorways development, asset management, road safety, data management, environmental protection.



Contents

- Acknowledgements
- Part I: Literature review
- Part II: Guidelines on work zone safety
- Recommendations



Source: autohaus.de



Source: GEWI



Acknowledgements

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Current positions	
Partner and Senior Specialist on Road Safety and Reliability	Vill Consulting Engineers (Vill ZT-GmbH), Vienna
Senior Road Safety Consultant (external)	World Bank, Washington
University Lecturer for “(Reliability) assessment of existing structures”	University of Applied Sciences, Vienna
University Lecturer for “Infrastructure safety” and “Transport/road safety policy”	University of Technology, Graz
Member of the Governing Board	Grossglockner High Alpine Road Cooperation
Member of the Governing Board	Railway Infrastructure Service Cooperation
Deputy Chair of the Management Committee	Austrian Research Association for Roads, Railways and Transport
Member of the Supervisory Board	Austrian Standards Institute ASI



Project objectives

- Identification of the main areas of consideration, including longitudinal and lateral **work zone components**, to achieve a **high degree of safety not only for road users but also for road workers and construction equipment**
- Summary of methods for **safety examination, risk assessment and traffic management in work zones** in terms of their ability to achieve the desired driver behavior, facilitating a safer driving and working environment
- Clear definition of **roles and responsibilities for all contributors in the work zone** (road operators, contractors and road workers), and identification of training needs for these parties
- Presentation of **traffic control and enforcement devices** as well as work zone equipment and exploration of their **effectiveness**



Literature review (I)



- Summary of main contents and findings of the most relevant literature
- Weblinks provided for each document
- **UNECE Documents**
 - UNECE Consolidated Resolution on Road Traffic (R.E.1) (2010)
 - UNECE Consolidated Resolution on Road Signs and Signals (R.E.2) (2010)
- **EU legal framework**
 - Directive (EU) 2019/1936 of the European Parliament and of the Council of 23 October 2019 amending Directive 2008/96/EC on road infrastructure safety management



Literature review (II)

- **European projects and initiatives**
 - ARROWS – Advanced Research on ROad Work zone Safety standards in Europe (1998), EC
 - PRAISE – Preventing Road Accidents and Injuries for the Safety of Employees (2011), ETSC
 - STARs – Scoring Traffic at Roadworks (2013), EC
 - BRoWSER – Baselineing Road Works Safety on European Roads (2015), CEDR
 - ASAP – Appropriate Speed Saves All People (2015), CEDR
 - IRIS – Incursion Reduction to Increase Safety in road work zones (2019), CEDR
 - Position Paper ‘Towards Safer Work Zones’ (2014), ERF



Literature review (III)

- **International projects and initiatives**
 - PIARC – Technical Report ‘Improvements in safe working on roads’ (2012)
 - Austroads – Guide to temporary traffic management (2019)
 - NCHRP – Estimating the Safety Effects of Work Zone Characteristics and Countermeasures: A Guidebook (2018)
 - NCHRP – Analysis of Work Zone Crash Characteristics and Countermeasures (2018)
 - FHWA – Work Zone Management Listing
 - CAREC – Road Safety Engineering Manual 2 – Safer Road Works (2018)
 - IRF – Statement of Policy ‘Mandating Safer Work Zones Globally’ (2018)



Guidelines on Work Zone Safety (I)

- **Safe System approach to work zone safety**
- **Definitions** – Work zones glossary
- **Classification of work zones**
 - Type of road works
 - Type of roads
- **Identification of the main areas of work zones** – Work zone layout
 - Longitudinal worksite components (work zone areas)
 - Lateral worksite components (lateral safety buffers)



Guidelines on Work Zone Safety (II)

- **Road safety in work zones**
 - Safety examination methodologies
 - Risk assessment for work zones
 - Traffic management plan (TMP)
 - Responsibilities of work zone actors
 - Safety and training of actors in work zones
 - Speed management and enforcement
 - Information management for road users
- **Traffic control devices and safety equipment**
 - Signs and markings
 - Barriers and restraint systems
 - Vehicles and construction equipment
 - Speed control and enforcement equipment



Guidelines on Work Zone Safety (III)



- **Strategic goals and criteria for work zone safety**
 - Strategic goals
 - Road user criteria
- **Work zone challenges and Recommendations**
 - Based on TEM Member countries case studies and best-practice



Work Zone Safety in TEM Member Countries – Highlights 1/4



- **Road safety data**
 - Basic general road safety data are available in TEM member countries for all types of roads
 - Regular collection of relevant data (at minimum crashes, injuries, fatalities) in work zones is not yet established
- **Guidelines and regulations for work zone safety**
 - Most TEM member countries have at least some national technical guidelines, standards or manuals for work zone safety on their motorway network
 - Content and depth of these documents differ significantly
 - Not all TEM member countries have yet implemented the relevant UNECE resolutions, and some are not even aware that these exist



Work Zone Safety in TEM Member Countries – Highlights 2/4



- **Work zone layouts and risk management**
 - Most TEM member countries have national guidelines or standards for TMP's
 - Road safety audits (RSA) are usually performed in TEM member countries for long-term roadworks, while road safety inspections (RSI) on existing work zones are not commonly used
- **Roles and responsibilities in work zones**
 - Most TEM member countries have written guidelines or internal procedures clearly defining duties and obligations
 - In some countries, mandatory contractual requirements for all organizations involved in undertaking or supervising the work are in place to ensure compliance with the relevant work zone guidelines or manuals



Work Zone Safety in TEM Member Countries – Highlights 3/4



- **Training of personnel**
 - Training for all actors (road operator, contractors, workers, etc.) in road work zones is mandatory in some TEM member countries
 - In those countries where flag persons are still used, these persons are specifically trained to ensure their own safety
- **Enforcement and road user information**
 - Not all TEM member countries have uniform speed limits or speed enforcement in work zones on the motorway network
 - Those countries that enforce speed limits in the work zone apply control methods that are both non-automatic (e.g., handheld speed guns) as well as automatic (e.g., fixed speed cameras or section controls)
 - To inform road users of longer-term work zones aside from advance notice by adequate signage directly on the road, social media and newsletters are widely used



Work Zone Safety in TEM Member Countries – Highlights 4/4



- **Strategic goals and indicators**
 - Many TEM member countries have strategic goals referring to the impact of roadworks on road users' mobility, traffic management or works efficiency (e.g., the reduction of crashes and fatalities as well as the highest possible network availability)
 - These goals are normally defined on a national level either by the road authority or the road operator



Challenges and Recommendations

Challenge	Recommendation
Inadequate crash data for work zones	Standardized collection and evaluation of crash data for all work zones on motorways and on other roads as a basis for data-driven and evidence-based work zone safety management
Lack of knowledge of relevant UNECE resolutions (R.E.1 and R.E.2)	Increase awareness of UNECE consolidated resolutions and their impact on work zone safety
Insufficient implementation of Safe System approach in work zones	Review and – where necessary – adaptation of existing national work zone guidelines/standards/manuals to be in line with the Safe System approach
No systematic investigation and evaluation of work zone implementation schemes	Full implementation of road safety audits for (long-term) work zones
No systematic investigation and evaluation of active work zones	Full implementation of road safety inspections for (long-term) work zones
Lack of training of actors in the work zone	Compulsory training of all actors (road administration, contractors, workers, etc.) – also as a contractual requirement
No common standards for uniform speed limits	Definition of appropriate uniform speed limits for all road work zones ^x
Insufficient enforcement of speed limits	Increase (automated) enforcement in all work zones (use of section control where possible)
Signage and road markings not in line with the capability and receptivity of the road users	Continuous application of the 4C concept for all signs and road markings to achieve a comprehensible guidance system
Large variety of work zone standards and layouts across TEM member countries	Creation of a TEM working group for harmonization of basic work zone frameworks and procedures

Thank you

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