BASt topics

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TRA 2020 Conference Helsinki

The Transport Research Arena (TRA), initiated in 2006, is organised every two years in a European city. It is supported by the European Commission and various European Technology Platforms. TRA Conferences cover all transport modes and all aspects of mobility and bring together experts from around the world, thus sharing best practices of policies and deployments. The TRA 2020 Conference in Helsinki, Finland was to be the 8th Transport Research Arena conference. It was cancelled due to the COVID-19 pandemic.

For TRA 2020 webinars, publications and the Book of Abstracts find out more here:
https://traconference.eu/
https://traconference.eu/webinars-and-publications/webinars/
https://traconference.eu/webinars-and-publications/book-of-abstracts/

The next edition of Transport Research Arena, TRA2022, will take place in Lisbon, Portugal:
https://traconference.eu/see-you-in-lisbon-in-2022/

"Rethinking transport – Towards clean and inclusive mobility". Under this theme, the TRA 2020 Conference was to take place in Helsinki in April this year. TRA, the Transport Research Arena, is the largest European research and technology conference on transport and mobility. And of course, Germany is usually represented at the TRA Conference.

As in previous years, preparations for TRA 2020 went very well. Scientists from all research departments of BASt had participated in the Call for Papers, lectures and posters were planned and the common anticipation of the event was great. The cancellation of TRA 2020 as a presence event due to the Covid-19 pandemic was a real pity, but undoubtedly the right decision.

As an equivalent of the Conference, we are now all the more pleased to present the valuable scientific work of BASt researchers in the current issue of BASt topics. You will find here the abstracts of all submitted papers, linked to the full papers or further information on our BASt website: www.bast.de/TRA2020

Enjoy reading and join us in looking forward to a next TRA Conference as a physical event. Until then please stay healthy!"

Stefan Strick
BASt President

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Assessing and enhancing resilience to extreme weather for transport infrastructure in Germany

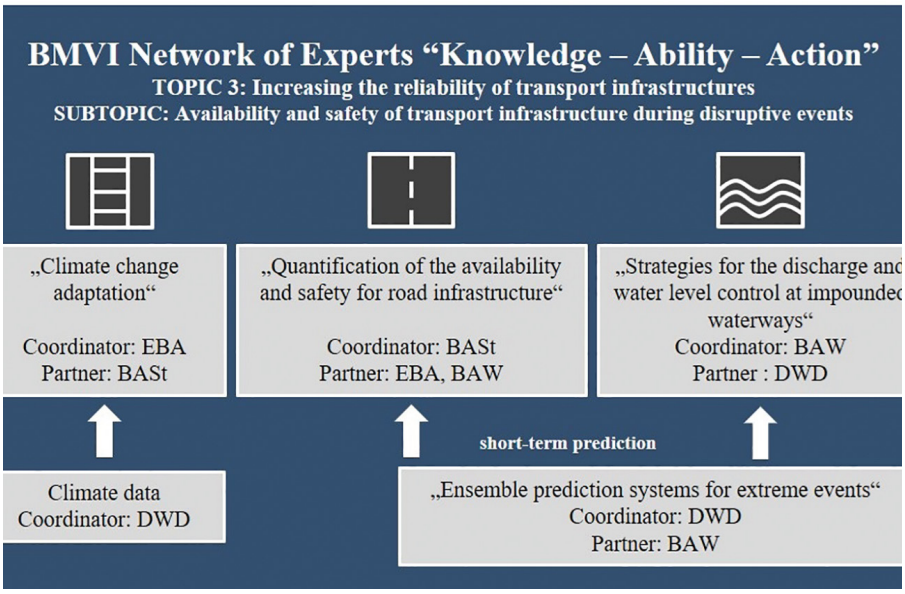
Transport infrastructure is exposed every year to different kinds of risks and disruptive events caused by natural hazards which can permanently impair its availability and safety. In order to maintain the functionality and operation of transport infrastructure during and after an extreme weather events, appropriate methods and concepts are required which enable a holistic, conceptual and systematic assessment of system resilience.

This paper presents current results from the investigations by departmental research facilities and executive agencies in the "BMVI Network of Experts", which was initiated in 2016 by the German Federal Ministry of Transport and Digital Infrastructure (BMVI).

New concepts and methods have been developed to quantify the availability and safety of transport infrastructure elements and to enhance transport resilience to extreme weather. By providing measures and practical guidelines to prioritize them, operators will be supported in improving the performance of transport infrastructure under unfavorable weather conditions.

BMVI Network of Experts
Knowledge Ability Action

Kalliopi Anastassiadou, Ralph Holst



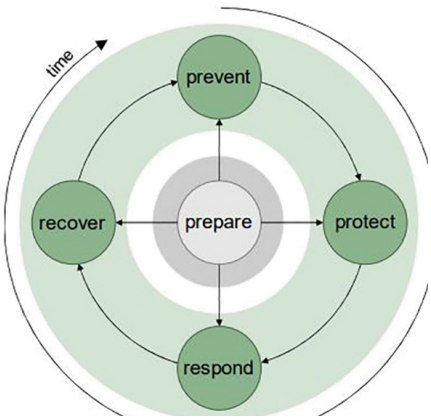
Schematic illustration of the interconnection between the co-projects and the institutions in the subtopic "Availability and safety of transport infrastructure during disruptive events"

Identification and prioritization of resilience measures for road infrastructures

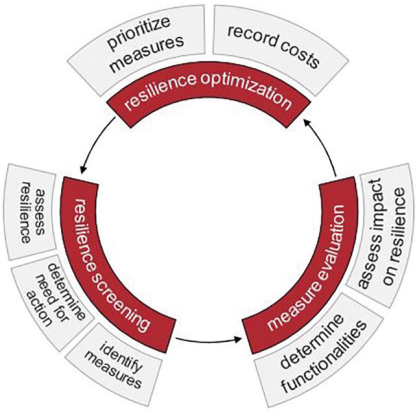
This paper presents a methodology for the optimization of the response and recovery processes for an all hazard resilience management of road infrastructures after the occurrence of a disruptive event. The developed methodology enables road owners and operators to identify, assess and prioritize measures to improve the resilience of their infrastructures.

A qualitative approach for measuring resilience is proposed, with a range of specific measures based on predefined resilience criteria and dimensions. The assessment process consists of a range of questions within each criterion, and to which scores are to be assigned.

A practical handbook describing the developed methodology together with a simple software application is provided as a final output. The outcomes of this study help to achieve a more effective and efficient resilience management and action planning strategy.



Resilience cycle showing the five leverage points to increase the resilience of the system. Based on Thoma (2014), adapted by Deublein et al. (2018)



Resilience management concept. The elements relevant for the proposed methodology are highlighted in red based on Deublein et al. (2018)

Kalliopi Anastassiadou,
Ulrich Bergerhausen

Guidelines for assessing the prevalence of mobile phone use in traffic

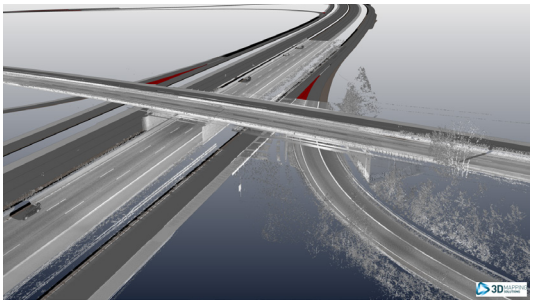
A major problem of assessing the impact of mobile phone use on traffic safety is the large diversity of study methods. To estimate prevalence, direct observations in traffic as well as interviews and surveys are used, which in turn are different with respect to the methodological implementation. Based on a review of epidemiological studies on distraction while driving published between 2000 and 2017, a set of guidelines for a common methodology was built.

These guidelines cover the main epidemiological research methods and focus on the estimation of prevalence of mobile phone use in traffic by car drivers, cyclists and pedestrians. It is expected that these guidelines will significantly improve the quality of data gathered in further studies and will facilitate cross-study comparisons on an international level.

Vollrath, M., Schumacher, M., Boets, S., & Meesman, U. (2019) Guidelines for assessing the prevalence of mobile phone use in traffic. FERSI technical paper. Retrieved from https://fersi.org/ [date]

Markus Schumacher

Infrastructure modifications to support the introduction of the automated driving



The introduction of Automated Vehicles raises the question which infrastructure measures could support the exploitation of the potential benefits of this new technology for the traffic sector. While the legal framework has been implemented in Germany, recommendations for the adaptation of the road infrastructure have not yet been established. As part of a basic research, the needs for infrastructure measures were analysed in a scenario-based approach. The requirements of Automated Vehicles show up on the layer of vehicle guidance. Many issues can be or are already settled by standardisation, better real-time traffic information, improved machine readability and reliability. The evaluation of possible infrastructure measures shows that physical infrastructure modifications are in most cases costly and only feasible in the long- or middle term. Most remaining issues can be solved by providing real-time data on upcoming infrastructure-status. This would be feasible e.g. via a backend-based digital HD reference map combining event localization with relevant infrastructure-information. Such a “digital twin” can be a core element of future strategies to develop the current infrastructure further. The way forward on an internationally harmonised implementation of a ”digital twin” in practice requires further attention as well as research on the machine readability of road markings.

Jan Ritter, Bernhard Kollmus, Tom M. Gasser, Lutz Rittershaus

Improvement of road safety on rural roads by using suitable safety barriers

Safety barriers can deliver an important contribution to approach the aim of “vision zero”. One main requirement for this task is the correct choice of suitable and safe barrier systems that fit the boundary conditions on-site. Usually the national guidelines for the application of safety barriers offer the required basic principles. However, the characteristics of some road types are far away from any standard. That is why some procedural guidelines are needed, to decide whether a construction is suitable for a special boundary condition or not.

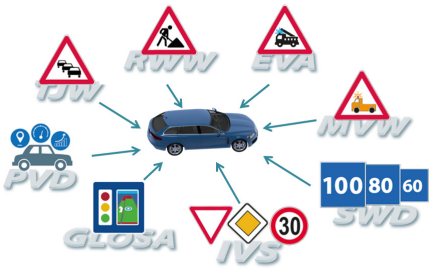
Therefore some considerations were made with the aim to support the correct choice of suitable and safe barrier systems especially for constricted space conditions like trees close to the roadside. In addition a future option for tested barrier systems for such special-purpose solutions is drafted. The ideas and concepts developed in this context

are described in the corresponding paper.

Susanne Schmitz, Linda Meisel

C-Roads Germany

C-Roads Germany, as part of the European C-Roads Platform, aims to test and implement cooperative Intelligent Transport Systems (C-ITS) in a real traffic environment. C-ITS encompass services based on wireless and cellular communication systems among road users and between infrastructure entities and road users. These technologies enable a new generation of services.



C-Roads Germany has two pilot sites where the following eight C-ITS Services are developed and tested: Emergency Vehicle Approaching, Green Light Optimal Speed Advisory, In Vehicle Signage, Maintenance Vehicle Warning, Probe Vehicle Data, Road Works Warning, Shockwave Damping and Traffic Jam Ahead Warning. All services aim to reduce the number and severity of accidents (Safety), minimize the emissions of noise and exhaust (Environment) and increase the efficiency of the road system (Efficiency). The road user receives the information to react accordingly.

The Federal Highway Research Institute fosters the European-wide harmonization of C-ITS and promotes their interoperability.

Farzin Godarzi, Tobias Reiff

infra4Dfuture at a glance

The infra4Dfuture (i4Df) project is a Coordination and Support Action (CSA) funded by the European H2020 programme, with a duration of 24 months (01/10/2018-30/09/2020). The infra4Dfuture consortium encompasses 20 partners from 17 countries, 19 of them being National Transport Infrastructure Authorities (NTIA) joining forces to develop a demand-driven overarching strategy and coordination mechanism for the modernisation of transport infrastructure including a shared strategic vision on future infrastructure capabilities and common pathways for innovation development and implementation. The coordination mechanism is structured around seven NTIA-lead Innovation Focus Areas, the Innovation Focus Area on „Decarbonisation of Infrastructure Management“ is coordinated by the BASt. The launch of the i4Df coordination mechanism, which was planned during the TRA2020 Conference, was replaced by a series of webconferences attended by the main stakeholders of the i4Df initiative.

Bernhard Gyergyay, Ursula Blume

The role of the duraBASt research facility in an innovation ecosystem: An innovation management portfolio analysis

In order to facilitate innovation in the road construction sector the German Federal Highway Research Institute (BASt) has set up in 2017 an external demonstration, investigation and reference area, the duraBASt. Investigation fields and demonstrators enable realistic tests on a scale of 1:1. The aim of this unique research facility is to significantly shorten the time required from the idea of an innovation to its standard application. The duraBASt also fills the gap between small scale research in a laboratory and the very complex process of setting up a test track on the road network. In order to improve the future selection of research projects on the duraBASt an innovation management portfolio analysis was conducted to analyse the research projects that were completed on the duraBASt. This paper shows the results of this analysis and provides recommendation how research projects can be evaluated on their innovation characteristics.

Bernhard Gyergyay, Stefan Höller, Lutz Pinkofsky

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