



Standards and Regulations in the Context of Climate Change

Identification of Adaptation Needs
with regard to Extreme Weather Events

Federal Highway
Research Institute

Presentation for the 22nd session of the UNECE
Group of Experts on Assessment of Climate Change
Impacts and Adaptation for Inland Transport



Table of Contents

1. Background
2. Methodological Approach
3. Results
4. Conclusion
5. Takeaways
6. Bibliography

1. Background – Climate Change

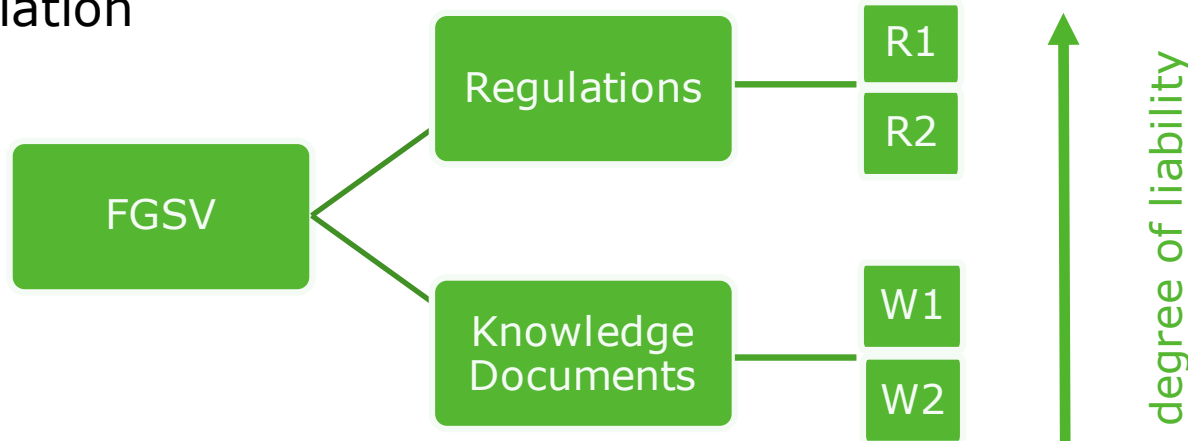
- increase in number, intensity and frequency of extreme weather events and their impacts on the road infrastructure
- examined parameters:

1. Temperature
2. Precipitation
3. Wind
4. Thunderstorm



1. Background – Standards and Regulations

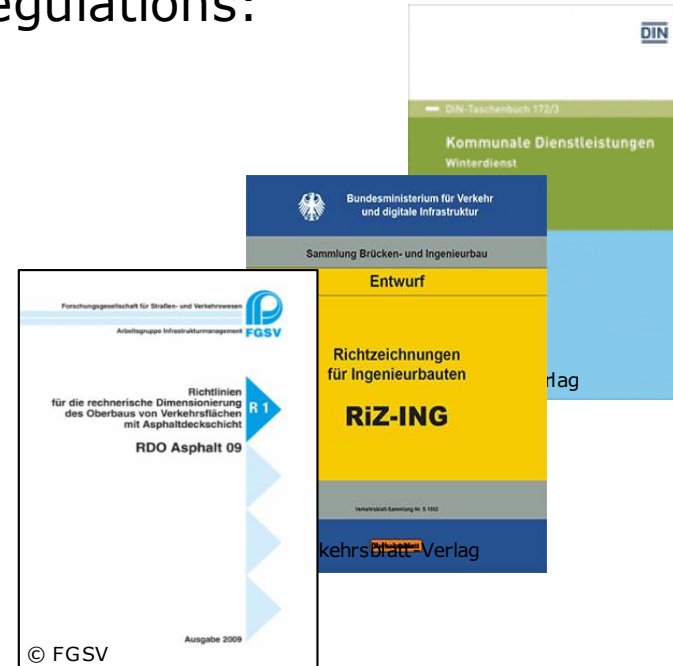
- engaging with standards and regulations is inevitable when dealing with climate adaptation in the road sector
- one central authority: FGSV - Road and Transportation Research Association



- for further information please visit <https://www.fgsv.de/en/start.html>

1. Background – Standards and Regulations

- other institutions drafting standards and regulations:
 - Federal Ministry for Digital and Transport (BMDV)
 - Federal Highway Research Institute (BASt)
 - The German Association for Water, Wastewater and Waste (DWA)
 - European Committee for Standardisation (CEN)
 - German Institute for Standardisation (DIN)



2. Methodological Approach

Two Approaches

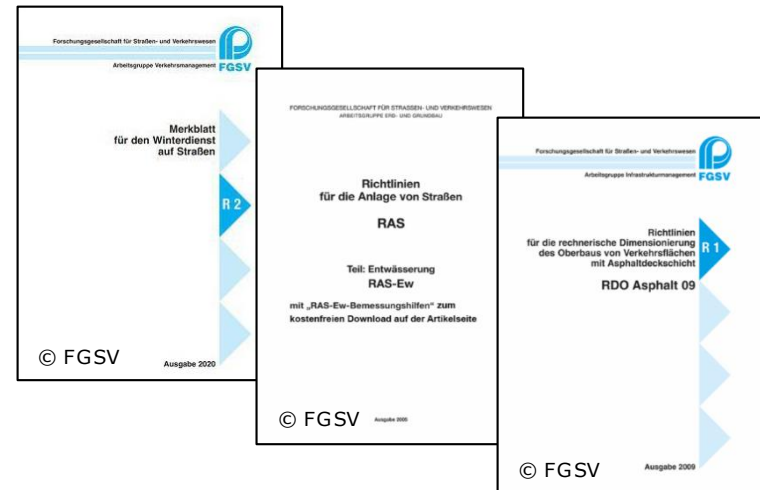
1. Syntax-based, partially automated keyword search
2. Expert-based search

2. Methodological Approach

1. Syntax-based, partially automated keyword search

- **purely quantitative** search for keywords
- not feasible for FGSV regulations, instead manual search in:

- fact sheet for winter road maintenance
- RAS-Ew
- RDO Asphalt



2. Methodological Approach

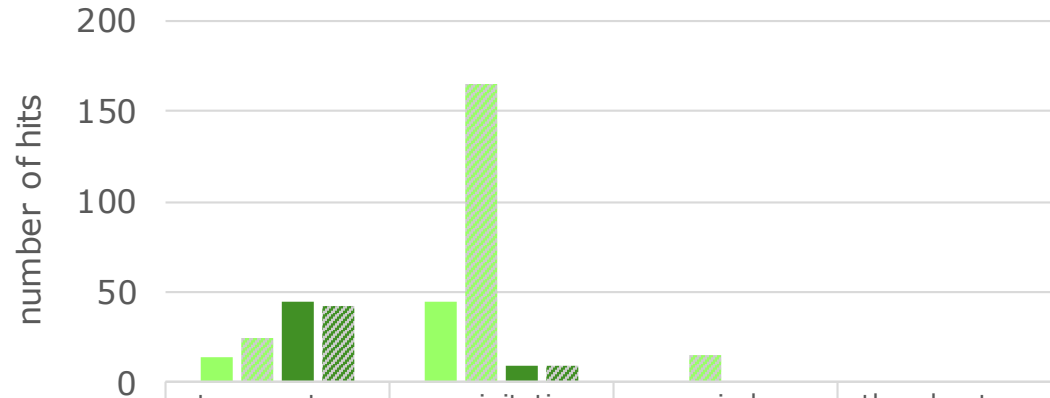
2. Expert-based search

- **quantitative and qualitative** identification of climate-relevant text passages
- division into four categories depending on information situation

Category	Information situation of data needed for adaptation
Category 1	adaptation of concrete values necessary
Category 2	adaptation necessary due to values to be determined
Category 3	adaptation through constructive solutions necessary
Category 4	no specific adaptations necessary; further research may be required

3. Results

Comparison between results of syntax-based and expert-based research for two exemplary regulations

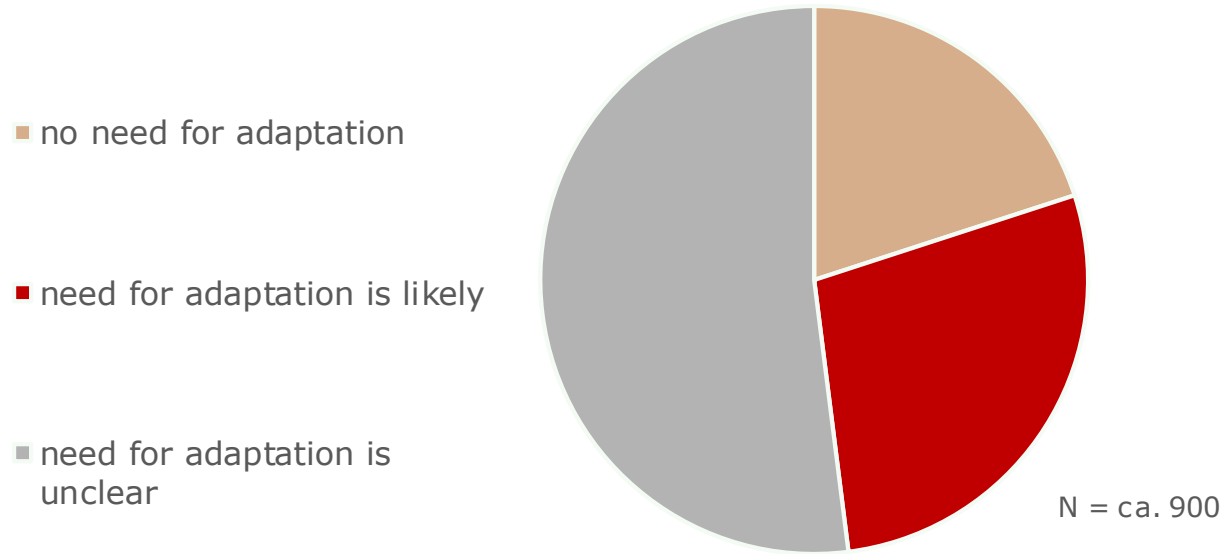


	temperature	precipitation	wind	thunderstorm
RAS-Ew expert-based search	14	45	0	0
RAS-Ew syntax-based search	24	165	15	0
RDO Asphalt expert-based search	44	9	0	0
RDO Asphalt syntax-based search	42	9	0	0

N = 367

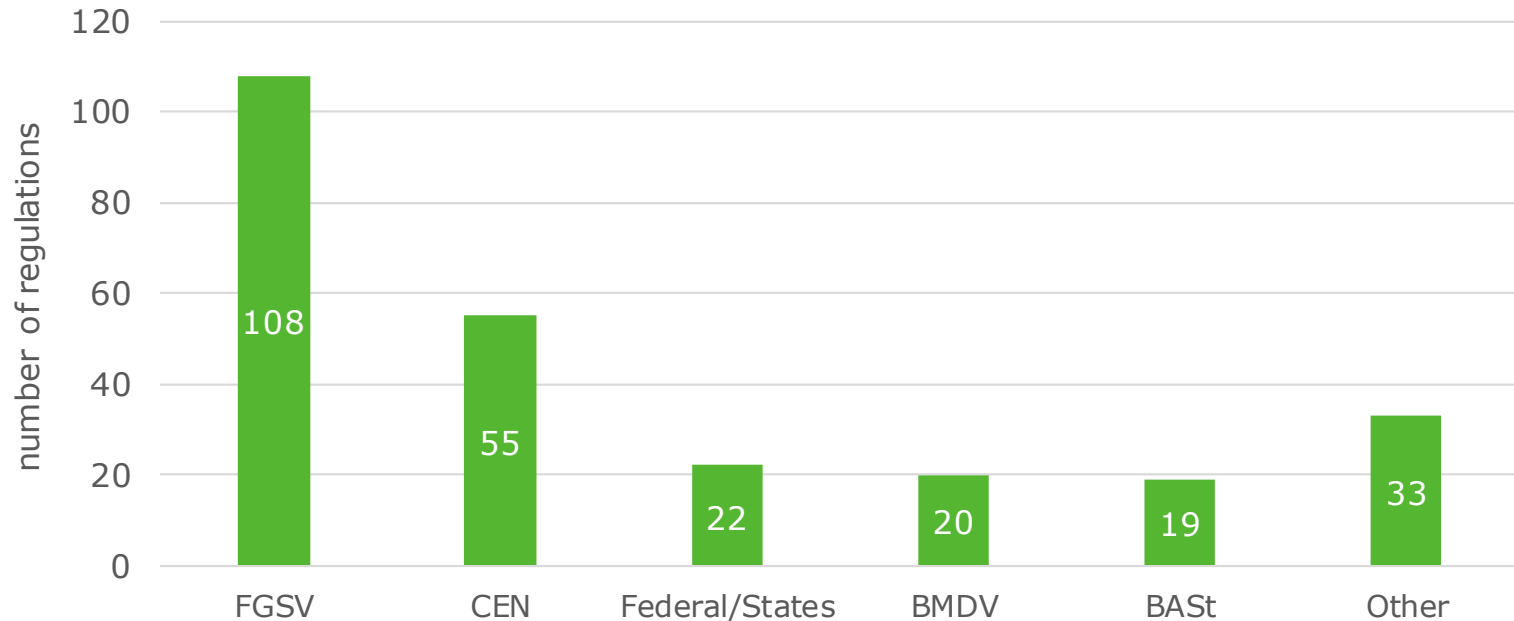
3. Results

Share of regulations in relation to adaptation need



3. Results

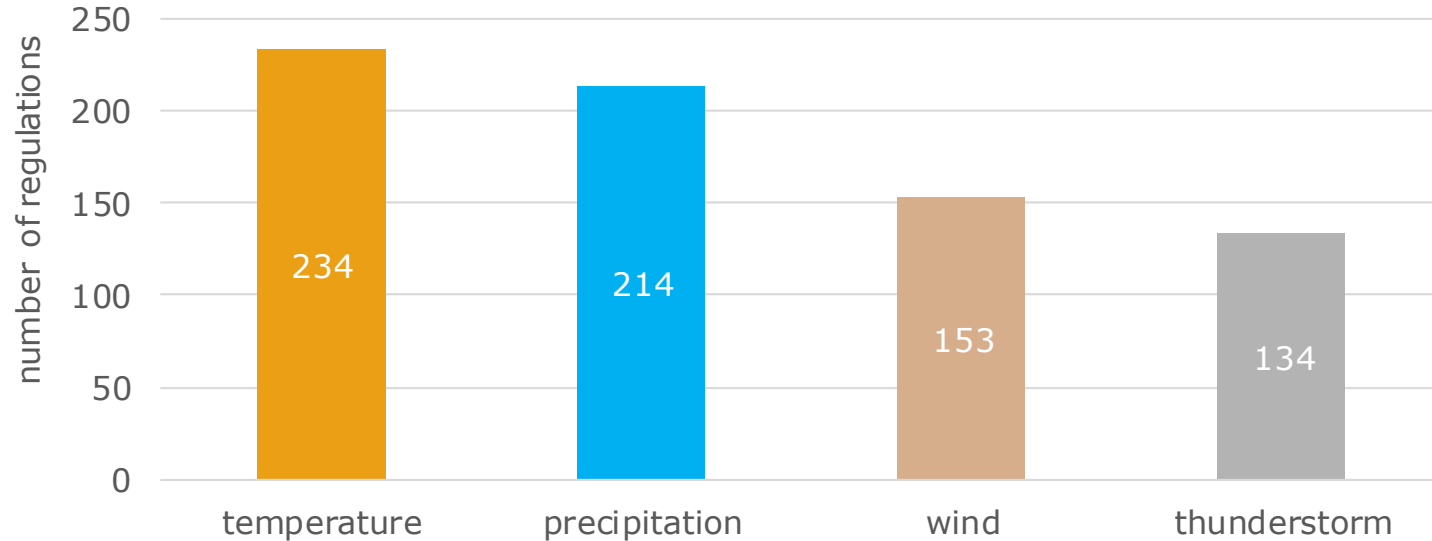
Number of regulations with probable need for adaptation per organisation



N = 257

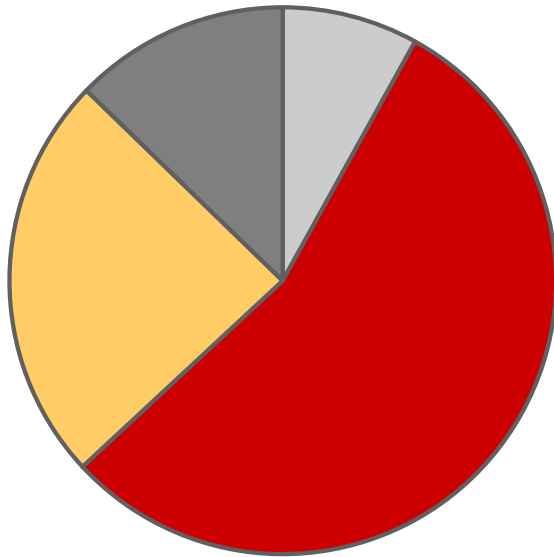
3. Results

Number of regulations with likely need for adaptation per climate parameter



3. Results

Text passages with need for adaptation per work effort from six regulations examined by experts



N = 149

Cat. 1	adaptation of concrete values necessary
Cat. 2	adaptation necessary due to values to be determined
Cat. 3	adaptation through constructive solutions necessary
Cat. 4	no specific adaptations necessary; further research may be required

4. Conclusion



only 20 % of all standards and regulations do not need to be adapted



for more than 50% of the adaptations: possibly a high time- and labour-intensive effort



precise determination of workload difficult

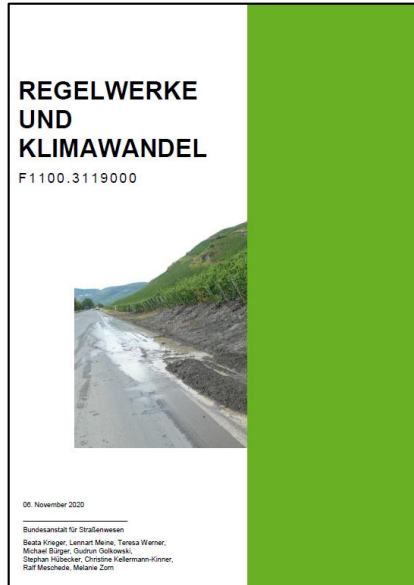


recommendation: to link adaptation of regulations to regular revision process

5. Takeaways

- Standards and regulations are **decisive instruments** for adapting transport infrastructures to climate change
- Fully automated computer-based programmes are (so far) only a preliminary stage to the **assessment** of adaptation needs **by experts**
- the **efficient** adaptation of standards and regulations requires a high degree of **coordination**, e.g. by interlinking revision intervals with IPCC publications

6. Bibliography



Krieger, B., Meine, L., Werner, T., Bürger, M., Golkowski, G., Hübecker, S., Kellermann-Kinner, C., Meschede, R. and Zorn, M. (2020): Regelwerke und Klimawandel – F1100.3119000. Bundesanstalt für Straßenwesen. 149 Pages.



Marvin Stell

Department S1: Sustainability, Resource Protection and
Earthwork Materials in Road Construction

Federal Highway Research Institute

Brüderstraße 53

51427 Bergisch Gladbach

Phone: +49 (0)2204 43 7105

Email: Stell@bast.de

www.bast.de

Thank you very much for your attention!