

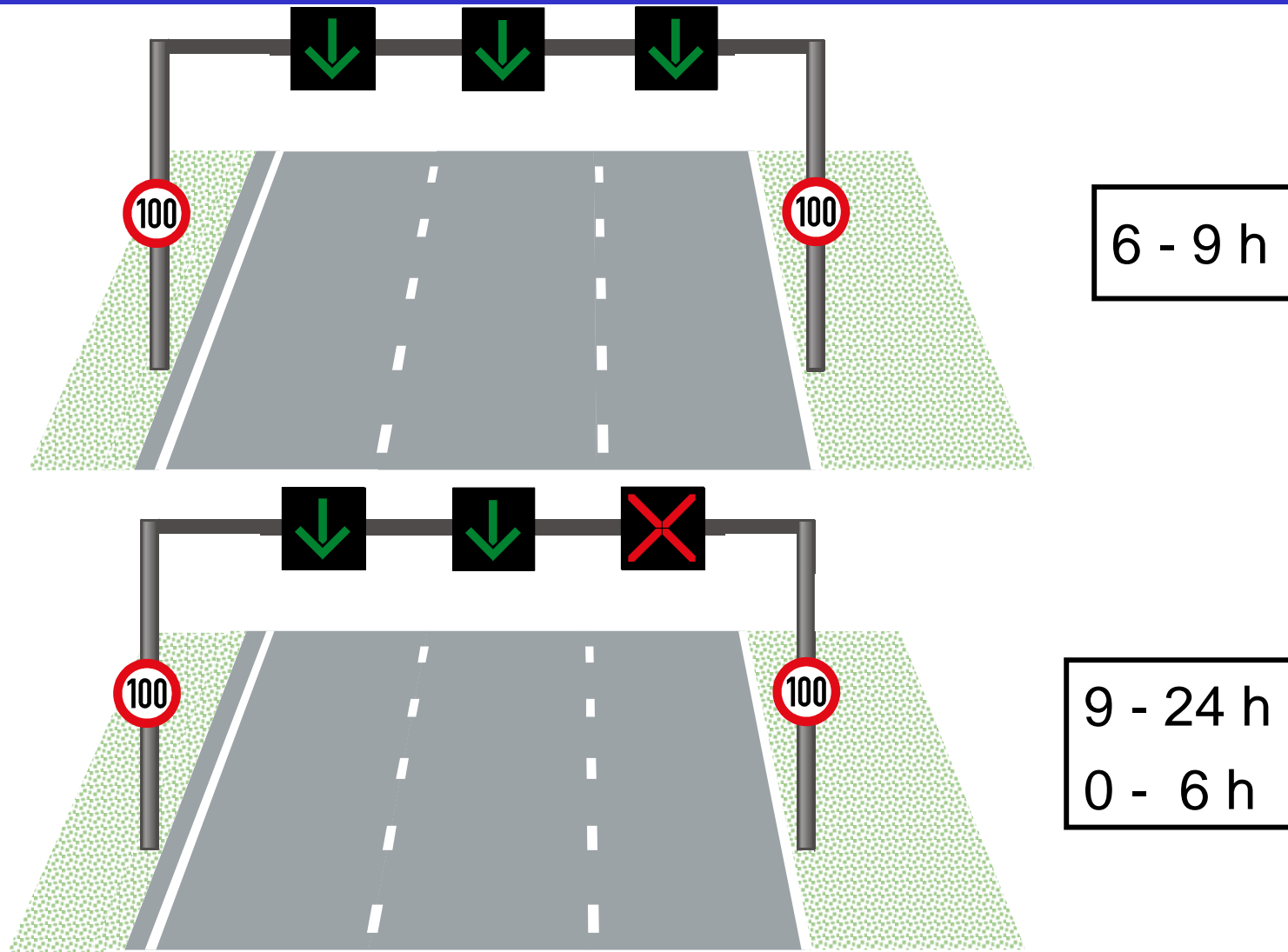
Temporary Use of Hard Shoulders

- Experiences and economic assessment

Dr. Kerstin Lemke & Marco Irzik
Section Traffic Planning, Highway Design,
Safety Analyses

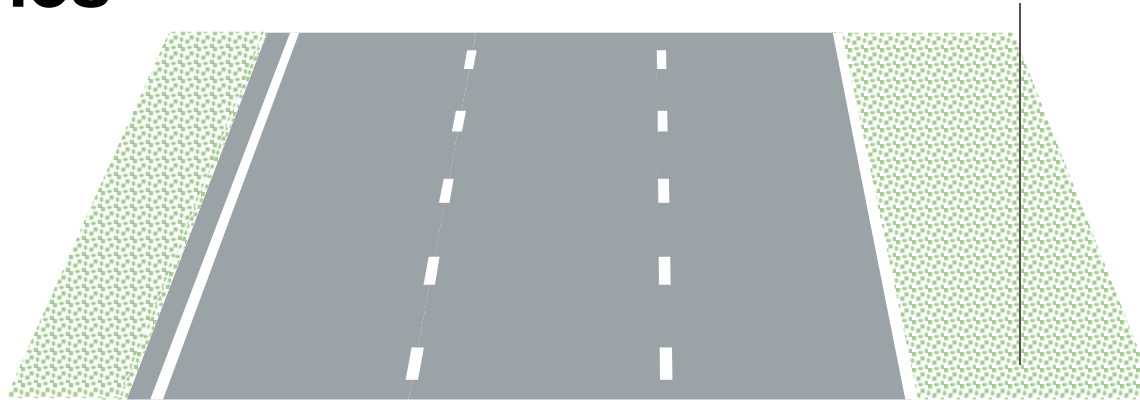
Lemke@bast.de or Irzik@bast.de

Signalling a 3rd Lane

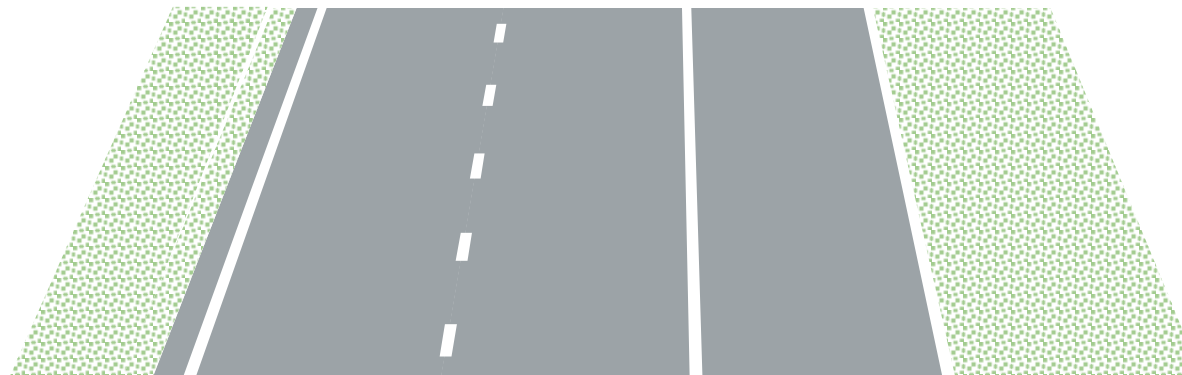


2 Different Forms

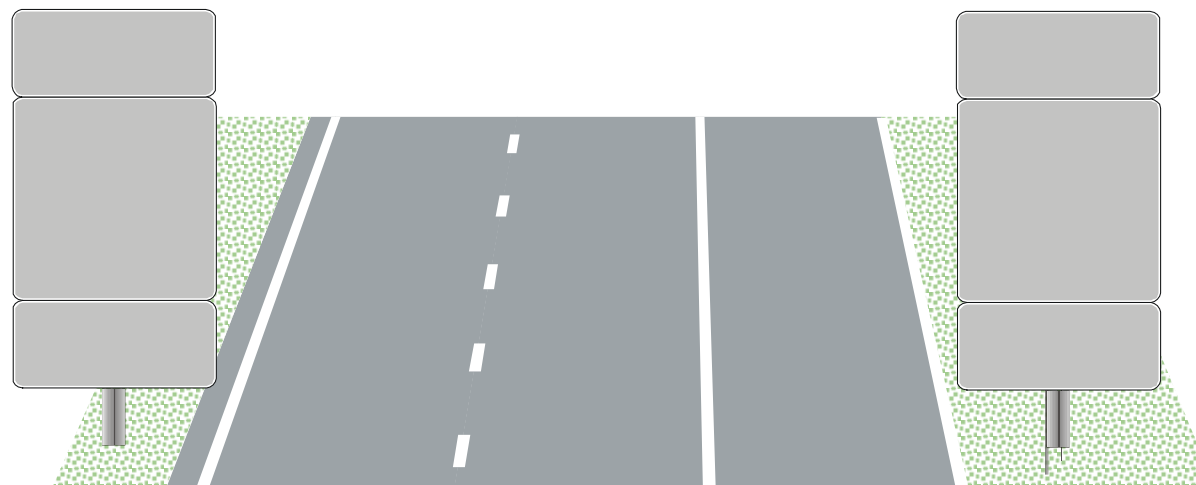
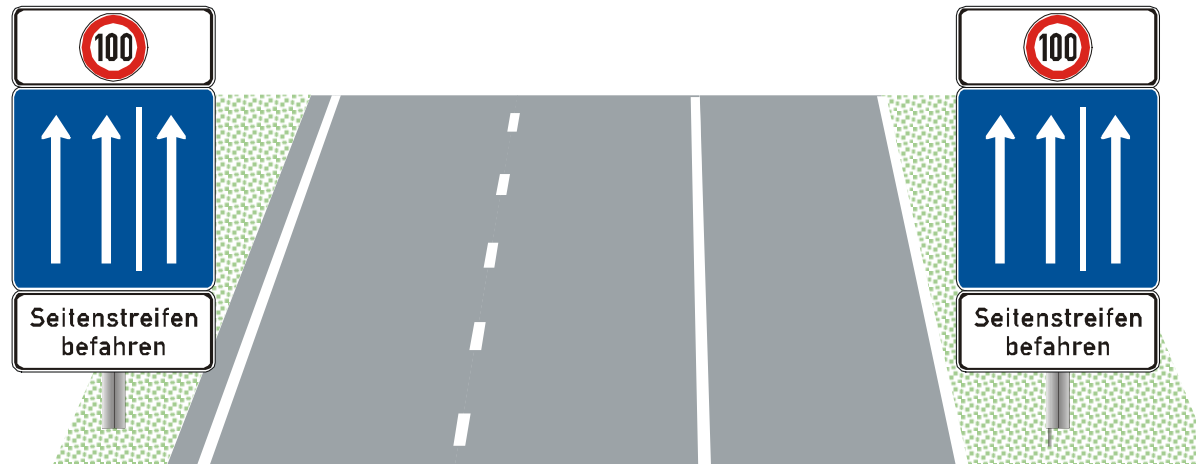
- **3 lanes**



- **2 lanes plus wide hard shoulder**



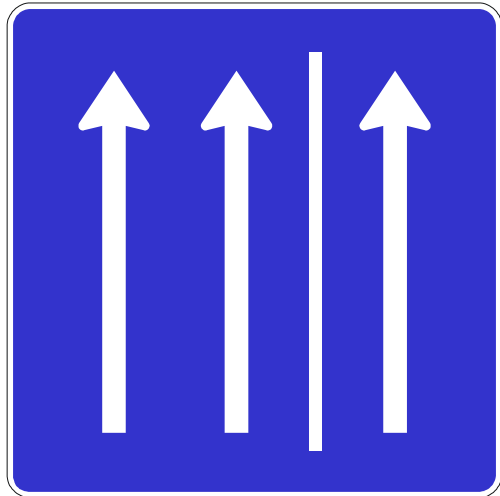
Dynamic use of hard shoulders



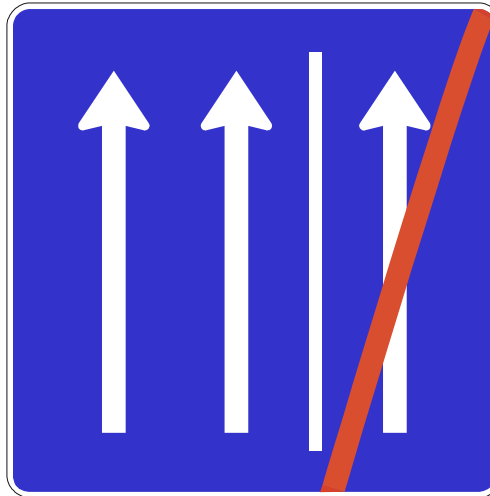


Z 223.1

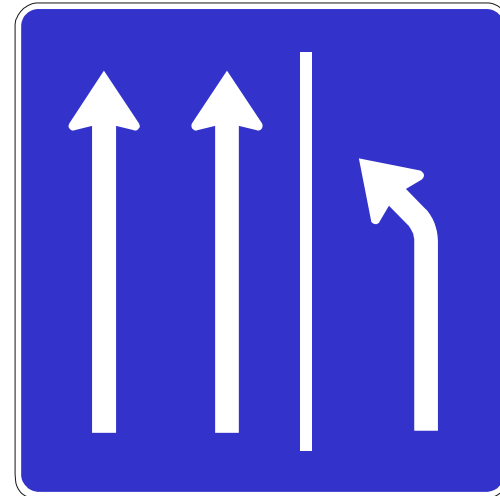
3 Forms of Sign no. 223



**use
hard shoulder**



**end use of
hard shoulder**



**leave
hard shoulder**

Sign no. 223 with Speed Limit



2,25 m * 2,25 m

2 lanes plus wide hard shoulder

- **Cutout**



Hard Shoulder Use - Simple Way



Hard shoulder use - signing



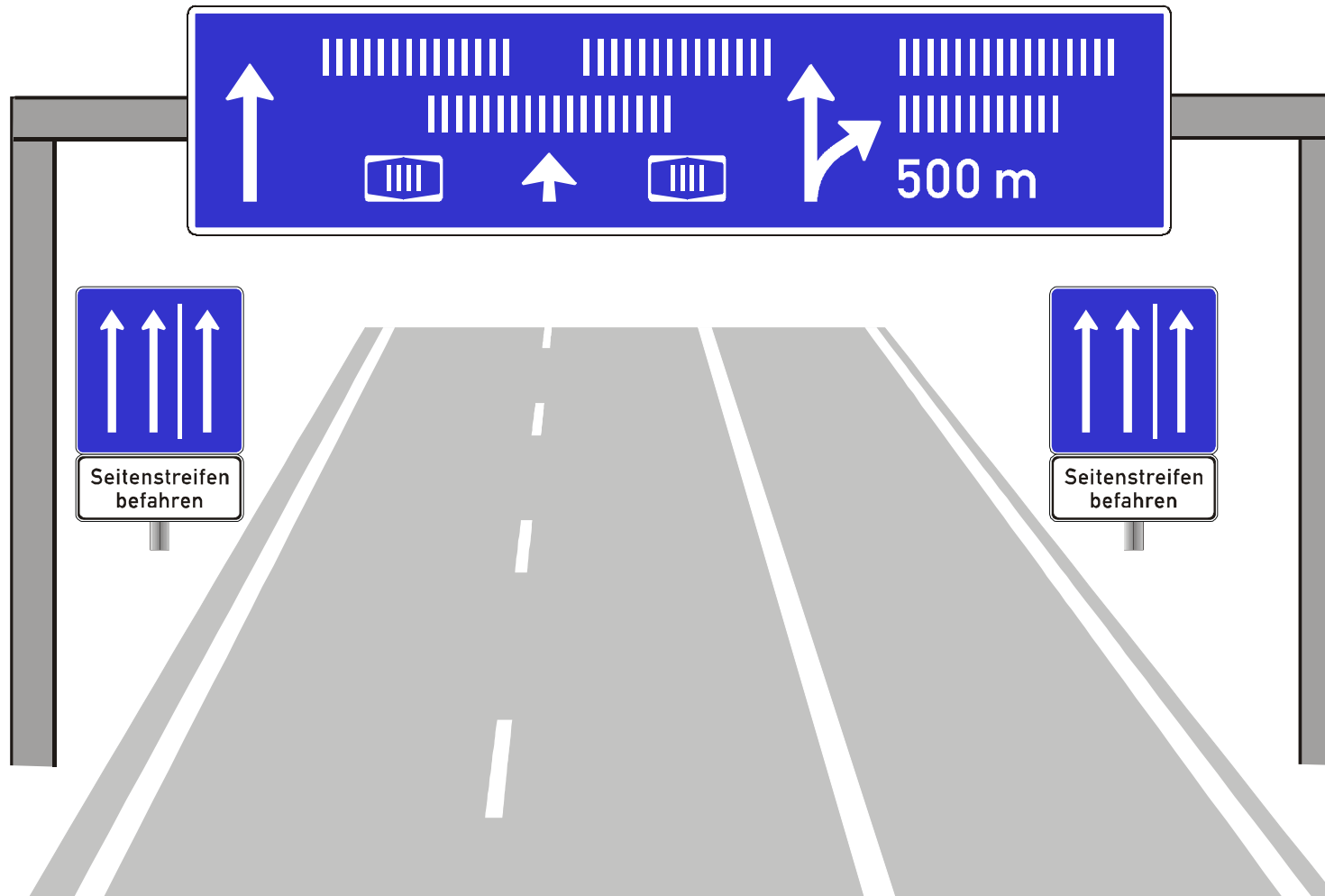
Photogrundlage: Autobahndirektion Südbayern

Hard shoulder use - signing (2)

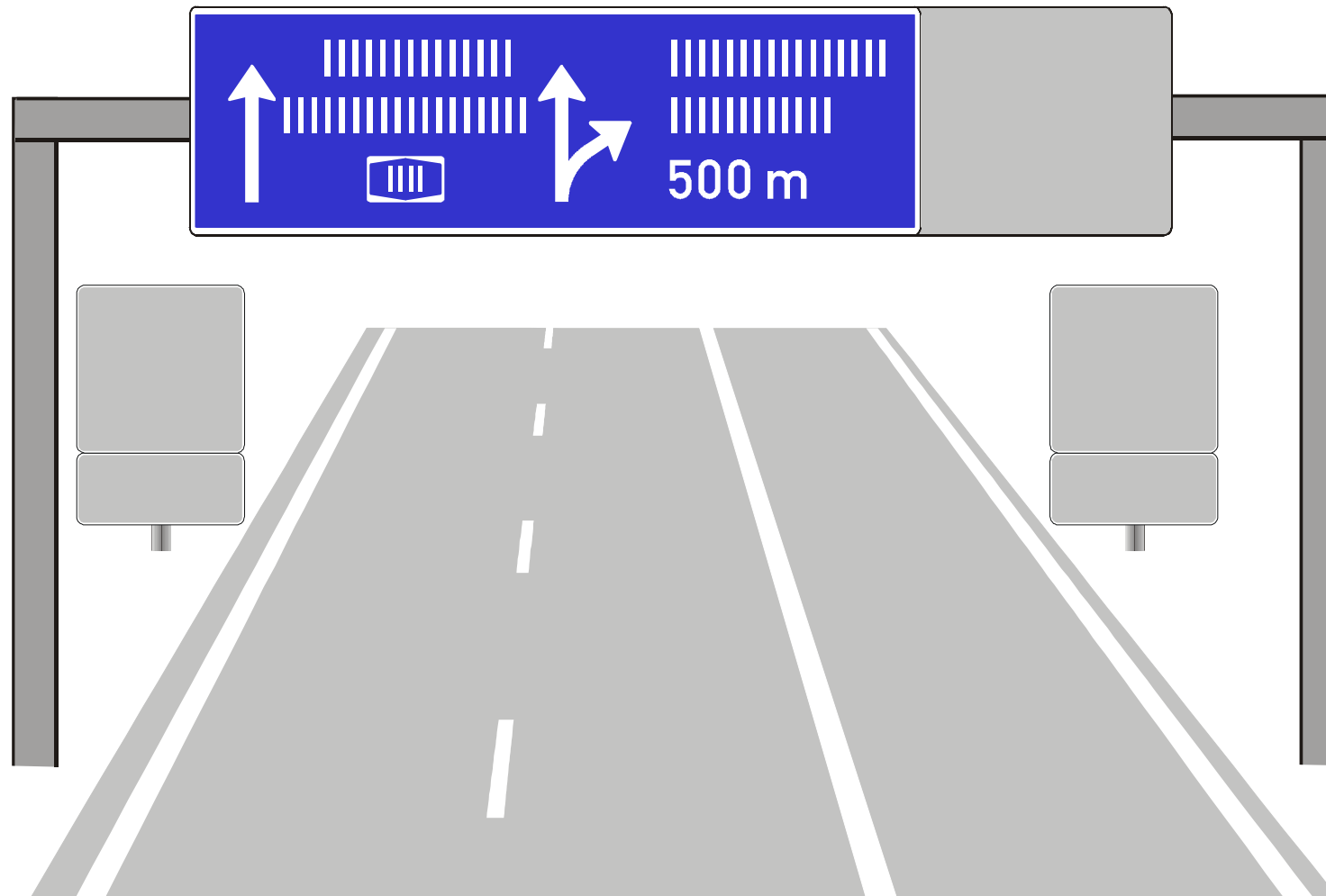


Photogrundlage: Autobahndirektion Südbayern

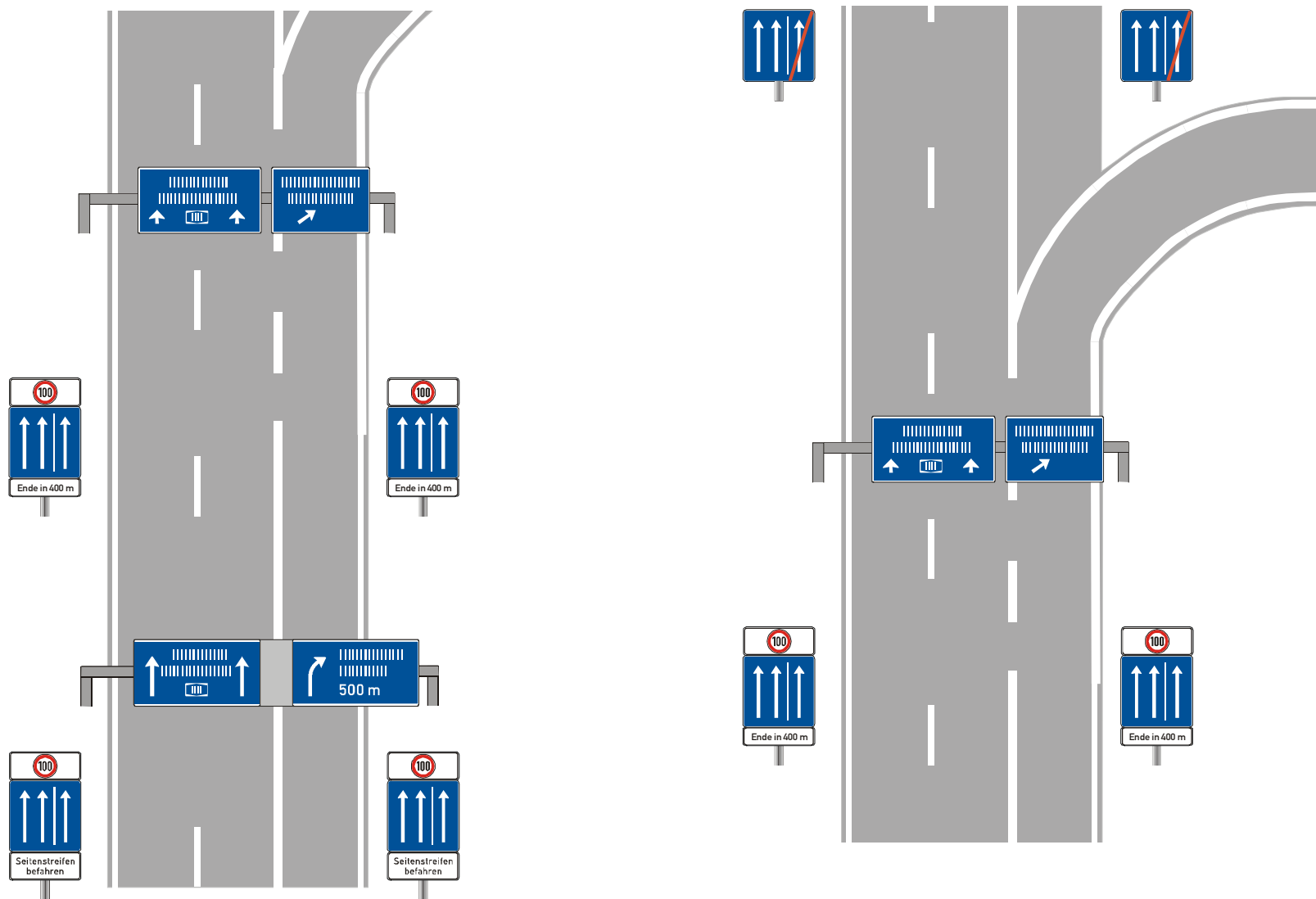
Dynamic Direction Signing



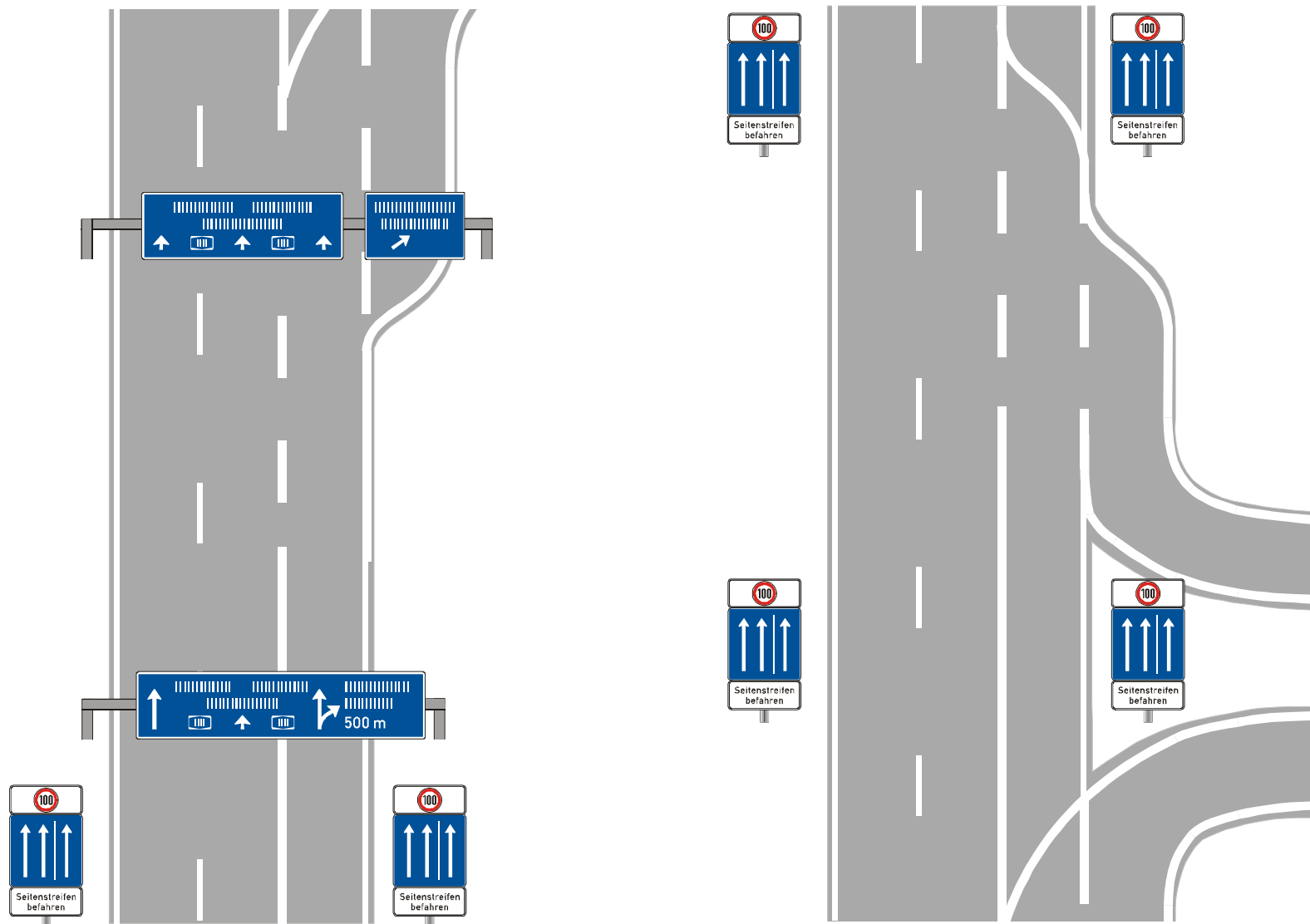
Dynamic Direction Signing (2)



Ends at Exit



Continues at Exit



A 7 to Denmark



End of Hard Shoulder Use

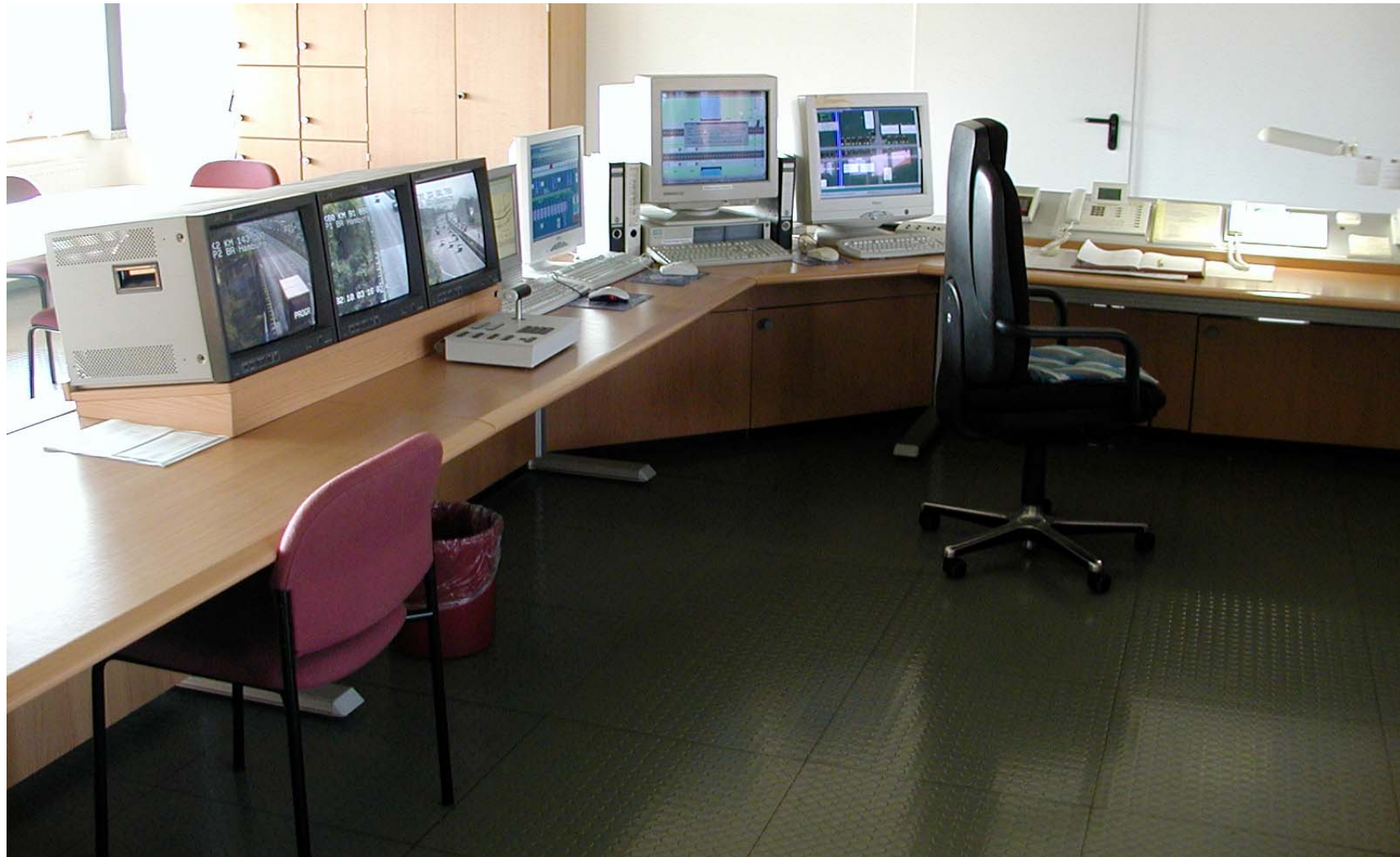




Video cameras



Traffic Management Centre

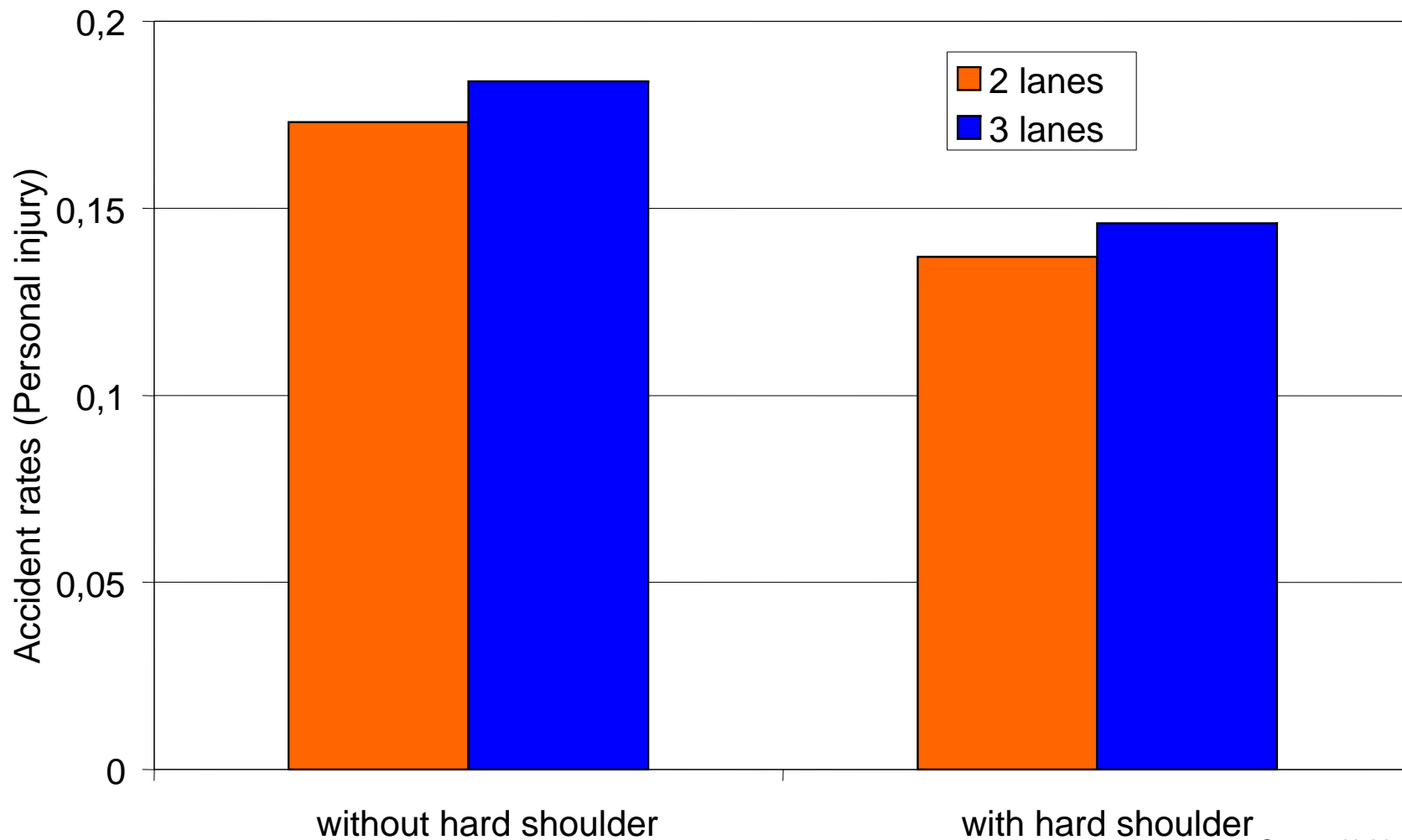


Based on general framework, including

- Investment costs
- Maintenance costs
- Traffic safety and accident costs
- Speeds and travel time expenses
- Emissions

⇒ Software tool

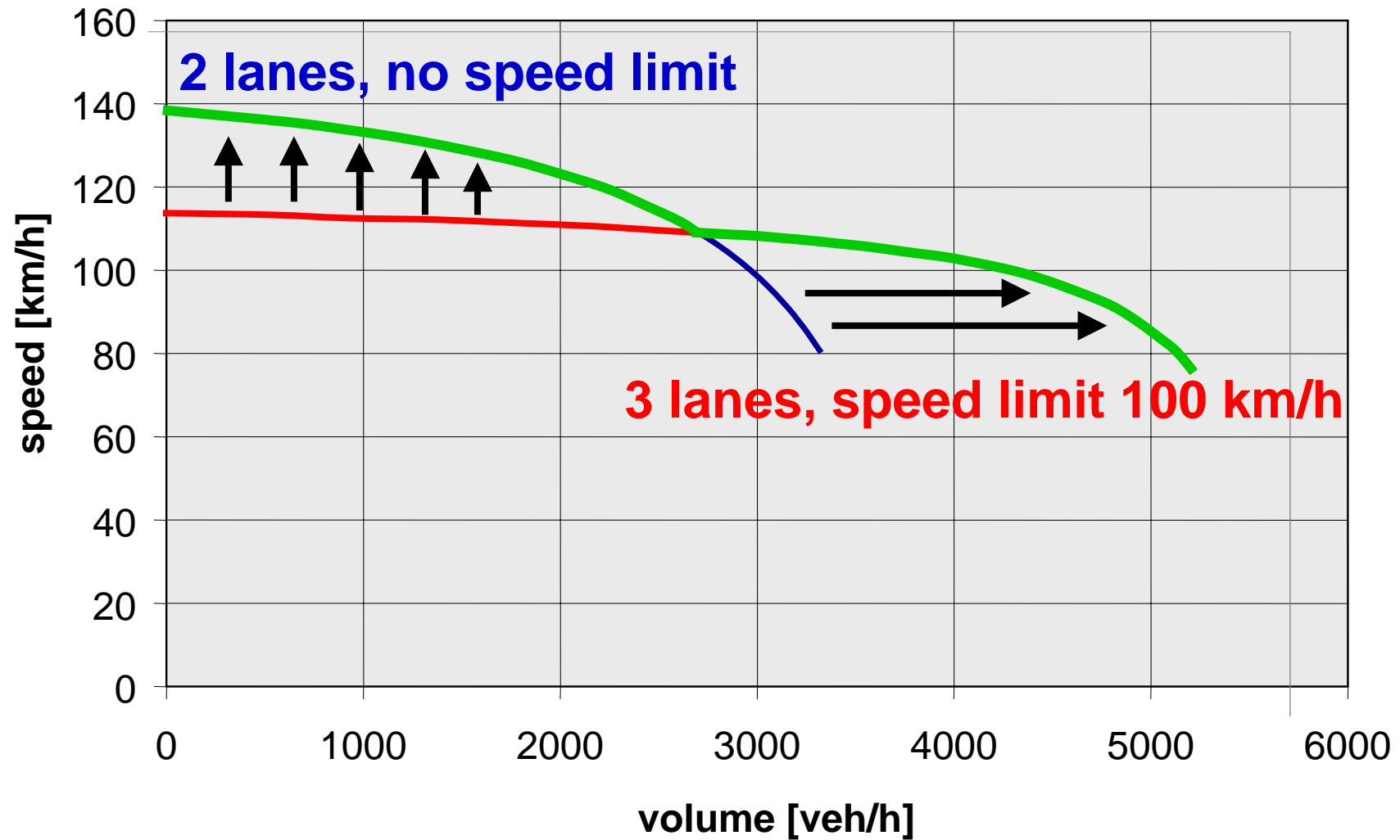
Accident rates with/without hard shoulder

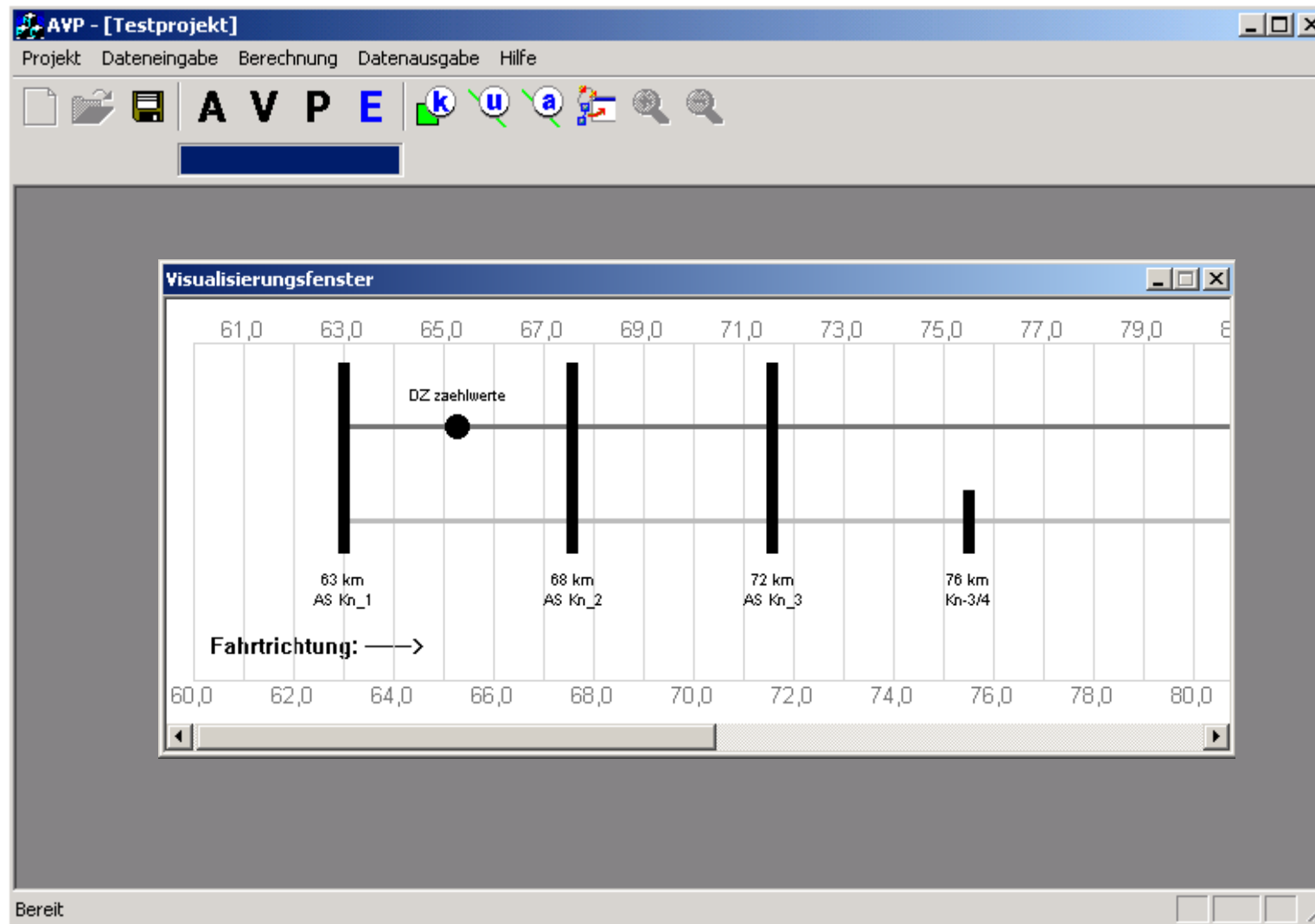


Source: Heidemann e.a.

- No change in metropolitan areas
- Outside metropolitan areas:
 - fatal and serious injury accidents: + 80 %
 - minor injury and serious damage-only accidents + 20 %
 - Other damage-only accidents reduction (congestion)

Volume-speed relationship





- traffic volume
- accidents

Abschnitte

Von Knoten Nach Knoten

Übersicht | **Unterabschnitte** | Fahrleistungen/Unfallzahlen | Freigabe

Jahr (JJJJ)

DTV-Gesamtwerte [Gesamt/24h]

<input type="text" value="52880"/>	<input type="text" value="51180"/>	<input type="text" value="50005"/>	<input type="text" value="0"/>
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Fahrleistung [Kfz*km/Jahr]

Unfallzahlen [Unfälle/Jahr]

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Kategorie 2	<input type="text" value="3"/>	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="0"/>
Kategorie 3	<input type="text" value="3"/>	<input type="text" value="17"/>	<input type="text" value="12"/>	<input type="text" value="0"/>
Kategorie 4	<input type="text" value="7"/>	<input type="text" value="11"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Kategorie 5	<input type="text" value="29"/>	<input type="text" value="67"/>	<input type="text" value="56"/>	<input type="text" value="0"/>
Kategorie 6	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Abschnittsliste

- Kn_1, 63,000, Kn_2, 68,033**
- Kn_2, 68,033, Kn_3, 71,600



costs

Kostenpositionen

Von Knoten Nach Knoten

Planfall

Obergruppe

Kostengruppe 12

└─ Untergruppe 1

Kostengruppe 12.1

└─ Untergruppe 2

Kostengruppe 12.1.2

Kostenkategorie

Maßnahmen, die nur für die Umnutzung anfallen

Mengeneinheit

Menge

Orientierungskostensatz [€/Einheit]

Gesamtkosten [€]

Nutzungsdauer JJJJ

Kostenpositionen

- 2, Nothaltmöglichkeit, Noth
- 2, sonstige Kosten, zusätzlic
- 2, Telematik + Video, Wech

- **Results**

		Planfall 1	Planfall 2	Planfall 3	Planfall 4	Planfall 5	Planfall 6
Investitionen Umnutzung	[€]	96.656	0	0	0	0	
Jährliche Kosten (Annuität)	[€/Jahr]	13.769	0	0	0	0	
BAB-Betrieb	[€/Jahr]	10.895	5.471	2.735	2.735	2.735	
Fahrzeiten	[€/Jahr]	-391	163.028	7.761	13.470	15.750	
Unfälle	[€/Jahr]	-56.000	-679.463	-3.079	92.829	40.778	
Treibstoff	[€/Jahr]	97	-16.848	-1.575	-2.228	-2.293	
Schadstoffemission	[€/Jahr]	-70	-73	-2	-21	-70	
Klimabelastung	[€/Jahr]	-15.833	-16.326	-537	-4.748	-15.833	
Nutzen gesamt	[€/Jahr]	-72.196	-549.681	2.567	99.302	38.332	
Nutzen-Kosten-Differenz	[€/Jahr]	-96.860	-555.151	-168	96.566	35.597	
Nutzen-Kosten-Verhältnis		-2,9	-100,5	0,9	36,3	14,0	

costs

effects

effect/cost-rate