

Influence of Vehicle Stability Control on Accidents on Rural Roads

GRSP Informal Group on a Pole Side Impact GTR

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Motivation

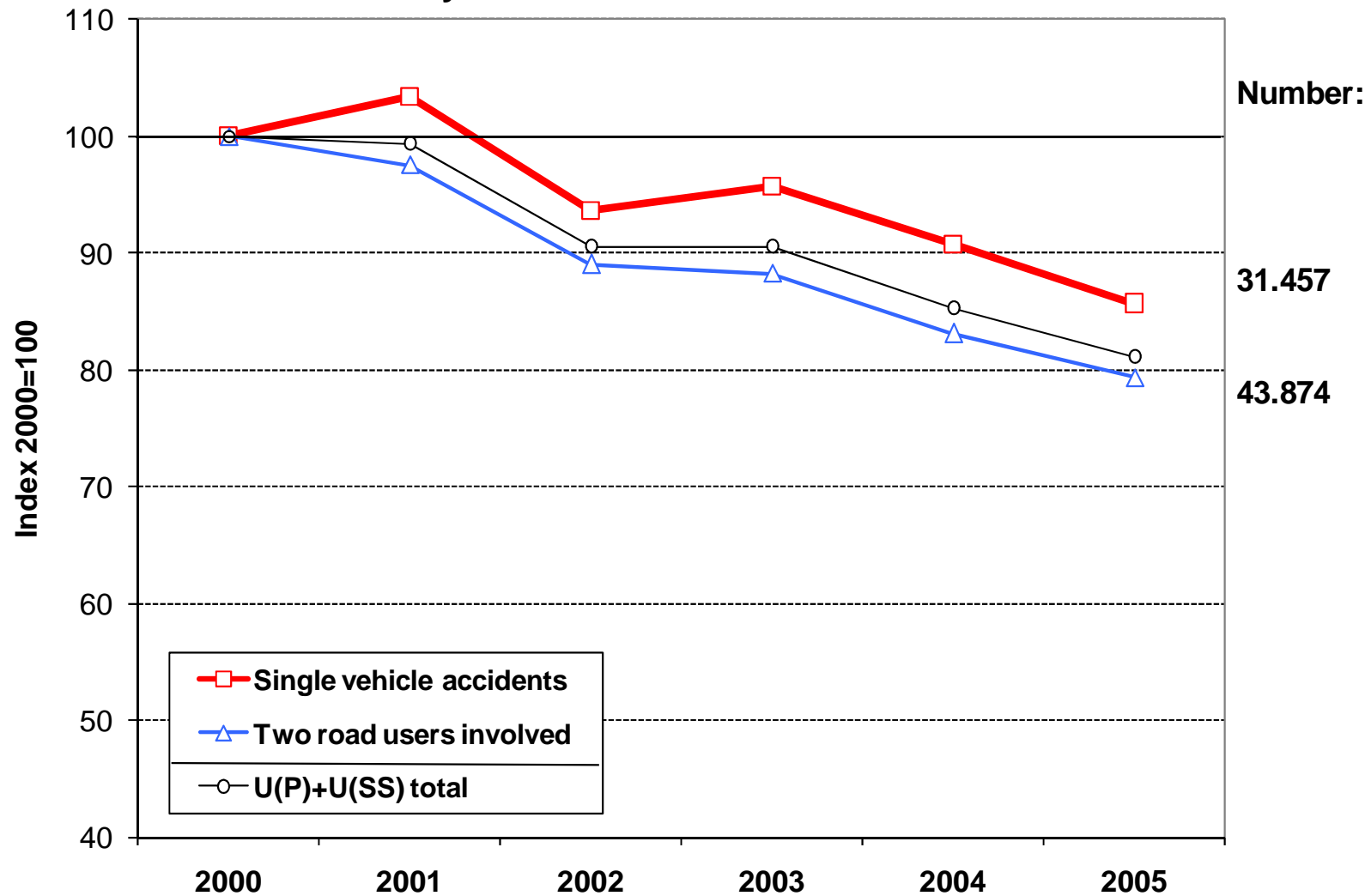
- Decline in accident figures in Germany in the last years
- Especially on rural roads

	2000	2005	
fatalities	4,767	3,228	- 32 %

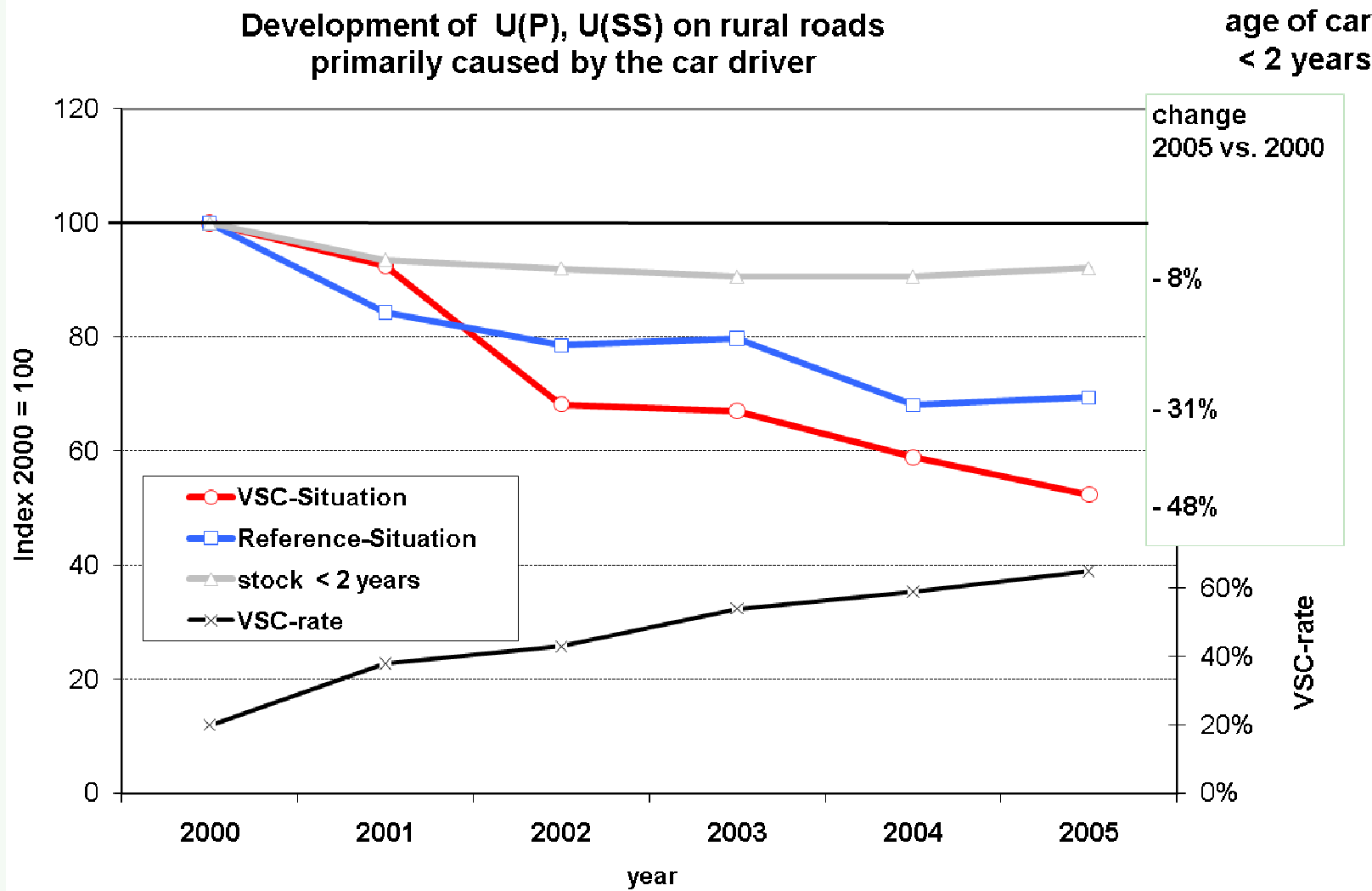
- Assumed reason: progress in automotive engineering
- Try to quantify how far modern safety systems are the cause

- Evaluation of the national road accident statistics (accidents collected by the police)
- For the years 2000 to 2005
- Consider
 - Accidents with personal damage [U(P)] or severe material damage [U(SS)]
 - only accidents on rural roads
 - only accidents with at least one passenger car involved
 - Caused by a car driver
 - Only one or two road users involved
- Assumption investigated
 - VSC should have a positive influence on loss of control accidents

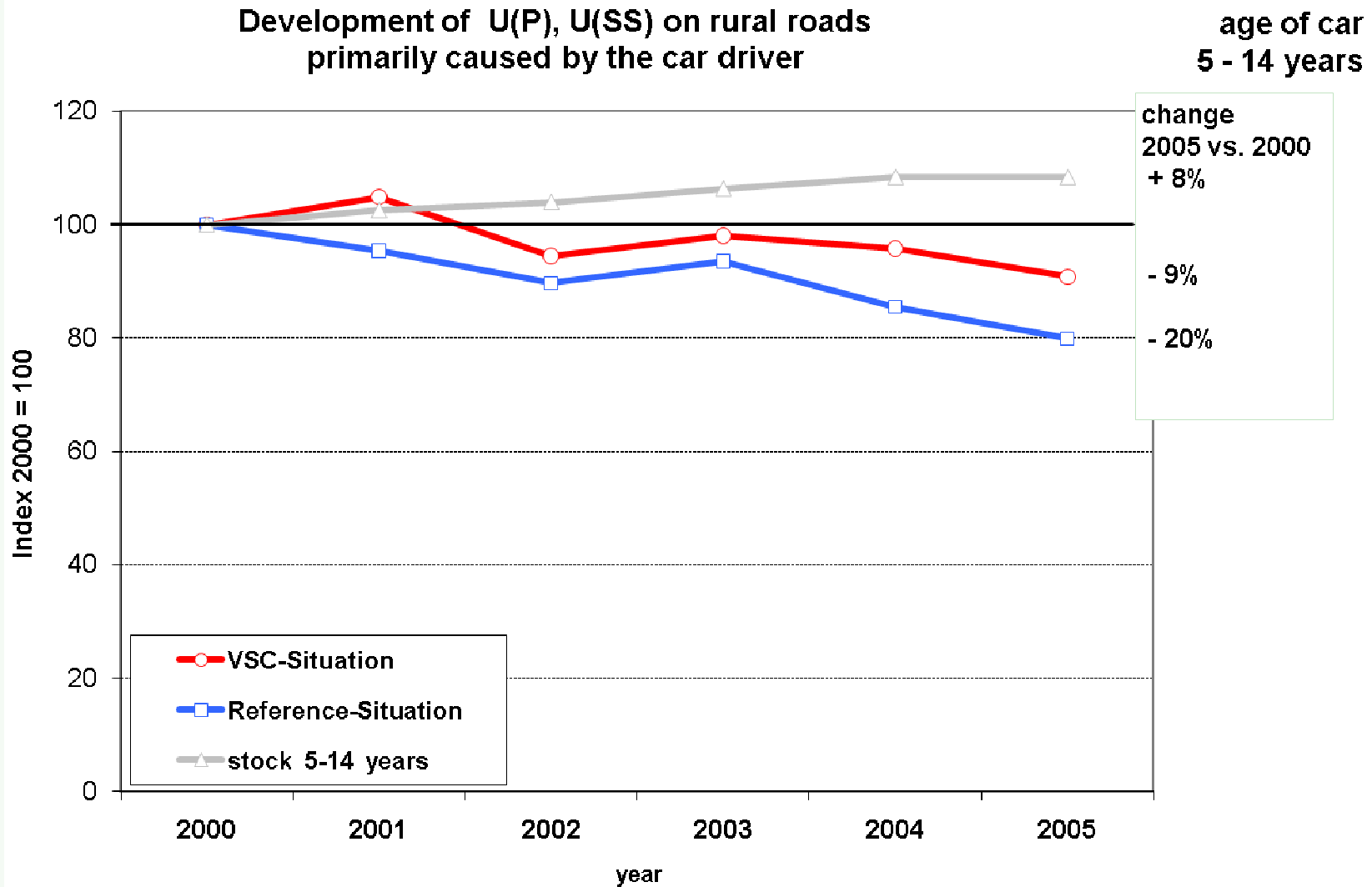
**Index: Number of accidents caused by passenger car drivers
by number of road users involved**



- Focus group: less than 2 year old cars
- Control group: 5 to 14 year old cars
- Relevant accidents (technical situation):
system should have a positive effect
-> all driving accidents
- Non-relevant accidents (reference situation):
system should have no influence on
all other accidents
 - » without turning and crossing or
 - » without benefit from BAS or Xenon



For new vehicles decrease in accident figures is higher in the VSC situation than in the reference situation



For older vehicles only small decreases can be observed for the VSC situation

⇒ **Overall effectiveness of VSC in avoiding accidents on rural roads: 28%**

Fatally and severely injured passenger car drivers:

Decrease 2004/05 vs. 2000/01	VSC situation	Reference situation
New cars < 2 years	- 47 %	- 43 %
Older cars 5-14 years	- 22 %	- 26 %

⇒ **Overall effectiveness of VSC in reducing fatally and severely injured drivers: 13 %**

Accident Severity

Indicator: severe personal damages per 1000 drivers involved

Decrease 2004/05 vs. 2000/01	VSC situation	Reference situation
New cars < 2 years	- 9 %	- 23 %
Older cars 5-14 years	- 14 %	- 12 %

- ⇒ Accidents of the reference situation appear to be less severe as in the VSC situation
- ⇒ If a collision occurs VSC can only serve to a limited extent for severity reduction
- ⇒ Physical limits (adhesion factor, speed, space for stabilising interventions) also limit the abilities of VSC



Thank you for your attention!

**More Information available in
BAST-Report No. F 70**

Primary / Active Vehicle Safety

Selection of special accident configurations in which the systems should have been effective:

- VSC situation: all driving accidents
- BAS situation: accidents with 2 participants on wet roads; car driver has caused the accident by hitting an obstacle (other car waiting or driving in front or obstacle on the road)
- Xenon situation: accidents with 2 participants during darkness; car driver has caused the accident by hitting an obstacle (either at crossings or junctions or other car, pedestrian or obstacle on the road was hit)
- Reference Situation: all other accidents without turning and crossing



Persons bearing the main responsibility for road traffic accidents with personal injury or material damage on rural roads

		2000	2001	2002	2003	2004	2005	2005 vs. 2000	2004/05 vs. 2000/01
VSC Situation	Total	36.983	38.686	33.948	34.808	33.458	31.809	-14%	-14%
	Vehicle Age < 2 Years	3.098	2.868	2.114	2.078	1.826	1.623	-48%	-42%
	5-14 Years	25.165	26.404	23.768	24.682	24.110	22.862	-9%	-9%
Reference Situation	Total	22.126	20.956	19.692	20.244	18.444	17.770	-20%	-16%
	Vehicle Age < 2 Years	2.401	2.026	1.886	1.916	1.634	1.666	-31%	-25%
	5-14 Years	14.143	13.495	12.688	13.233	12.094	11.300	-20%	-15%
Passenger Car Population	Total	43.772.260	44.383.323	44.657.303	45.022.926	45.375.526	46.090.303	5,3%	4%
	Vehicle Age < 2 Years	7.165.905	6.705.341	6.596.713	6.490.253	6.491.578	6.599.765	-7,9%	-6%
	5-14 Years	23.856.221	24.460.516	24.803.035	25.368.669	25.855.222	25.850.242	8,4%	7%
Fitment Rate VSC	Total	9%	16%	18%	23%	29%	38%		
	Vehicle Age < 2 Years	20%	38%	43%	54%	59%	65%		

Table 1: Development of accidents in the VSC and reference situation for new and older vehicles

		2000	2001	2002	2003	2004	2005	2004/05 vs. 2000/01
VSC Situation	Total	9.957	9.533	8.378	8.222	7.648	6.882	-25%
	Vehicle Age < 2 Years	804	673	558	484	457	325	-47%
	5-14 Years	6.811	6.562	5.843	5.871	5.493	4.971	-22%
Reference Situation	Total	3.002	2.680	2.374	2.435	2.220	2.003	-26%
	Vehicle Age < 2 Years	263	212	175	164	151	122	-43%
	5-14 Years	2.073	1.852	1.651	1.706	1.540	1.368	-26%

Table 2: Development of severe personal damages in accidents on rural roads with passenger cars

Consequences for the Driver		2000/2001		2004/2005		04/05 vs. 00/01	
		<2 Years	5-14 Years	<2 Years	5-14 Years	<2 Years	5-14 Years
VSC-Situation	GT	163	1.538	92	1.218	-44%	-21%
	SV	1.314	11.835	690	9.246	-47%	-22%
	LV	2.495	19.709	1.424	19.435	-43%	-1%
	UV; O.A.	1.994	18.487	1.243	17.073	-38%	-8%
	Sum	5.966	51.569	3.449	46.972	-42%	-9%
Reference Situation	GT	55	441	34	361	-38%	-18%
	SV	420	3.484	239	2.547	-43%	-27%
	LV	997	6.719	687	5.997	-31%	-11%
	UV; O.A.	2.955	16.994	2.340	14.489	-21%	-15%
	Sum	4.427	27.638	3.300	23.394	-25%	-15%

Table 3: Development of the consequences of accidents for the car driver



Severity Indicator		2000	2001	2002	2003	2004	2005	2004/05 vs. 2000/01
VSC-Situation	Total	269	246	247	236	229	216	-14%
	Age of Car							
	< 2 Years	260	235	264	233	250	200	-9%
	5-14 Years	271	249	246	238	228	217	-14%
Reference Situation	Total	136	128	121	120	120	113	-12%
	Age of Car							
	< 2 Years	110	105	93	86	92	73	-23%
	5-14 Years	147	137	130	129	127	121	-12%
Stock (Mio)	Total Stock	43.8	44.3	44.7	45.0	45.4	46.1	3,8%
Age of Car	< 2 Years	7.2	6.7	6.6	6.5	6.5	6.6	-5,6%
	5-14 Years	23.9	24.5	24.8	25.4	25.9	25.9	7,0%
Equipment Rate VSC (Stock)		9%	16%	18%	23%	29%	38%	
Equipment Rate VSC (New Registrations)		20%	38%	43%	54%	59%	65%	

Table 4: Development of the severity indicator (severe personal damages (SP) per 1.000 drivers involved) for VSC and reference situation