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Can light engineering measures make a difference?

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Introduction

Road environments are already heavily developed

- Building new infrastructure is not a solution!
- Solutions should be less obstructive
- Do not interfere with existing infrastructure elements
- Instead: Seek management and additions in the road environment



Aims and Objectives

- The examination of several “light engineering” measures
- Assessment of their impact on road safety of 5 specific measures:
 - signage installation/ improvement for workzones
 - road markings implementation
 - installation of chevron signs
 - edgeline rumble strips
 - traffic sign installation/ traffic sign maintenance



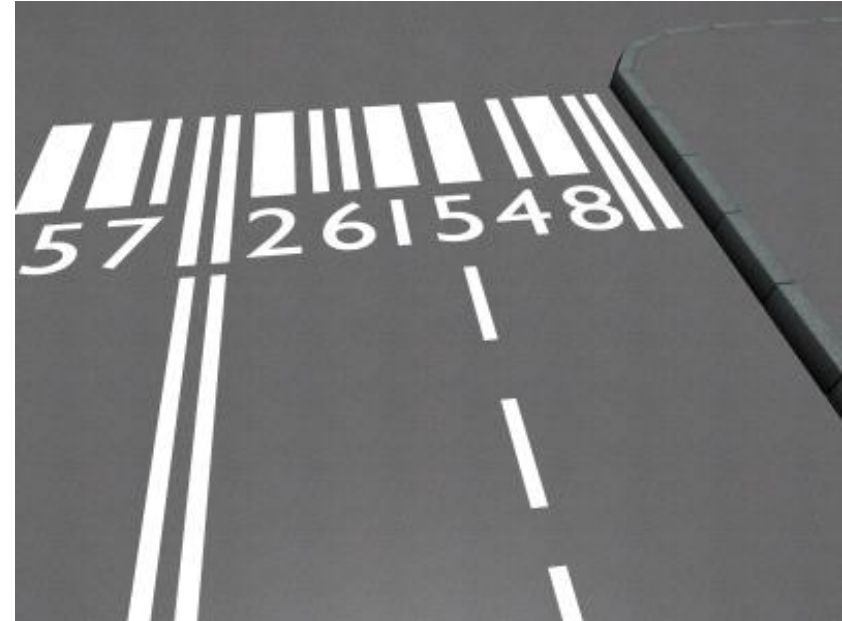
Methodology

- A clearly defined methodology was developed
- Carried out within the SafetyCube project
 - rigorous literature search
 - analysis of studies in terms of design
 - methods and limitations and synthesis of findings and meta-analyses
- Studies were selected and analyzed in a set taxonomy consisting of light engineering measures
- Analysis options: meta-analysis, vote-count, qualitative review



Delineation and Road Markings

- Qualitative review-type analysis
 - Mostly positive effects on road safety
- A meta-analysis showed significant correlations with mean speeds
- Positive effects of repainting the barrier lanes on vehicle encroachments
- A few unclear effects for the effect of line and number markings on median speeds
- Some speed increases due to a sense of security to drivers



Signage installation and improvement for workzones

- Qualitative review-type analysis
- Most studies reported speed reductions
- Mixed results also present for speed limit compliance rate
- Lack of statistical tests in a number of studies
- Positive effects on lane distribution
- Positive impacts on road safety overall



Chevron signs

- Vote-count analysis
- Significant reductions in
 - crash numbers
 - speed due to chevrons and full-post chevrons
 - vehicle lateral lane position
- Beneficial effects on speed both for Flashing Yellow (FY) chevrons and Flashing Yellow (FY) signposts
- The combination of FY chevrons and FY curve signs was found to have a small and inconsistent effect

Outcome definition	Tested in number of studies	Result (number of studies)		
		↑	-	↓
Crash Reduction	2	-	-	1
Mean Speed	4	-	-	4
Mean Lateral position	2	-	-	2
Exceeding speed limit vehicles	1	-	1	-
Behavioural Safety Indicators [Simulation]	1	-	-	-
Total Studies = 7				



Edgeline rumble strips

- Vote-count analysis
- An improvement in road safety both for:
 - single treatments (edgeline rumble strips only)
 - combined treatments (edgeline rumble strips and widening of shoulder width)
- Reduction in all single-vehicle run-off road crashes
- The presence of edgeline rumble strips does not affect severe crash occurrence

Outcome definition	Tested in number of studies	Result (number of studies)		
		↑	-	↓
Total Crashes	4	-	-	4
Severe crashes	4	-	2	2
Crash severity probability	1	-	1	-
Lateral position Indicators	1	-	-	1
Encroaching onto or across edgeline	1	-	-	1
Passing manoeuvre indicators	1	-	1	-
Total Studies = 5				

Traffic sign measures

- Qualitative review-type analysis
- Reduction of the displayed speed limit has a limited impact on crashes (including injury and fatal crashes).
- Significant decrease in mean speed and for all the different speed exceedance intervals.
- Sign treatment shifts motor vehicles away from the rightmost lane positions.
- Fluorescent SYG (Strong Yellow Green) warning signs → marginal improvements in perceived safety at crossing sites.



Conclusions

- Assessment of several light engineering measures
 - evaluating their impact on road safety
 - based on its documented impacts in synopses
 - various outcome indicators (e.g. crash counts, mean speed, more indirect behavioural effects)
- Light engineering measures are beneficial for road safety.
- Findings are particularly useful for developing road safety policy measures.
- All results available at: <https://www.roadsafety-dss.eu>.





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