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Effectiveness evaluation of section speed control in Czech motorway work zones

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Introduction

- Speed is the most influential risk factor, attributed to ~40% of fatal accidents.
- One of speed management techniques is **section speed control (SSC)**, based on detection of average driving speed between two cameras, with following enforcement.
- International studies found SSC effective, with **average speeds reduced by up to 20 km/h** and **number of serious accidents almost halved**.
- However, safety impact of Czech SSC has not been evaluated yet. In addition, SSC in Czechia is non-typically used in motorway work zones. We aimed to fill this gap by **assessing the effectiveness of SSC in selected Czech motorway work zones**.

Data

Where? 3 sections on motorway D1 (average length 6 km + 1 km up/downstream)

When? four time periods (TPs) in 2016–2017

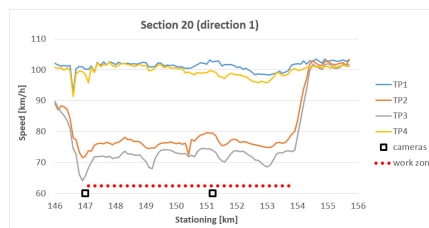
- TP1 ... normal operation before SSC
- TP2 ... work zone
- TP3 ... work zone with SSC
- TP4 ... normal operation after SSC

What?

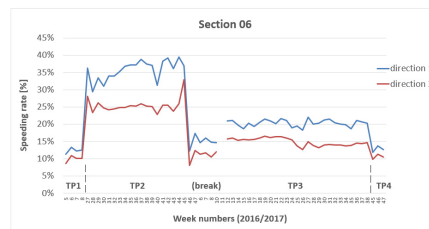
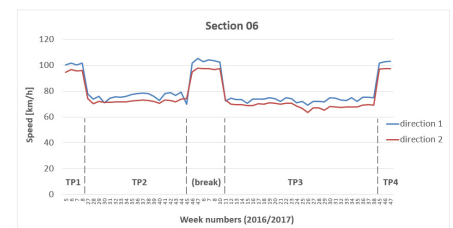
- **Traffic volumes** (AADT data)
- **Speed and speeding** (from floating car data – FCD, with > 30,000 (mostly personal) veh. in each section, ~1000–2000 drives each day) *
- **Accidents** (public on-line data + details from Traffic Police)

Examples of results

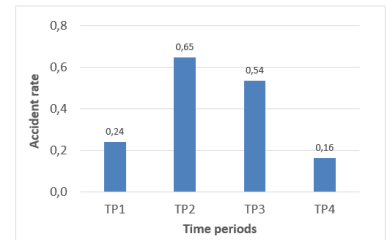
Average speed profiles “in length” *



Average speed profiles “in time”



Speeding rates



Accident rates

Summary

In work zones we found:

- **lower speed and speed variance** (but not as low as in non-work zone conditions)
- **higher accident rate** (but typically side-swipes without injuries)

Adding section speed control to the work zones helped decrease in all indicators.

After removal of work zones and section speed control, all indicators returned to almost original values.

	TP1	TP2	TP3	TP4
	normal operation	work zone	work zone + section speed control	normal operation
	"before"			"after"
Average speed	~ 100 km/h	decrease by ~ 20 km/h	decrease by ~ 3 km/h	increase to ~ 100 km/h
Speed variance	~ 23 km/h	decrease by ~ 2 km/h	decrease by ~ 2 km/h	increase to ~ 24 km/h
Speeding	~ 10%	increase by ~ 20%	decrease by ~ 10%	decrease to ~ 10%
Accident rate	~ 0.2 accidents per 1 million veh-km/year	increase by ~ 170%	decrease by ~ 17%	decrease to ~ 0.2

Further notes:

- * Identified V-shaped speed profiles (“kangaroo jumps”) were independent of the location of SSC cameras.
- * Limitations: low number of sections, aggregation of AADT, representativeness of FCD

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