

COLLECTIVE SPEED CONTROL ON GERMAN MOTORWAYS

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ABSTRACT

Collective Speed Control on German Motorways as a means of intelligent speed management, on the basis of variable message signs (VMS), is increasingly effected on German motorways. VMS are applied to achieve the following traffic policy objectives:

Sustainable mobility, safety, traffic fluidity, efficient exploitation of transport resources, environmental protection, economic energy consumption.

It should be stated that speed itself is no transport policy objective. VMS are used to display information, warnings, recommendations and prescriptions. They are legally based on international conventions (European rules concerning road traffic, signs and signals = so-called Vienna Convention), national traffic codes. Thus they are legal instruments for traffic management.

The application of VMS has proved to be very effective as far as the above mentioned objectives are concerned. Their efficiency depends very much on drivers' acceptance. VMS can be enforced; however, the more important bases for acceptance is drivers insight into adequateness of temporary prescriptions.

It should clearly be stated that the driver is included as "intelligent controller". The driver has the final responsibility and control over his car.

Existing Traffic management systems using VMS and based on reliable control algorithms have proved to be very effective and have yielded very positive accident experience.

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- Definition “VMS”
- VMS and their Legal Environment
- Applications
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- VMS and their Technical Environment
- Standardisation
- Exploitation

OBJECTIVES OF TRAFFIC MANAGEMENT

Sustainable Mobility

- Traffic Safety
- Traffic Fluidity, Ease of Operation
- Accessibility of Cities and Regions
- Exploitation of transport capacity
- Environmental Protection
- Economic Energy Exploitation

STRATEGIC OBJECTIVES

- Prevent Congestion
- Prevent Accidents
- Keep Traffic Flowing
- Alert Drivers
- Protect Road Works
- ...

DEFINITION “VMS”

- Traffic Sign
- **Message** Sign
- **Variable** Message Sign

COLLECTIVE SPEED CONTROL IN A COMPETITIVE ENVIRONMENT

- Police on the Spot
- Variable Message Signs (VMS)
- Traffic Broadcasts
- RDS-TMC
- Individual Route Guidance & Navigation Systems
- Driver Assistance Systems
- Platooning

WHY COLLECTIVE SPEED CONTROL?

- VMS as Legal Instrument to influence Drivers/Traffic
- Internationally applicable

LEGAL BACKGROUND OF VMS SYSTEMS

- International Vienna Convention on Traffic Signs and Signals
- National Constitution
- National Traffic Legislation

POSSIBILITY OF MANDATORY REGULATIONS:

- Police Prescriptions
- Signals, Signs, (VMS)
- Enforceable, but ...
- ...Effects depending on Driver Acceptance

MOTORWAY TRAFFIC MANAGEMENT

- Network Control
- Stretch Control
- Junction/Lane Control

REROUTING SYSTEMS

“Substitutive System”



- Same Appearance as Static Signposts
- Destinations on Rotatable Prisms
- Principle of Continuity
- Deviation from „Normal“ Route Guidance not clearly visible

“Additive System”

- Specific Conspicuous Sign Layout
- Arrow as Trailmark on Alternative Route = Continuity
- Indication of Type and Place of Hazard



STRETCH CONTROL

- Information
- Warnings
- Recommendations
- Prescriptions



Stretch Control

Anhang 1

RWVA

Anhang 1

Streckenbeeinflussung

Anordnung der WZG im Anzeigequerschnitt

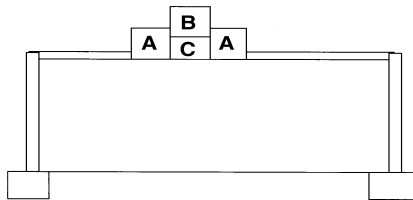


Bild A1 WZG an Verkehrszeichenbrücke über zweistreifigen Richtungsfahrbahnen*)
Schema

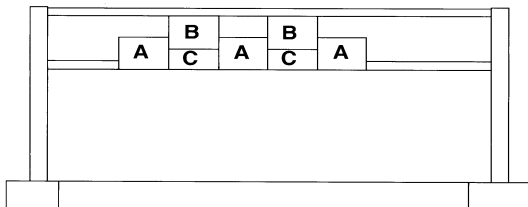
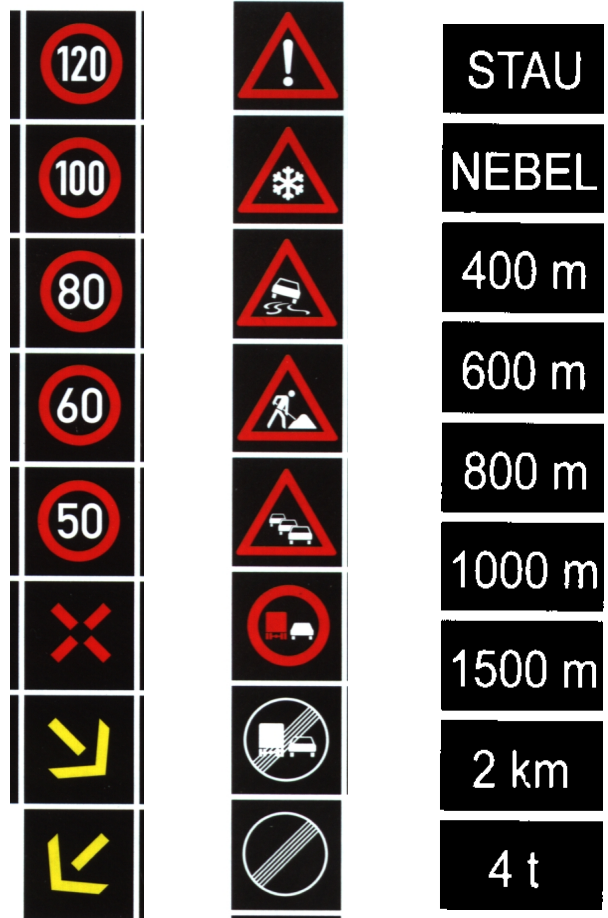


Bild A2 WZG an Verkehrszeichenbrücke über dreistreifigen Richtungsfahrbahnen*)
Schema

- Typical Arrangement of VMS
- Type A: Lane oriented
- Type B & C: Carriageway oriented

POSSIBLE MEASURES

- Lane Allocation/Blockage
- Different Regulations for individual Lanes
- Overtaking Regulations
- Warnings
- Safeguarding Roadworks
- Flexible Speed Regulations



COLLECTIVE SPEED CONTROL ...

- ... affects the driver
- ... includes driver reactions
- ... leaves full responsibility with the driver
- ... doesn't immediately affect vehicle control, i.e.:
 - ⇒ *no automatic acceleration*
 - ⇒ *no acceleration blockage*
 - ⇒ *no automatic braking*

FRAME CONDITIONS FOR DRIVER DECISIONS

- Permanent and area-wide valid Regulations
- Local static Prescriptions
- Local dynamic Prescriptions (**Variable Message Signs**, Police Instructions)

FACTORS AFFECTING ACCEPTANCE

- Awareness of Regulations
- Comprehensibility
- Adequateness of Prescriptions
- Advantage for Drivers
- Earlier Experiences

BASIS OF COLLECTIVE SPEED CONTROL

- Prescriptions and Recommendations adequate to prevailing Situations
- Drivers as responsible and intelligent Partners

CONSEQUENCES

- Understandable and useful regulations are well accepted.
- Notably senseless prescriptions are not followed.
- If the situation requires so, drivers even drive slower than with signed maximum speed.

RESUMÉ

- There is no rigid “mechanical connection” between traffic management measure and traffic flow.
- It is a “flexible system” which can be used to realise various strategies adequate to prevailing conditions .

DRIVER RESPONSIBILITY

- The inclusion of the driver underlines that in all situations responsibility is with the driver.
- Positive effects on traffic flow and accident statistics result from high driver acceptance

TRAFFIC MANAGEMENT IN GERMANY

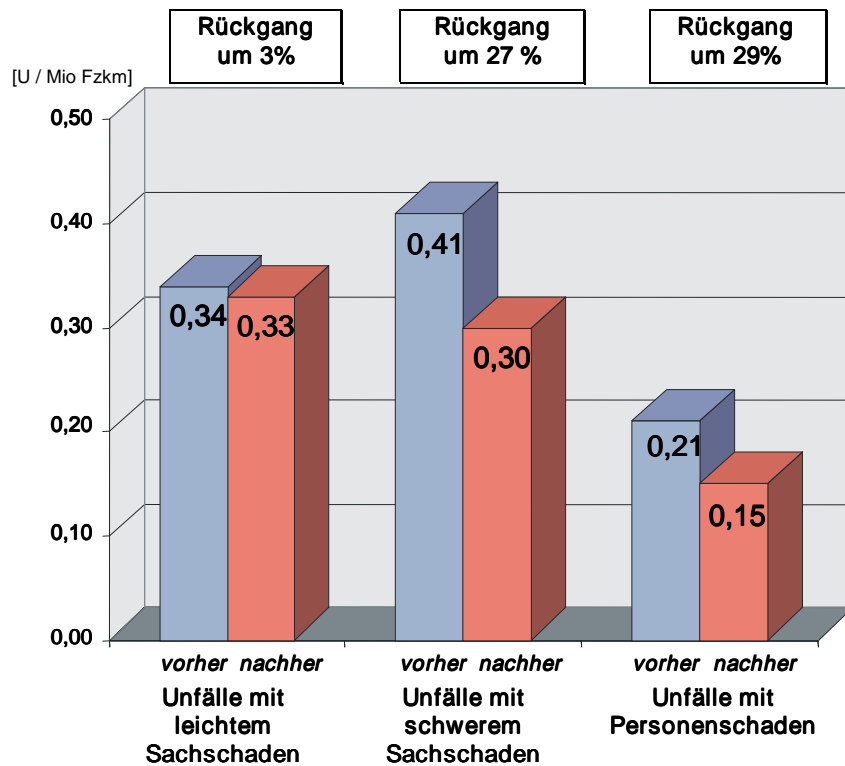
- 800 km Stretch Control
- 1500 km network Control

EXAMPLES OF SPEED CONTROL

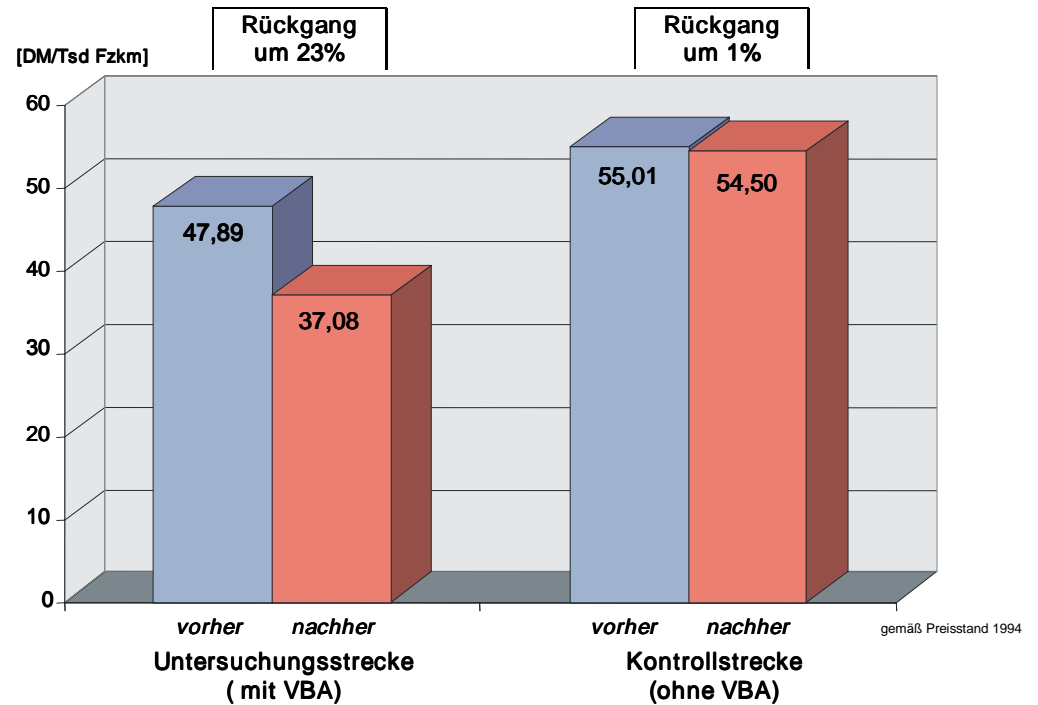
- A5 Frankfurt - Bad Homburg - Wetterau
- A4 Köln - Aachen

More Safety with VMS: BAB A5 Bad Homburg-Frankfurt

Accident Rates

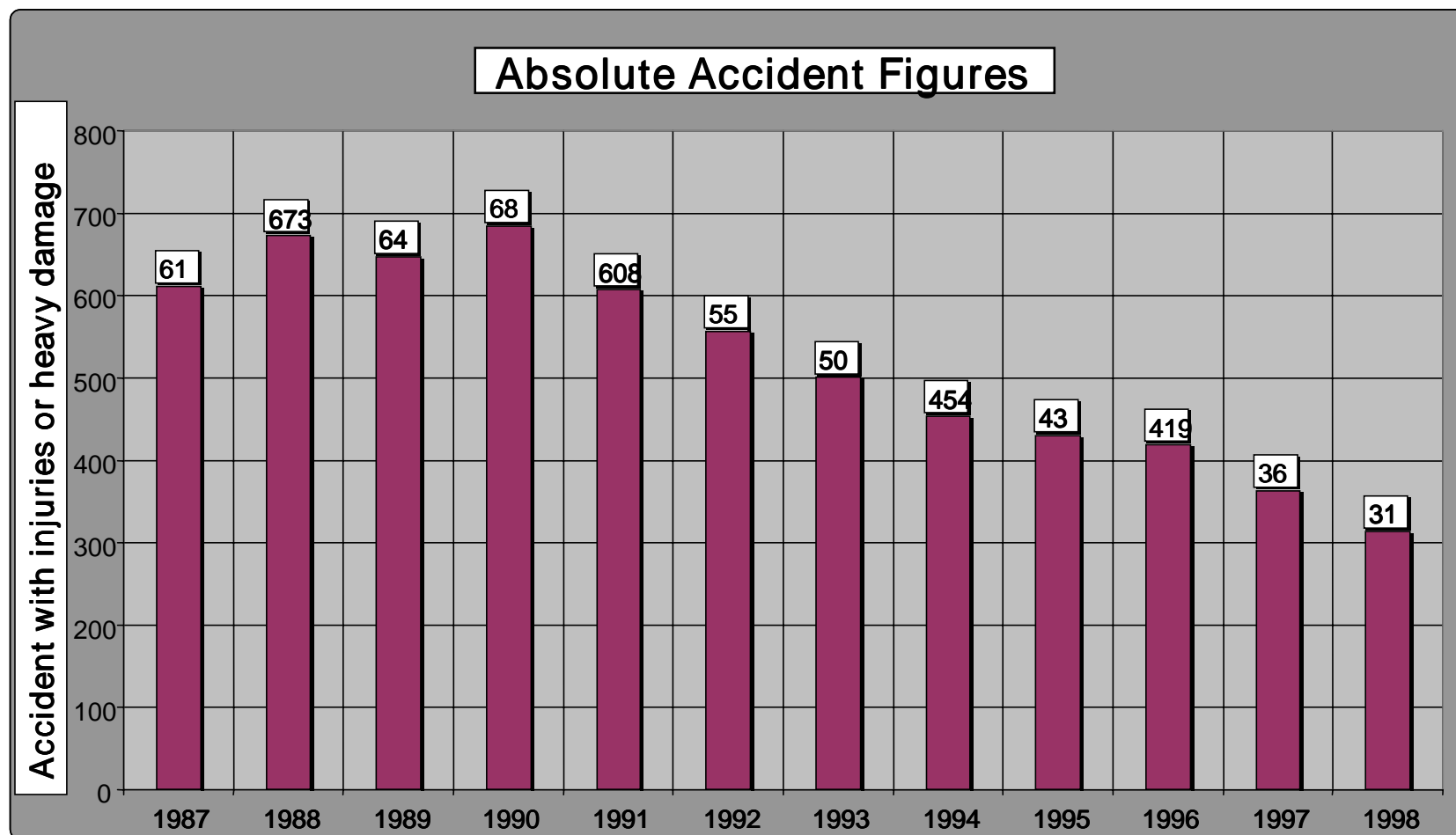


Accident Cost Rates



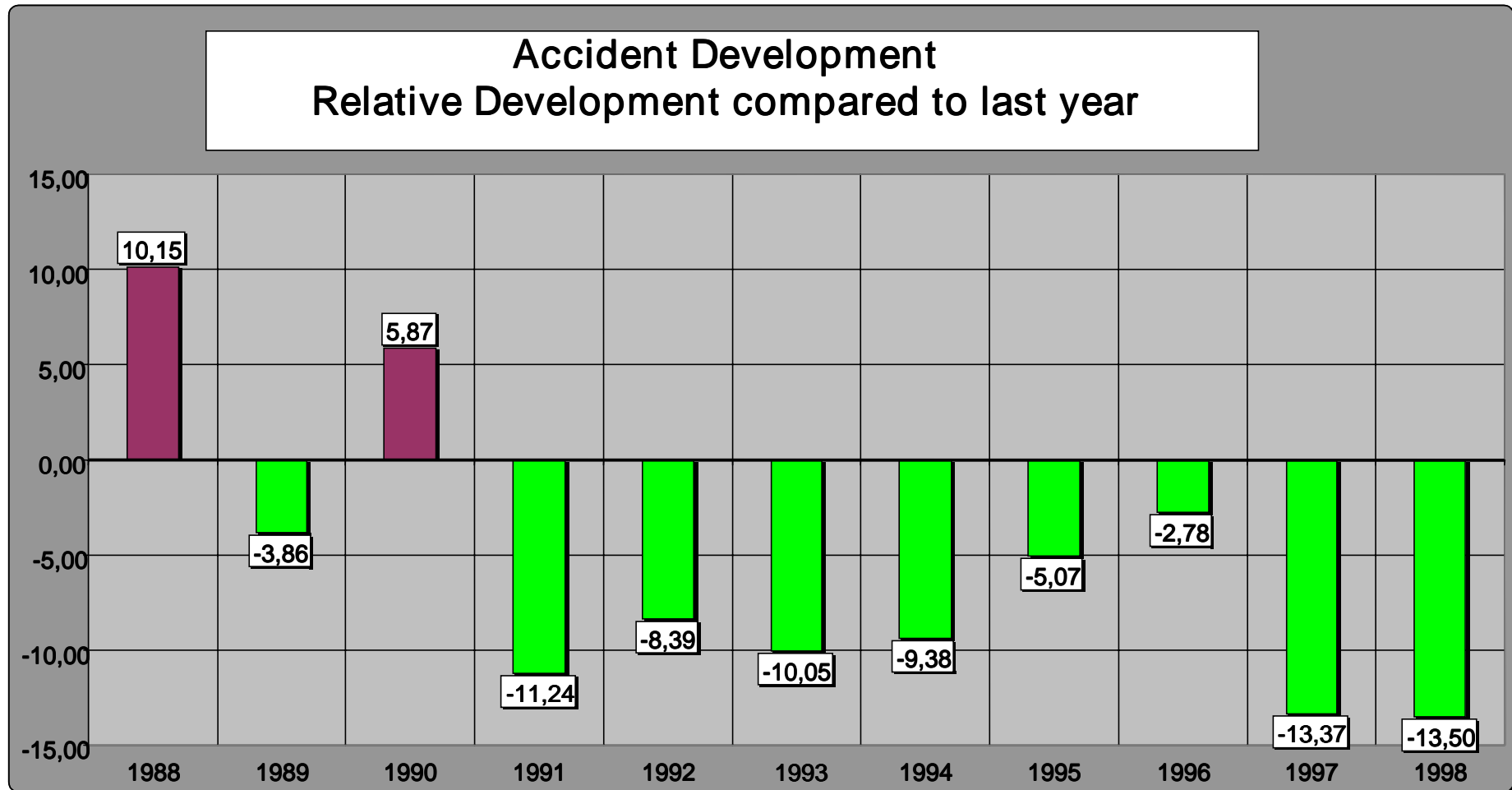
Quelle: Hess. Landesamt für
Straßen- und Verkehrswesen

BAB A4 Köln - Aachen



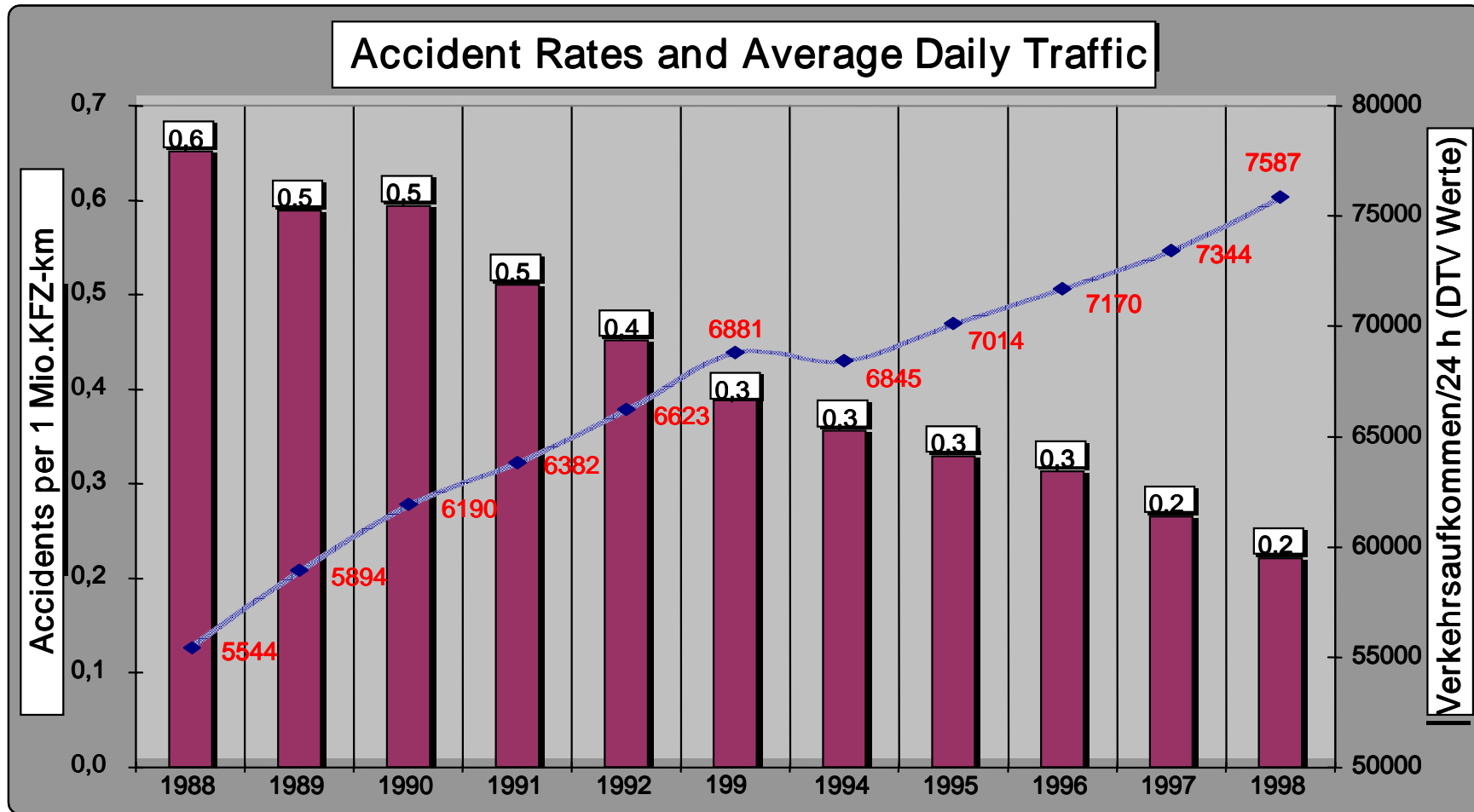
Quelle: RVLZ
Köln

BAB A4 Köln - Aachen



Quelle: RVLZ Köln

BAB A4 Köln - Aachen



Quelle: RVLZ Köln

CONCLUSIONS

- Dynamic speed management is advantageous compared to fixed regulations.
- The driver as “intelligent controller” accepts adequate flexible regulations.
- In accordance with valid legislation the driver keeps full driving responsibility.
- Collective Speed Control is indispensable also in the future