EVA

Telematic controlled measures to increase the traffic flow quality at construction sites with lane drop offs on motorways

Verkehrstelematisch gesteuerte Maßnahmen zur Erhöhung der Verkehrsflussqualität bei baustellenbedingter Fahrstreifensubtraktion auf Autobahnen

Funding: National (Austria)
Duration: Feb 2004 - Aug 2006
Status: Complete with results

Background & policy context:

Capacity bottlenecks in the road network limit the capacity of the adjacent sections. A frequent cause for such capacity bottlenecks in the major road network are lane drop offs in the context of construction sites. On Austrian motorway, construction site caused by capacity bottlenecks are concentrated to the summer, when the traffic volume rises by reasons of holiday traffic, in addition to the common level. These arrays are designed as merging segments, where vehicles change from the off dropping to the remaining lanes. These manoeuvres cause discontinuity in the traffic flow, so that the capacity of a merging section is lower than the one of a basic freeway lane.

Experiences show, traffic overloads cause unstable conditions of the traffic flow, which reduce the capacity clearly and also result in a decrease of traffic safety; suitable traffic management and information measures can increase the capacity; compliance suffers from discrepancies between posted information and actual traffic situation.

Objectives:

The objective of this feasibility study is to identify factors that influence the traffic flow and to develop condition-responsive measures to increase capacity and safety. The next step is is to develop and test measures, which increase the traffic flow quality, the capacity and the traffic safety at construction sites with lane drops (follow-up-project DIVVA).

Methodology:

This deficit can be abated by a traffic condition dependent control. The question is analysed, which measures are suitable to increase both the traffic quality and the capacity in that certain traffic bottleneck situations. Traffic safety shall be guaranteed and as possible increased. The statutory framework and regulations are analysed. The state of the art is surveyed in an international literature review. Measurements were conducted to test several measures. For this purpose velocity, time and vehicle length were measured in multiple cross sections. To analyse traffic behaviour and interactions between drivers the weaving area was also videotaped.

Parent Programmes:
I2 - Intelligent Infrastructure

Institute type: Public institution
The most important findings are:

- A speed limit of 60 km/h can maintain flowing traffic conditions slightly longer than a speed limit of 80 km/h.
- A speed funnel can delay the beginning of congestion distinctly. Therefore it is appropriate to survey the application of a speed funnel in an on-road test.
- In case of flowing traffic with higher speeds it is favourable that drivers change lane previous to the lane drop. So a longer area (some 100 meters) can be used for merging and drivers can find a sufficient gap by moderate speed positively.
- Under congested conditions the highest capacity can be obtained, if the ending lane is used until its very end. Alternate merging affects the capacity advantageously.

**Policy implications**

On the basis of these findings an information system was developed, which consists of different signals, sensors and a control unit. On the basis of the estimated benefits it is recommended to follow the direction of survey:

For a high effectiveness of the information transmission different embodiments and texts should be put to a on-road test.

In a next step the proposed system should be assigned to and tested at sites with long-term lane drops and expanded by a dynamic speed funnel. The results of the feasibility study EVA shall be extended in
The form of information transfer and its control is specified and will be tested on-road. The application shall be extended to other highway sections with lane drops. This allows more expensive measures. The quantitative evaluation of the effects shall be extended by pollutant emission and traffic safety.

The test facility shall be applied under real conditions, to observe the effects on the traffic flow. Measures of parameters of the traffic flow and observations of traffic behaviour will be performed in the on-road test. The aim of the pilot project is, to test a facility on-road, which optimises the traffic flow in sectors with lane drops in permanent adaptation to the actual traffic conditions. This optimisation effects the increase of capacity, the reduction of loss of time of the vehicle occupants and causes a homogenisation of the traffic flow, which causes a increase of traffic safety.

The facility is built up modularly: The basic module, which was suggested in the previous project is mobile and can be applied flexibly. The extension module is additionally applied at long lasting lane drops.

**Related Projects:**

DIVVA - Dynamisch gesteuertes System zur Erhöhung der Verkehrsflussqualität und Verkehrssicherheit bei Fahrstreifenreduktion auf Autobahnen

**STRIA Roadmaps:** Network and traffic management systems, Infrastructure  
**Transport mode:** Air transport  
**Transport sectors:** Passenger transport, Freight transport  
**Transport policies:** Digitalisation  
**Geo-spatial type:** Other