DIGITALES TESTFELD AUTOBAHN

Field of Intelligent Infrastructure

Status: June 2021

Intelligent Lane Reduction

Initial Situation / Motivation

It is not uncommon for the number of lanes to be reduced in front of roadworks. Possible consequences are traffic jams and accidents. Studies of traffic flow in such situations show a clear potential for optimisation with regard to the merging process.

Measure Goal

The aim of this measure is to optimise the merging process by visually influencing the road users with light signals. The merging process is to be supported by permanent light signals adapted to the situation.

By making the best possible use of the narrows' capacity, traffic jams are supposed to be prevented or their spatial and temporal extent reduced.

Measure Implementation

Within the scope of the measure "Intelligent Lane Reduction", new methods for optimised traffic management by means of temporary telematics in the forefront of a road work (narrowing of the road) are supposed to be developed.

The system to be newly designed will support road users changing lanes. For an optimal traffic flow, the control system must intelligently decide depending on the traffic density whether road users should get in the proper lane over a longer distance or use the traditional zip merging principle at the end of the lane.

By means of demand-based signalling, unnecessary braking can be avoided and the capacity of the motorway can be maintained for a longer time.

In addition, the maximum permitted speed is adjusted as required. No intervention will be made when traffic demand is low. The aim of the control system is to allow traffic to enter the interlinked area in an increasingly slow and controlled manner when traffic demand is high. In this way, a congestion can be prevented there and the narrowing of the road can be operated at the level of its capacity.

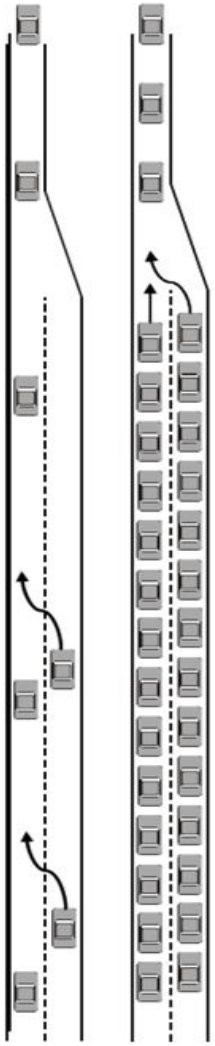
In a first step a scientific study was completed to establish the theoretical basis for controlling the intelligent lane reduction.

The simulation carried out within the scope of the study showed the greatest effects by a traffic density adapted speed control.

Current Status

So far, the theoretical principles of a possible control of the "Intelligent Lane Reduction" have been tested in a research project.

For a practical test, some legal points have to be clarified in advance. Furthermore, in addition to the definition of the necessary boundary conditions for a practical test, a corresponding evaluation concept of the implementation has to be developed.



Source: Final report of FE 03.0533/2015/FRB

Figure: Example of possible lane reduction procedures in free and stopped traffic.

Location

The measure has only been considered as a model so far.

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The Digital Motorway Test Bed is operated by the Federal Ministry of Transport and Digital Infrastructure (BMVI), by the Free State of Bavaria, by the German Association of the Automotive Industry (VDA) and by the German Federal Association for Information Technology, Telecommunications and New Media (Bitkom).