TEMPORARY HARD SHOULDER RUNNING A 63 IN GERMANY

Overview

In 2002 temporary hard shoulder running (HSR) has been included into the German Highway Code. Since then and by 2012, 230 km of motorway have been equipped with such systems.

The system on the A 63 in Rheinland-Pfalz with total length of 7 km on both carriageways has been installed in 2011. It has replaced a permanent HSR scheme.

Background / objectives

In Germany HSR is considered to be a remedy for recurrent congestion when regular upgrading of motorways is not feasible on the short run, due to financial or environmental concerns.

It found its pace amongst the set of ITS solutions and has developed into one of the major instruments for traffic management on the motorway system. The current national telematics investment plan "Projekplan Straßenverkehrstelematik 2009 - 2015" comprises the installation of 350 kilometer of temporary HSR systems.

Funded by the Federal Government, the planning, realisation and opertion of HSR systems is part of the Federal States (Länders’) responsibilities.

The technical guidelines for HSR are embedded in the general framework for motorway signage and operation. The high requirements and safety relevance of HSR system need to be carefully implemented into this environment. For example strict obligations for the visibility and size of VMS for HSR can collide with restrictions for placing objects between the carriageways.

The Federal ministry has defined the prerequisites, which should or must be met to consider and implement HSR systems:

- Since HSR is regarded as a temporary solution in advance of a regular extension, the relevant section must be part of the national highway extension scheme. (Bundesverkehrswegeplan)
- The cost benefit ratio must be calculated according to a standard economic model comparing HSR to alternative forms of operation.
- Traffic quality must be lower than level of service D according to the guideline HBS 2001 (German HCM) for more than 30h per year.
- All lanes to be used by hgv must have at least width of 3.50 meter, other lanes at least 3.25 meter
- Speed limit must not exceed 100 km/H while the HSR is in operation
- Emergency stop areas, usually equipped with fixed emergency telephone, must be present minimum every 1000 meter, if possible closer
- Slip roads must be present on all relevant ramps
- Signing is mandatory both to the left and to the right side of the carriageway (sign # 223.1 to 223.3 German Highway Code (StVO))

In total 230 km of German motorway sections have been equipped with such HSR systems (2012).

Approach / project description

The A 63 close to Mainz is a motorway heavily used by commuters in the Rhine-Main-area and shows pronounced directed peak hour traffic with frequent congestion. Average daily traffic on this section of the A 63 is around 63,000 vehicles, of which approx. 12% are HGV. Maximum hourly values are up 4000 vehicles per direction. Yearly traffic growth rates have been 1-2%.
Threshold values have been defined to control the HSR operations: trigger conditions are about 3200 vehicles per hour and direction. Usually these conditions are met from 6 to 9 am (northbound direction Frankfurt/Mainz/Wiesbaden) and from 15-19 pm (southbound).

Under this regime the hard shoulder is available for broken down vehicles or other purposes for most of the day. This can be regarded as a substantial gain in safety and comfort for the driver but also for the maintenance staff and for police. During operation the hard shoulder is continuously supervised by the traffic centre staff, which is supported by incident detection software. Cameras (with pan and zoom capability) are placed every 500 meters. The HRS system is not used under conditions of very bad visibility (heavy rain, fog).

An operation manual has been developed to support operators in their decisions. During the operation speed limit is 100 km/h per year, otherwise 130 km/h.

The system A 63 has replaced a permanent hard shoulder running regime. This change was perceived as a loss of capacity by some drivers and caused extensive discussions in the public. Anticipating this, the launching of the HSR has been accompanied by a special information website and a PR campaign involving the regional broadcaster.

Cost for realizing the HSR ran up to 14 mio. € of which 6 mio. for the signing, communication, and telematics and 8 mio. for construction works (reinforcing and widening of lanes, construction emergency areas). The estimated overall benefit cost ratio was around 4.5.

Since the camera system allows observing the situation in detail – where faces or number plate might be recognized – the technical approach and the operator’s manual have been discussed with the data protection agency of Rheinland-Pfalz. Precautions have been developed to prevent all usage of images that is not strictly needed for the operation or the improvement of the system.

The HSR is planned to be extended by 3 km until the next junction.

**Results / Evaluation**

After 4 months of operation the results of a first evaluation are positive: Driver’s compliance is generally high and comments and complaints have decreased. However still some drivers tend to remain on the hard shoulder outside operation time and “old habits” persist sometimes. This is especially true since the permanent HSR regime had been in place for more than two years and drivers had got accustomed to the third lane.

During the first 4 months of operation approx. 80 emergency closures have become necessary while the HSR was in operation. This number clearly shows the need to supervise the hard shoulder and protect vulnerable road users.

The maintenance service and highway police staff appreciates the HSR since it helps to protect employees and facilitates their work. Police officers can observe the system status from their base and directly request actions from the traffic centre. The HSR translates into savings of effort for the road authority of about 2 persons and two vehicles in case of road works and even more for clearing broken down vehicles.

Experience is regularly exchanged between the traffic centre staff, road maintenance services and police. If necessary, measures to improve the operation or the impact of the system can be decided quickly.

**Contact**

- Reiner Dölger
  reiner.doelger@isim.rlp.de

Right hand side:
Location and diagrams of actual HSR usage (above average speed, below throughout, one red dot per minute) during and outside activation of HSR on a typical day.