



Intelligent Controlled Compact Parking for Modern Parking Management on German Motorways

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Abstract

Despite the considerable number of existing parking spaces for trucks along the main routes in Germany, at certain times shortages of vacant truck parking spaces and overcrowding occur due to the enormous traffic increase. To counter the lack of parking capacities and unsafe parking, intelligent solutions for a more efficient use of the existing parking capacities are developed, tested and implemented in addition to the continuous construction and expansion. Using intelligent transport systems the existing parking spaces for trucks will be optimally utilized. On behalf of the Federal Ministry of Transport and Digital Infrastructure the Federal Highway Research Institute developed a potential new control procedure called “Intelligent Controlled Compact Parking”. The aim is to achieve an increase of parking capacity for trucks in rest areas by a special positioning of trucks in parking rows and the reduction of driving lanes. With the help of variable message signs above the parking rows, the drivers receive the needful information to park their vehicle in a parking row, in which other trucks have the same or an earlier departure time.

Keywords: truck parking; intelligent transport systems; intelligent controlled compact parking; rest area

1 Introduction

Due to the high density of commercial freight transport on motorways in Germany it is often problematic for truck drivers to find safe parking places for longer rest periods during the night. Even though expansions have been made to satisfy the demand, overcrowding and dangerous situations still occur as a result of vehicles parking on the entrance and exit roads of rest areas. According to an investigation in 2013 by the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) about 11,000 truck parking spaces are missing in the vicinity of motorways in Germany (BMVBS, 2013). In addition to the extension and construction of new rest areas, intelligent transport systems (ITS) can also be deployed in order to achieve an improved distribution of the demand and an increase in the capacity of rest areas (BMVBS, 2012).

Compliance with European rules for maximum daily and fortnightly driving times (EU, 2006) contributes to road safety for all road users. In case there are not enough legally designated parking spaces available, road safety can be reduced by disorderly parking trucks (University of Wuppertal, 2003). Likewise accidents can be caused by fatigue or lack of attention (Evers et al., 2006). Surveys prove that i.a. the traffic-related conditions have a significant influence on the vehicle driver. Named were poor parking options, the behaviour of other road users and a high level of traffic (Evers, 2009).

The “Masterplan Freight Transport and Logistics”, adopted in 2008 by the Federal Government, describes in action A3 the accelerated implementation of the expansion program to improve the parking offer of rest areas along the Federal Motorways (BMVBS, 2008c). ITS should be used in addition to expanding the rest areas which is strongly promoted.

Detailed surveys on the parking situation demonstrate the potential for ITS. As shown in Figure 1, vehicles are parked in the entrances and exits of rest areas although free parking spaces are available (in Figure 1 capacity of 60 truck parking spaces). Disorderly parked trucks in the roadways also hamper visibility and accessibility of free parking spaces. By the provision of parking information truck drivers can be directed to the most appropriate parking space supported by ITS (Kleine et al., 2014).

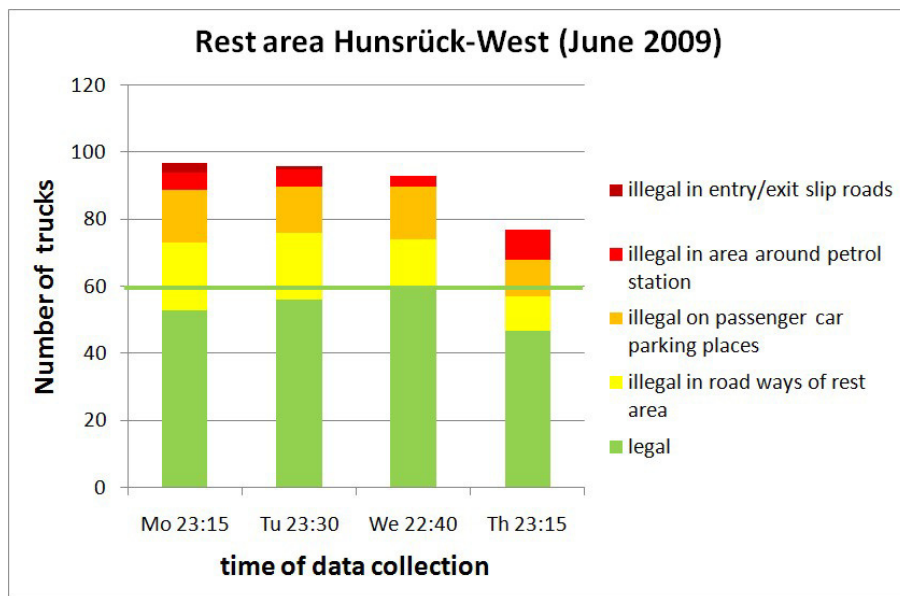


Figure 1: Occupation rest area Hunsrück-West (Data: Rhineland-Palatinate)

Another goal of ITS is to increase the parking capacity by a different and more efficient use of the available space in the rest area. Due to the special positioning, the truck driving lanes can be dispensed and used as additional parking space.

2 Special parking methods

The "special parking methods" allow an efficient use of space for parking. ITS shall ensure an orderly access and departure of the trucks parked right next to and behind one another. Figure 2 shows the possible redesign of a rest area from conventional to a special parking method. In each parking row at least three trucks fit in succession.

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