
Abstract of diploma thesis

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Topic: Use of HGV tolls data for freight traffic management

Thema: Nutzung von LKW-Maut-Daten für das Güterverkehrsmanagement

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The traffic load on German highways increases steadily. With it, the annual jam kilometers, caused by disruption from over-load and accidents, and the use of the infrastructure increases. Primarily the increasing amount of heavy good vehicles (HGV) leads to a rising extent of structural substance damages. This is why, a mileage-dependent HGV toll was introduced in Germany in 2005, to allocate costs to users causing damages. A cost-intensive, satellite supported system with high technological effort was selected. Already at this time, this choice was justified with the added value walking along by telematics performances which make such a system possible. Till now, these weren't converted yet, legal questions remain open and the expected exports in other countries also failed to appear. The actual legal position, the technical possibilities and sectors of application for freight traffic management are picked out as a central theme in this work.

The legal bases for the use of the toll data for other purposes than as the toll elevation itself, are clear. A misuse is excluded categorically by the federal highway toll law (Bundesfernstraßenmautgesetz, BfStrMG) as the basis law of the toll elevation. But legal evaluations of the topic have shown, that this regulation can be partly break down with the help of the Federal Data Protection Law (Bundesdatenschutzgesetz, BDSG). So, the authorization requires consent of the persons affected for data elevation, further processing and use. This is due to the fact that collected data of the journey can be connected directly or indirectly individual persons, namely the drivers of the vehicles, which means an intrusion into their individual rights. With their admission they can release these, inasmuch as they are the legal owner of the data. But the reality has shown that even then, an implementation in projects is hard to achieve, so that a clear legal basis must be created to make these use possible absolutely. A use of the data, which exclude inferences on the drivers by anonymization, is, however,

sufficient often at all. But without the necessary amendments of the law, such applications are forbidden till now.

The technical aspect is considerably more positive to see. The toll system contains various technical components which could be used elsewhere. As processing unit and central component an On-board-Unit (OBU) processes the generated data in the vehicle and can send these to a mainframe. The data are position and movement data generated over the integrated GPS module, which can obviously be assigned via digital card material to the used infrastructure. Moreover, the system is equipped with a mobile telephone module which is used as a communication channel for the transmission of the data. About interfaces of the OBU, a connection of further components of the vehicle is possible whose data also can be processed and sent. Besides the additional possible use of the technical components, the use of the dynamic traffic information is primarily of a great relevance, to complete from local data sources (e.g. detectors) generated information about the traffic network and its load.

Different possible applications which are summarized exemplarily in the following are therefore given from the technical view.

These possible applications are various. At first the attention shall lie on the field of the traffic management. So comprehensively optimizations of the route planning can be reached by the use of the dynamic traffic information. This dynamic route planning can react better to disturbances in the traffic network and cause time and cost savings. But also new instruments can be installed by use of the toll data. In this way it is possible to provide truck preferences in certain places in the road network to reduce the losses of time. For example, green waves can be established to traffic lights along a road, to achieve a traffic fluidity of an increasing HGV traffic volume, leading to a reduction of emissions caused by less starting processes. But also strict local and temporal traffic ban and such for overtaking for HGV hinder an optimized freight traffic progress. So, a softening of such measures by dynamic restrictions up to a point, which is related to the area of application and tolerable conceivable, which are determined by the total traffic volume or measurement of noise and emission, is possible.

A safety problem of the freight traffic is also solvable by use of toll data. The demand has reached the existing supply of parking space on freeway parking facilities with the increasing HGV traffic volume and by restrictive steering times. Not only vehicles searching for alternative solutions on residential and commercial districts near to the freeway, more those parking besides entrances and exits of the parking lots up to the use of the hard shoulders are the consequence. The safety risk can be reduced by a parking planning, informing truck drivers about free capacity on their originally route to ensure an

forward-looking planning. In the ideal case such a system for a parking space management can be enlarged with reservable parking slots.

The introduction of traffic volume-dependent rates will primarily, however, prove to be a useful instrument in the end, to shift journeys away from high loaded times and sections into lower loaded ones, caused by higher charges for the use of high loaded network-sections. The traffic information from the toll data is the characteristic quantity of the load and is used as parameter of price grading. In addition to supply-influencing instruments, such controlling the demand over the transportation management are installable. Value-added services for arrangement and assistance systems for the fleet management are authoritative working examples.

Finally the vision of an inter modal, general interdisciplinary freight traffic management introduced briefly. Besides the possibility of the integration of other traffic carriers in the tour planning, the management of those is transferred to the street system primarily. Track planning on the railroad network and slot allocation at air traffic management are already tested and accepted, to reach an optimal occupancy rate of restricted capacities. If such a wide-ranged “window-management“ by forward-looking route booking in road transport network is possible to introduce , will turn out only in the case of a realization of this vision, however, in the future.

In conclusion, the basic element represents the change of the legal basis for implementation of the freight traffic management over the application of toll data. This, which suppliers activate for the development of further applications of telematics solutions in the traffic and logistic sectors will prove to be a Trigger event. The actual potential and the variety of possible applications will show this by opening of the market for such applications.

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