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THE ALTERATION OF THE HUNGARIAN TOLL PAYMENT SYSTEM IN 2013, ACTIVITY SUPPORT WITH THE APPLICATION OF A FLEET MANAGEMENT SYSTEM

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Abstract: Forwarding and transport planner firms are facing with a new challenge by the change of the road toll payment in Hungary. In this article authors give a brief review firstly about the current road toll system, than the new system to be introduced with the possible payment methods. Their advantages and disadvantages are also reviewed. Applications of GPS based fleet management systems, and their integration possibilities with the new road toll system are detailed. Authors analyse the information gained from the fleet management system, how can it help in the daily tasks, and how can it help the company management.
Keywords: toll, fleet management system.

1. Introduction

In the view of the frightening the application of fleet management systems became an especially important factor. The efficiency can be improved substantially by the tracking of transportation vehicles and the fuel consumption can be optimized by a real-time control possibility. In most cases the firms are not paying enough attention for the amount of fuel consumption. It is necessary to optimize to make efficient and to make up to date this activity. A fleet management system can help to solve these tasks.

Furthermore in July of 2013 a new electronic, distance-based toll system (DTS) will be introduced in Hungary [1], which can realise serious problems. A fleet management system can provide detailed information about the driving and rest times for the forecast of the arriving time of trucks, and about the exact time of the loading or unloading activities of the trucks [2].

2. The new Hungarian vehicular toll payment system and it's effects

2.1. Preceding payment system. Nowadays the payment for the motorway usage is done by the purchase of highway vignettes. There are four possible vignettes in case of passenger cars: weekly, monthly, half year and annual. In case of frightening trucks the possibilities are a bit different: 1 day, weekly and monthly vignettes are allowed by the State Motorway Management Company Ltd. (SMMC) till the 30th of June in 2013. The purchase of the vignettes can be done at assigned petrol stations or at the offices of the SMMC. The current road toll system provides easier application because these vignettes can be purchased in short time before the day of the usage. Almost every petrol station could sell the needed vignettes next to the motorways and before the access road to the motorways.

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2.2. New payment system and its possible methods. In frame of the new system the actual motorway toll payment system is ceased for the vehicles which gross weight is 3.5 tonnes and above. Instead of this, a complex electronic payment method is introduced which offer three main solutions for the road toll payment. However, their efficiency is highly different.

In the first two solutions the operator of the vehicle fleet must register in a central database system. This system is the HU-GO, which is the name of the new electronic road toll payment system to be introduced in Hungary.
The payment is completed by the basis of the data provided by either a GPS system or an On-Board Unit. The registered motorway users must upload their account with money, which is registered at the SMMC. The payment of the road toll is completed from this uploaded account.

In the third case there is no need of registration into the HU-GO system, the toll payment is done by the purchase of prepaid tickets. This action can be done with the help of machines next to the routes, petrol stations and other vending places.

During the purchase the following parameters must be predefined: the route which wants to be followed (with the initial and arrival place), the duration of the use and the characteristics of the vehicle (euro qualification of the engine, number of axes).
In every three case pre-paid financing must be applied.

3. General introduction of the new fleet management system

More and more company realize the importance of the fleet management system. They can make it easier to control their vehicle fleet by installing fleet management system.

The operation of these systems is the following. The on-board unit measures the operation of the vehicle (for example with the help of sensors or measuring devices etc.), and the position (with the help of GPS), and also saves the information given by the truck driver. These information, are occasionally sent to the central server. The on-board unit connects to central server with the help of mobile network. The received data are controlled and saved on a database. If it is necessary the central server can send an alarm massage to the given address. The vehicles can be followed on the internet, furthermore if we evaluate the off-line transportation data (for example: fuel consumption, activity of the driver etc.) we can get more information about the vehicle [3].

With fleet management system the following possibilities will be available [4]:

- monitoring the vehicles,
- fuel control,
- recording of distance driven by the vehicle,
- communication with the management and operators of the company,
- recording of volume of the operating hours,
- evaluation of driving performance,
- automatic record of the route,
- evaluation of work time efficiency,
- monitoring and paying of road toll.

More and more companies are using fleet management systems, which completely controls the employee and the operation of the vehicle fleet. Movement of the trucks, the fuel consumption and the condition of the complete vehicle can be monitored by usage of fleet management system, which can result the reduction of operational costs and the administrational procedure of the truck driver.

The goal of those companies that use this fleet management system is to get more logistical information, which makes them able to operate companies more efficiently and oversee their vehicle fleet.

New fleet management systems are also able to provide information to the Hungarian electronic toll system from July of 2013.

3.1. The practical problems of the new regulation. Those companies that have not registration in this system can count on reduction in efficiency because of the followings:

- Finding the point of sale will cause more costs.
- These companies can count on a big waiting time at the point of sale which will be a loss of time. Buying of prepaid ticket will reduce the work time of the truck driver.
- A prepaid ticket – recommended option for occasional road use. Several times it causes problem, when the customer changes the loading- or the unloading place, in this case a new prepaid ticket should be bought. For example those who complete groupage transport activity and get one more destination during the transportation loop, or because of long waiting time of truck at the loading or the unloading station the next stations should be changed.

Buying of a no adequate prepaid ticket will causes a lot of extra charges, because it results extra kilometres and work time.

4. The electronic road toll payment with fleet management systems

In Hungary there should be an avowal contributory companies (which play control function in the use of the motorway) between the customers (e.g. forwarding companies) and the SMMC. Operation of these companies is regulated by the law and they have to control the distances of use and provide correct information for payment. For these tasks the GPS based fleet management systems provide solution. These fleet management systems are internet based complex systems with theft protection and vehicle administration solutions, so they can provide better efficiency in working by integrating road toll paying possibility, whereas the old system could not provide this efficiency.

Fleet management systems provide better efficiency in operation because of the following reasons:

- no need to find a point of sale, so the driver can save work time,
- paying only for the actually driven kilometres,
- the route is not need to defined in advance, so the reaction for unpredicted situations are much more easier (for example: snow-bound, accident, traffic jam, change of the transportation route etc.),
- there is no need to check the road toll every day, the user only have to check the balance of the account at the SMMC,
- reduces the administration tasks,

- the mistake done by the driver can be eliminated (for example: prevent penalty, giving wrong route),
- there is no need to provide cash or credit card to the truck driver before the departure,
- customers get accurate information about the costs and the position of the vehicles.

5. Utilization of information obtained from fleet management system

Data obtained from the fleet management system provides the following advantages:

- possibility of online monitoring and controlling of vehicles,
- controlling of AERT regulations relating to driver's work,
- idle times can be proved and relating charges also can be admitted,
- more efficient information flow between the hauliers, truck drivers, and customers that leads to improvement of organisation efficiency and service quality.

The fleet management system is mainly used for the daily controlling of the trucks. Due to it the dispatcher is able to monitor the operation of the trucks and give them real time control information, which was not possible earlier via phone. The route of the trucks and the activity of the drivers can be coordinated in real time.

Dispatcher can check the adherence of AERT regulations and can step into the activity of the driver in real time if the truck driver disregards the AERT rules, or drives inefficiently.

Movements and time periods of transport tasks can be recorded with the help of the fleet management systems. Due to it the idle times can be proved and relating charges also can be admitted. The idle time can be the source of argue, because nobody wants to pay or verify the idle time which has a huge cost.

The communication between the costumers, hauliers and truck drivers can be improved. Information gained from the fleet management system makes it possible to forward the information immediately and to make immediate reaction. The haulier can give adequate information to the costumer, without calling the driver. The haulier has accurate information about the position and the idle time of the truck. Real time information saves time and increases efficiency of organisation.

6. Utilization indicators for support of decision making of company management

Utilization- and efficiency indicators can be defined based on data provided by the fleet management system [5, 6]. Service quality and efficiency can be improved due to key process indicators, e.g. it can define which part of the transportation task is inefficient or not utilised. That is why it is crucial to measure some of the processes. Firstly, the company management requires this kind of information.

Most important basic data provided by the fleet management system are the followings:

- length of way with useful load,
- length of way without useful load,
- total length of transportation,
- travelling time,
- idle time,
- route,
- vehicle's speed,
- driving time,
- work time,
- rest time,
- overtime,
- fuel consumption, ...

Basic data can be divided into 4 main groups [7, 8]:

I. Distribution of transport distances:
- for vehicles (1 truck) or vehicle groups (more truck)
  - export km,
  - import km,
  - total km.

II. Specific fuel consumption:
- for vehicles,
- for vehicle groups.

III. Data relating to transport loops:
- travelling time of vehicles,
- utilization of transport loops,
  - length of way with useful load,
  - length of way without useful load,
  - total length of transportation.

IV. Data relating to truck drivers:
- work time,
- driving time,
- rest time,
- overtime.

Evaluation of logistics indicators relating to transport activity can provide useful information because the analysis of historic data provides a real view of the company activity. These information can be useful for decision making of the general management, and during the daily routine (planning on short and long time interval) on operative level.

The following utilization indicators can be defined form the basic data of the fleet management system:

- *Performance indicators*
  Loaded transport kilometres can be gained from the fleet management system, export and import kilometres also can be defined from the electronic travelling warrant. Different performance indicators can be defined, e.g. the ratio of the before mentioned basic data. For example the company management will get information whether they should improve the export or the import transport activity. So finding new market opportunities will be done targeted.
- *Fuel consumption indicators*
  Specific fuel consumption indicators can be defined for vehicles and vehicle groups. To evaluate these indicators firstly we should gain information from the fleet management system about the fuel consumption needed for a given transport task. These indicators show for the management that the operation of the vehicles is economical or not. Based on these information the management can plan the costs and evaluate the fuel consumption.

- *Loading utilization indicators*
  The vehicle utilization indicators show the ratio of the loaded and the empty transport distances driven by the trucks. The purpose is to reduce the empty kilometres which improve the efficiency. This indicator also shows the organisational efficiency of the haulier. This data can be used for pre-calculations on technical costs.
- *Time utilization indicators*
  Indicators relating to truck drivers require data for drive time, work time, rest time and overtime which can be gained from the fleet management system. From the utilization of the work time the management can realise the efficiency of the employee. The overtime's indicator e.g. shows that the company needs more employees.

7. Summary

The establishment of the new Hungarian road toll system has many practical problems. However if the company use the road toll payment service of the fleet management system the efficiency can be improved. The information which can be gained from the fleet management system can be utilized in the daily tasks, furthermore can help the decision-making of the company management by defining different utilization indicators relating to the transport activity.

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References

[1] Hungarian legislative act: No. 2013/LXVII.: Relating to Hungarian road toll payment procedure.
[2] Kraft, W. H.; Homburber, W. S.–Pline, J. L. (2008): *Traffic Engineering Handbook*. 6th Edition, p. 717.
[3] Szalay, Zs.–Aradi, Sz. (2009): *Requirements for fleet management systems used in field of fuel transport activity*. Research study, IFFK, Budapest, Paper 5. (In Hungarian)
[4] Zakar, K. (2012): *Optimization of fuel consumption in road freightening*. Diploma thesis. University of Miskolc, Department of Materials Handling and Logistics (In Hungarian)
[5] Demeter, K.–Gelei, A.–Nagy, J. (2009): *Activity management, handbook*, p. 366. (In Hungarian)
[6] Kovács, Gy.–Cselényi, J.–Schmidt, Sz.–Izsai, Á. (2007): *Software conceptions relating to utilization of historic data evaluation of international transport activity and relating to cost calculation of transport loops.* MicroCAD 2007. University of Miskolc 2007. 03. 22–23. Proceedings. Supplementary, Volume pp. 47–56.
[7] Kovács, Gy.–Cselényi, J.–Bálint, R.–Tamás, P. (2007): *Analysis of parameters of international freight services based on statistical analysis of historical data, possible application of the gained results.* MeAKKK II. Conference, Miskolc, 2007. 02. 15–16. Proceedings, Vol. 1, No. 3, pp. 159–168. (In Hungarian)
[8] Development of a software which evaluates the logistical characteristics of the forwarding service, R+D project report, University of Miskolc, Department of Materials Handling and Logistics, 2007. (In Hungarian)