

DRAFT OF FREIGHT TRANSPORT CAR PARKS FACILITIES

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Abstract

The contribution deals with a problem of road trucks parking sustainability. The road freight transport is currently the most significant mode of transportation within national freight transport. The White Paper on Transport supposes increasing of transport to 80 per cent in 2050 compared of the year 2010. The supposal of transport increasing is fulfilling in real practise and is followed by increasing number of trucks in road infrastructure. To ensure the safety and sustainability of transport it is necessary to built not only higher roads capacity but also the infrastructure for cars parking that is connected with safety breaks and ensuring drivers' rest. On the other hand, the increasing drivers' demands on rest causes also the increasing demands on parking places. Authors in the first part introduce a review of available approaches for establishment of the parking places in the world. They analyze problems depending to parking in United States, Japan and Germany. In the next part the authors deal with parking facilities for freight transport. Drafts are processed on the base of own authors' research.

Keywords: transport, sustainable, parking

1. Introduction

The road freight transport is currently the most mode of transportation within national freight transport. The White Paper on Transport supposes in-creasing of transport to 80 percent in 2050 compared of the year 2010. The supposal of transport increasing is fulfilling in real practice and is followed by increasing number of trucks in road infrastructure. To ensure the safety and sustainability of transport it is necessary to build not only higher roads capacity but also the infrastructure for cars parking. That is connected with safety breaks and drivers' rest ensuring. On the other side, the increasing drivers' demands on rest causes also the increasing demands on parking places (e. g. judgement [17]). The aim of contribution is to identify the demands and skills of drivers with parking of freight transport vehicles, during breaks and during daily rest. Drivers are often faced with cases when they have no place in a car park for vehicle parking. The car parks, that do not provide even basic equipment for the rest drawing, are also problems. For example, car parks are not often equipped even by toilets in spite of drivers are often drawing regular daily rests

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in duration at least 11 hours. The aim of this article is to suggest a car parks equipment specified for vehicles of freight transport.

2. Literature review

In the relation of road transport output sustainability and trucks parking spaces places capacity is interested only a few of studies. Chatterjee and Wegmann in 2000 in [5] noted that in United States are the parking places for trucks in public car parks and resting areas along highways in the state of Tennessee fully occupied what causes big trucks parking on highway feeders to these areas. Based on interviews with drivers they found out that, although there are existing facilities for resting and sleeping in public places, many drivers of trucks cannot use these facilities because of the reason of parking place unavailability mainly during top hours of nightly rest. Al-Kaisy and col. in 2012 in [1] published that the existing studies about rest areas are not actual or they came out from old data. By using of data collected from folders of surveillance video cameras with a view of whole parking place during one week in 44 car parks was found that in USA the average trucks' parking time is longer than personal cars' average parking time in less occupied highways [2, 3]. That means 30 minutes during a day and approximately 3 hours and 22 minutes during a night. Kay in 2014 introduced the results of binary logistics regression and negative binomial regression on demand characteristics of 47 road resting places in Michigan [8]. He found that with increasing distance between resting areas the number of cars approaching to the road resting areas increased. He used on-line data that were obtained from the monitoring information transport system from Michigan's transport department.

The problem of car parks capacity was dealt in Japan by Muramatsu and Ogu-chi, which published a study in 2017 [13] and from results of this study it is possible to claim that parking places for freight transport are underrated in Japan. Authors suggest implementing the time toll to motivate the drivers to use a public area of car park as short as possible. But the listed approach is counterproductive in relation to road transport safety demands. Stated claim is possible to support by studies' results that are processed by author Jung in 2017 [6]. A study in conditions of Corea showed that complementing resting areas, that are relatively small resting areas between common resting areas and serve mainly for drowsy drivers' rest, could decrease a number of accidents caused by sleepiness to approximately to 14 percent, mainly in highway parts with two or more driving lines. Matsushita and col. released a survey of the resting areas distribution and developed a model of selection and model of attractivity evaluation [10]. Their results showed that transport time, area's attractivity and the number of passengers over 65 are positively increasing on car park solution while the available areas, cleanliness of sanitary facilities and availability of restaurants or shops are contributing to higher attractivity evaluation. Next it emphasizes also the importance of information providing that concerns the resting areas and relaxing places. A study of Hajime Seya examines truck drivers' behaviour in car parks [14]. Author uses six-month data about vehicle's trajectory from digital tachograph and introduces a car park solution and parallelly a situation by multilevel continual model development. Given that digital tachographs note trucks' time and area information in Japan, it is possible to analyse not only behaviour in car parks but also way of usage that means the

parking time in this study. Information in the study are drawn from 1600 vehicles disposed by tachographs that are similar to those used in European Union. Basis on data from digital tachographs it was possible to identify an average driver's resting time, but was not possible to identify parking places occupancy [4, 7].

According to the analyses processed by Andras Nowak, there are missing more than 30 000 parking places in Germany [18]. In average 7000 trucks is parking in restricted places like highways feeders and exits and emergency parking areas in highways. They are blocking an approach to gas stations or are standing in places defined for personal cars parking. A study [18] points out a fact that from 2016 the number of injuries and collisions with trucks is continually increasing because of incorrect parking. In Germany the listed state causes problems with finding drivers that are willing to drive a vehicle for longer distances like 500 kilometres. More than 15 percentages of all drivers spends the night next to highway with no comfort, no WC or possibility to wash themselves [19]. According to the studies [18] the increasing of road freight transport in Germany introduces 4 per cent per year that evokes a necessity 4000 freight transport parking places establishment. Problems with establishment of parking places next to highways have also an economic aspect. According to [12] the building of parking areas is very uneconomic because the investing difficulty for one parking place is (70 000-120 000) €.

On the base of realized analysis it is possible to claim that road freight transport output increasing and also demands in social area cause problems with trucks parking. The capacity of resting areas is not built together with road freight transport output development.

3. Research

The Authors team realised from October 2018 to March 2019 an extensive research of drivers' skills in road freight transport with vehicles' parking. Responded were drivers from Slovakia, Poland, Bohemia and Germany that provide international road transport. The survey was taken part by 825 drivers from which 64.24 percentage are providing transportation with road trains by total weight of 40 tons. Considering by [16] realised survey showed that drivers' quality of sleeping is better at night, we reconnoitred whether the drivers have a problem with rest drawing because of lack of parking places in night hours. 86.67 percentage of drivers answered that they have problem with finding parking. Most often they have problems with finding a parking place by highways. It is followed by main roads; border crossings and driver are able to find a parking place, in industrial areas the easiest. Drivers, according to the social demands [8], [9] and [11], can drive a vehicle not more than 9 hours, then follows necessary a daily rest in duration at least 11 hours. Excluding a daily rest, the drivers have to draw also the working breaks that have to be drawn not later than after 4.5 hours of driving. Length of the break is 45 minutes at least [6, 10]. That means that every truck has to stop in car park after 4.5 hours of driving latest. The authors also analysed how the drivers plan their rest. It was found out by the research that drivers often cannot drive whole 9 hours per day or 4.5 hours without break, because they are afraid that they will not able to find a car park. Drivers' answers were often: I park the vehicle earlier or start the driving earlier only because of finding a free place. The survey showed that to 92 percentages of drivers adjust the driving time and their own working time to the

situation in car parks. As resulting from listed the drivers are not using their working time effective because they cannot ensure that they find a safe parking place at the end of working time. A research realised by authors was also aimed to the comfort of drivers during rest drawing in car park. From the point of view of safety only 12.73 percentages of drivers feels safe in vehicle during rest drawing. 49.45 percentages of drivers are afraid of fuel and personal belonging being stolen from vehicle, 14.3 percentages felt sometimes endangered and to 23.5 percentages of driver has own personal experience with a robbery in car park. In spite of that lack of car parks is presently a fact; the research realized by authors dealt also with car parks facilities. A significant deal of car parks doesn't provide suitable comfort for drivers. Basis on research results the drivers also claimed demands for car park facilities from the point of view the daily rest drawing, which length is more than 11 hours. Results are listed in Table 1. The most important demand is cleanness of toilettes and showers.

Table 1. Demands of drivers on car park's facilities.

Demand	Weight of importance	Rating
Clean toilettes and showers	20.27	1
Calm environment	16.52	3
Eating facility	14.72	4
Foods shop, supermarket	12.97	5
Social room for drivers	8.90	7
Active guarding	16.82	2
Laundry room	9.80	6

On the basis of research, it is possible to claim that sufficient capacity of parking places for freight transport doesn't exist. This situation gets worse with increasing output of road freight transport. In spite of significant effort of logistic companies and public institutions, the output cannot be moved to other transport mode [15] and also in near future it is not possible to consider with autonomous trucks in road traffic. On the basis of research, it is possible to claim that from the point of view of sustainability it is necessary to deal with parking policy. Today, already 87 percentages of driver's don't feel safe in car parks, 87 percentages of drivers have a problem with vehicle parking, 92 percentages of drivers adjust their own working time to the bad situation in car parks and car parks have insufficient equipment. Without parking policy solution with freight transport output increasing it is possible to wait that drivers will search parking places by exiting highways to urban areas, what is from the point of view of comfort, congestions and environment undesirable condition.

4. A draft of freight transport car park equipment

The car park equipment is the base for social and cultivated time spent by people that are performing job of freight transport carrier. Quality services increase drivers' work level but mainly increase a quality of resting. It comes out from the realized research that some car parks do not fulfil basic demands on quality rest. For example, they even are not equipped

by toilets. A draft for car park equipment is worked up from the realized research of authors. The car parks for freight transport should be equipped at least as follows:

a) Clean toilets and showers

The existence of toilets and showers are necessary in car parks if the driver should spend his daily rest in duration of 11 hours in car park. A next demand is cleanliness of these toilets. Cleanliness of toilets and showers are determined by regular maintenance. If the toilets are without service, it is difficult to ensure the cleanness of toilets and showers. By building of superior transport infrastructure, for using which the carriers pay fees, it is necessary to build also the suitable car parks for freight transport. An owner of transport infrastructure could maintain the toilets and showers for freight transport drivers. Every parking area for freight transport built in paid infrastructure would be equipped with toilets, showers and also a place where it is possible to draw drinkable water. The object would be possible to manage like an individual object or like a part of petrol station object. The object should have its own service that will provide security and keep the equipment clean. Operation of the object could be paid from toll collection or its using could be paid individually.

b) Monitoring

Within own research it was found that drivers do not feel safe in car parks. There often are thieves in park areas, drivers face to consignment theft tries. For this reason each car park should be monitored by a security camera system where all parking places have to be monitored. The monitoring system in combination with regular police patrol within the park area has a supposition for increasing of drivers' security in parking area.

c) Quiet place

Freight transport drivers draw a rest in car parks not only at night but often during the day. Since car parks situated by highways, drivers have problem to rest well because of noise. Therefore it is necessary to equip with an acoustic wall next to highway. Significant noise is caused by refrigerator vehicles whose aggregates are powered by an internal combustion engine. The car parks should be equipped by individual separate power supply for aggregate to be powered without working combustion engine.

d) Next equipment

Excepting the necessary equipment that are necessary for resting: clean toilets and showers, safety and quiet place, it is possible to ensure other equipment for drivers in greater car parks. This equipment includes for example, restaurant, supermarket, social room and laundry room.

5. Conclusions

The issue of truck parking is not only in the European Union. The problem of insufficient capacity of car parks is also encountered in countries outside of Europe. The vehicles are also parked in unauthorized places due to the full capacity of the legal car parks and also because the driver is subject to a fine in case of the prescribed rest is not drawn. This situation is not sustainable in the long term, especially in view of the expected growth of road freight transport output. Based on the research we found out those drivers, because of the fear of not finding a suitable parking place, park vehicles earlier before the set rules, respectively earlier than they need for recovering. Alternatively, they park the vehicles during the day and drive at night when they have not a possibility to find a parking place. Such a situation decreases the safety of road transport. Research also points to insufficient equipment of existing car parks.

On the basis of research, the research question is insufficient parking capacity for trucks, was confirmed. The research also showed the facts that car parks for freight transport are not fully equipped for resting. In spite of freight transport drivers draw a rest of 11 and more hours in the car parks, there are existing car parks, which are not equipped by toilets. In the design section there are necessary demands for car park equipment.

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