

EVALUATION OF SOCIAL LEGISLATION INFRINGEMENTS FOR INTERNATIONAL HAULAGE TRUCK DRIVERS INVOLVED IN ROAD TRANSPORT ACCIDENTS

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Abstract. Different organizations are committed to reducing deaths and serious injuries in road traffic. Their activities must be guided by research to produce measurable results contributed in reducing casualties and making roads safer. This paper provides detailed information about the second stage of the study for an evaluation of social legislation infringements for international haulage truck drivers involved in severe road transport accidents. The data were obtained from original sources of information: from digital tachograph printouts, analog tachograph data record sheets and attestations of activities. The aim of the second research stage was to find out to which extent the drivers involved in severe road traffic accidents (hereinafter RTA) have committed infringements more often and in larger quantities compared to the data obtained from the vehicle and driver regular roadside checks, i.e. compared with the drivers not involved in RTA. The second task for the paper is to analyze infringements by type and by level of drivers' riskiness to be involved in the RTA. The obtained findings and conclusions of in-depth case studies have been compiled, processed, analyzed and systematized by severity, quantity and type of simultaneously committed offences, installed tachograph type and other parameters. The statistical data have been grouped, systematized and analyzed according to the aim of the research. Based on various sources of information, an analysis of infringements for international haulage truck drivers was made between the obtained average amount of infringements per severe RTA case and per regular roadside check. The results of the research state that the drivers involved in severe RTA have committed considerably more infringements before the actual RTA has happened. The most part of infringements directly or indirectly refers to the lack of rest time and increased driving or overall working hours. These infringements for international haulage truck drivers are referred to be as major factors contributing to drivers' fatigue and high accidents risk.

Keywords: driver's work and rest times, infringements of social legislation, commercial vehicle roadside checks, drivers' fatigue, accident risk.

Introduction

Based on previously developed advisory opinions and expert conclusions, infringements in the field of compliance with the rules for drivers' hours and tachograph application committed by international haulage truck drivers involved in severe road transport accidents were ascertained in the first stage of the research.

Previously it has been concluded [1], that a large proportion of infringements committed by international haulage truck drivers involved in severe road transport accidents are in the field of compliance with the rules for drivers' hours or overall working hours. This means, infringements are related to fatigue of truck drivers. The finding that fatigue is involved in 10-25 % crashes does not in itself prove that fatigue increases crash risk [2; 3]. There is no clear definition of fatigue. It can have physical, neurobiological, mental or psychological meaning. The term describes a range of states and symptoms including drowsiness, lack of concentration, increased reaction time, decreased awareness and poorer coordination, with the most serious potential consequence being actually falling asleep at the wheel [4].

Although a reliable estimation of the strength of the association between the drivers' fatigue and their involvement in severe RTA cannot yet be given, the results of several previous studies have stated positive relationship between fatigues and crash risk [2] and have attempted to quantify the risk increase. On the one hand, there could be just minor relationship between the working time and fatigue, but the working time is just only one of the many factors influencing the drivers' safe performance on the road. More importantly for road traffic safety than the total length of the shift, though, is that the regulations on driving and resting times are taken into account [3]. On the other hand, total working time and fatigue are close related concepts. The working capacity gets worse and crash risk starts to rise, if daily driving time exceeds 9 or 10 hours or when daily total working time exceeds 11 hours. After 11 hours of work span the crash risk doubles [2]. The working capacity deteriorates more intensively during long term continuous work. After four hours of continuous

driving the accident risk is doubled and after eight hours of continuous driving it is ten times higher [3].

Drivers, who have been involved in a fatigue related traffic accident, had more often several jobs or unusual working hours and night-time driving, lack of sleep and excessive time spent awake which leads to drowsiness and falling asleep behind the wheel. The traffic crash risk due to fatigue is significantly increasing if the driver sleeps less than 7 hours [2-4].

Different methods yield diverse estimates concerning the frequency of fatigue-related crashes. The most frequently used research methods are: police (RTA statement) record studies, questionnaire studies, naturalistic observation studies and in-depth investigations [2]. According to several previous studies, about 16-20 % of crashes on motorways were sleep-related [2], or about 10 % to 24 % of crashes were related with fatigue [2; 4]. The vast majority (nearly 90 %) of fatigue related accidents has occurred on highways or on inter-urban roads. About 37% of the accidents where fatigue was a factor were fatal [4].

The Directive 2006/22/EC of the European Parliament and of the Council provides the common methods, content, frequency, test criteria and procedures for drivers' inspections in the European Community, as well as arrangement of organizing, tracking and recording of driving and rest periods. Regular roadside inspections are intended as one of the methods. Inspection results are compiled and published by the European Commission annual reports. One of the functions of the ECR secretariat is collection, publication and exchange of the obtained information between countries. By collecting and systematizing the obtained statistic data, it is possible to determine the types and amount of infringements committed by the drivers during a certain time period.

Materials and methods

During the first stage of the research, at requests from several insurance companies, 138 advisory opinions and expert conclusions on commercial vehicle drivers' infringements in the field of compliance with the rules for working and resting times and application of recording equipment (tachograph) in local and international road transport operations have been developed from 2008 to 2014. The investigated cases were accidents selected by Latvian insurance companies with severe consequences and/or with large material damages. The evaluated data refer particularly to infringements committed by the international haulage truck drivers, who have driven truck and/or truck-trailer combinations registered in the Latvian vehicle registry. The results of the analysis of infringements by their importance with regard to road safety and other aspects have been published previously [1].

The aim of the second stage of the research has been defined as two sequential tasks:

1. To evaluate whether and to what extent drivers involved in severe RTA have committed irregularities more often and/or in larger quantities compared to the data obtained from the vehicle and driver regular roadside inspections, that is, compared to the RTA unaffiliated drivers;
2. To find out what and how many infringements have been committed by drivers before he/she has been involved in the RTA, that is, to analyze infringements, which could increase the driver's fatigue during the period before inducing in RTA and thus jeopardize traffic safety.

The data set analyzed in this paper refers particularly to severe infringements committed by the international haulage truck drivers, who have driven truck and/or truck-trailer combinations registered in the Latvian vehicle registry. As serious traffic accidents are considered RTA with severe consequences and/or with large material damages.

For the second stage of the research, data about drivers' working and rest times and application of tachograph were obtained from original sources of information: digital tachograph printouts, analog tachograph data record sheets and attestations of activities.

Initial manual processing of the data included in original information sources was followed by data logical analysis, systematization of infringements by their nature, severity, type of tachograph and other factors, and then explanatory qualitative data and in-depth case studies were carried out.

To determine the infringements of the drivers' working and rest times and application of tachograph that have been established at regular roadside inspections carried out in European

countries, the data contained in annual reports of the European Commission and ECR coordinated routine inspections were analyzed. Further, the data contained in statements were compiled, systematized and analyzed according to the research purpose.

By evaluating the data set, the types and the amount of drivers' infringements of social legislation requirements were identified. There were recognized irregularities which may promote excessive fatigue for drivers as well as the share of infringements relating to compliance with the rules of the working and resting times. Using various sources of information, the average amount of infringements per one driver involved in severe road traffic accidents and the same per one driver tested during regular roadside inspections were compared to one another.

Results and discussion

By analyzing the RTA cases of commercial vehicle severe accidents and conducting in-depth case studies, it was found that in 86.2 % of cases the drivers involved in local and international road haulage operations have committed at least one infringement relating to the drivers' hour rules and legislation on tachograph equipment and shortcomings at record keeping.

The social legislation rules and provisions on correct use of recording equipment and record keeping have been infringed most often. These types of infringements were subject for 83.8 % of the detected violations. More rarely (16.2 %) offenses on driver's hour rules were found.

An important issue was the type of tachograph the vehicles were equipped with. Considerably larger amount of violations (about 43.4 % per one RTA case) were established when the vehicles were fitted with an analogue tachograph.

The results above indicate that for drivers involved in severe road traffic accidents have been found less/fewer infringements of driving and resting time rules, but more often drivers have not registered their activities related to performance of other duties. Thus, the drivers are not fully accounted for all the working time that may be causally related to a possible lack of rest and excessive actual working time and lead to increased fatigue. Predominantly drivers have not registered other work, as defined by the European Parliament and Council Directive No.2002/15/EC, also tachograph charts and cards have been used improperly, the drivers have not been able to present the necessary data as well as have observed indications suggesting manipulation of the recording equipment, record sheet or driver card which may result in data and/or printout information being falsified, see Fig. 1, a.

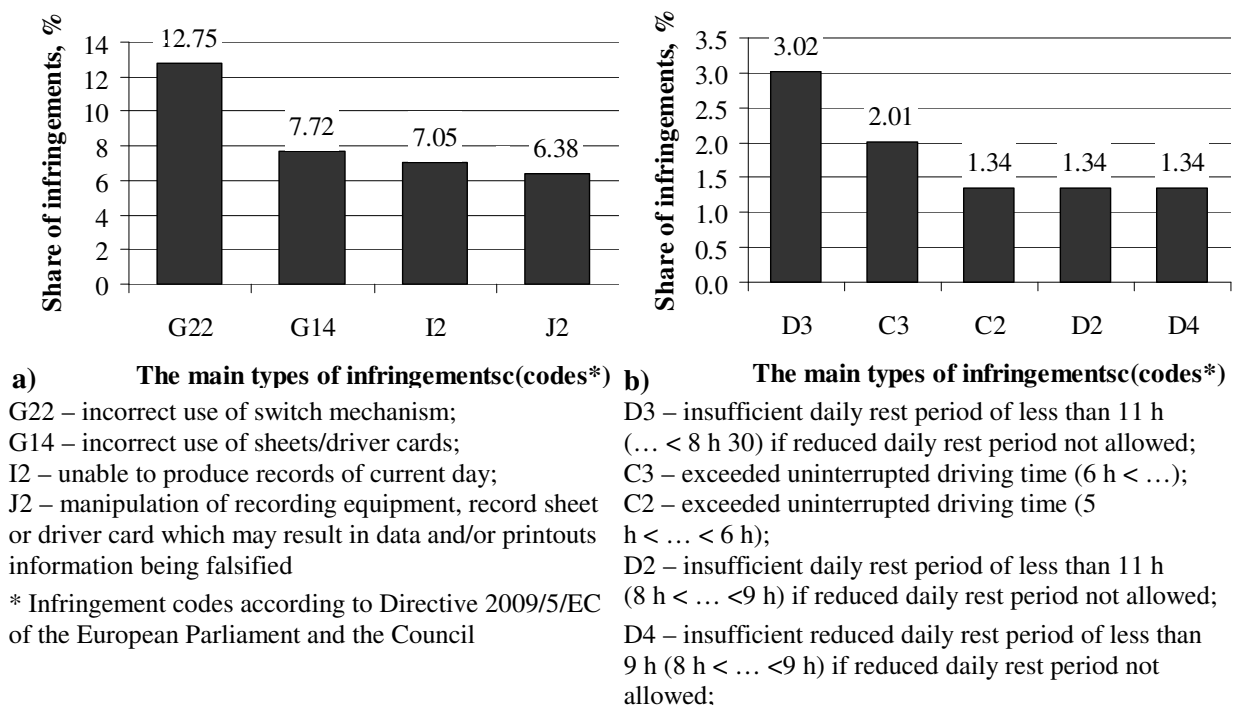


Fig. 1. **Types and share of most common infringements:** a – in relation to the requirements of the Regulation (EEC) No.3821/85; b – in relation to the requirements of the Regulation (EC) No.561/2006

Violations and irregularities related directly to work and rest time violations most often have been in direct relation to the lack of rest and excessive driving time (insufficient daily rest period slightly or significantly exceeds uninterrupted driving time etc., Fig. 1, b).

The results obtained here are close to the previous research findings that insufficient daily rest and excessive working periods are considered to be the main factors contributing to fatigue and accident risks for long-haul drivers.

At the regular roadside inspections carried out by the ECR, the share of each above mentioned infringement group was in opposite: on average respectively 29.7 % for infringements in relation to the requirements of the Regulation (EEC) No.3821/85 and 70.3 % for infringements in relation to the requirements of the Regulation (EC) No.561/2006. The summary and systematization of the data in accordance with the objective of the presented research about coordinated periodic roadside inspections contained in the ECR reports [6-13] are given in Table 1.

The results shown in Table 1 are sorted over the years to show long-term trends. As one can see, there is no decline of the amount of infringements in a 5-year period. This means that the existing system for application and control of the recording equipment (tachograph) in local and international road haulage operations does not improve the real level of road safety. It would be desirable to revise and improve the commercial road transport control system to systematically eliminate the described problems.

The European Commission annual report data [5] are consistent with the ECR data – 26.5 % and 73.5 % respectively.

When the vehicles registered in the Latvian Republic vehicle registry have been involved in severe RTA, at least one infringement related to non-compliance with the working and resting times and tachograph application rules has been detected in 86.2 % of all cases (i.e. 9.83 times more often than at the ECR regular roadside checks). During the ECR roadside checks, at least one irregularity of any type (inadequate technical condition, breaches of haulage provisions, social legislation or other ones) was found in 20.0 % of cases, of which in only 43.9 % of cases at least one violation has been registered relating to non-compliance of the working and resting times and tachograph application rules (only 8.8 % of all regular checks performed at roadside, if assumed that violations have uniform distribution).

When provisions of social legislation have been identified during the ECR roadside checks, on average in 30.9 % of cases were found at least one infringement of the working and resting time rules, but at least one infringement of the tachograph application rules has been found in about 13.1 % of cases.

Table 1

Summary of infringements identified during ECR regular roadside inspections

| Year | Number of vehicles checked, units | Number of all types of infringements | Number of cases when at least one infringement of any kind has been detected | Number of cases when has been permitted at least one infringement lied down in Reg. 3281 ⁽¹⁾ | Number of cases when has been permitted at least one infringement lied down in Reg. 561 ⁽²⁾ | Total number of cases rules of social legislation when has been permitted |
|-------------------|-----------------------------------|--------------------------------------|--|---|--|---|
| 2010 (8 weeks) | 139 815 | 55 665 or 19.55 % | 27 319 | 6 742 | 19 109 | 25 851 |
| 2011 (6 weeks) | 107 089 | 46 912 or 17.30 % | 18 525 | 6 709 | 13 830 | 20 539 |
| 2012 (8 weeks) | 154 646 | 62 350 or 22.12 % | 34 215 | 8 425 | 19 494 | 27 173 |
| 2014 (3 weeks) | 71 947 | 31 636 or 20.90 % | 14 455 | 4 058 | 9 015 | 13 073 |

⁽¹⁾ requirements of tachograph application (data recording),

⁽²⁾ drivers' working and resting time rules.

According to the results of the analysis of the developed advisory and expert opinions, the drivers involved in severe RTA have committed about 2.74 violations per case. A higher average number of infringements (3.34) was observed in the case of analogue tachographs and significantly lower (2.33) in the case of the digital tachograph. In 59.4 % of all severe RTA cases the vehicles have been equipped with an analogue tachograph while in 40.6 % – with a digital tachograph.

During the regular roadside inspections carried out by the ECR, on average only 0.18 infringements were detected per tested commercial vehicle driver, which is 15.22 times less than what was specified for the drivers involved in severe RTA. Greater difference of average quantity of infringements have been observed in cases where the vehicles have been equipped with an analogue tachograph (18.56 times), but lower when the vehicles have been equipped with a digital tachograph (12.94 times).

According to the European Commission annual report, during regular inspections carried out by authorities of the EC member states on average there were 0.24 infringements per tested commercial vehicle driver found, which is 11.42 times less than what was specified in the dataset per driver involved in severe RTA. Greater disparity of average quantity of infringements has been observed in cases where the vehicles have been equipped with an analogue tachograph (13.92 times), but lower when the vehicles have been equipped with a digital tachograph (9.71 times).

At the beginning of the second stage of the research extra data have been added (about 26.6 %) to the previously analyzed data set. Although the added data volume exceeds one fourth of the total amount of the data, the results of the analysis change insignificantly. The findings from the updated data set and previous results differ by no more than 1.6 percentage points. This indicates the stability of the obtained data, small parameter distribution and a high degree of certainty.

For the drivers involved in severe RTA, the observed infringements have been related significantly more often to improper use of tachographs and data recording (83.8 %), but infringements related to inadequate planning or working and resting periods were detected less frequently (16.2 %). Distribution of breaches observed in regular roadside checks carried out by the ECR as well as breaches published in the annual report of the European Commission was in opposite correlation. The total amount of breaches detected at roadside checks was significantly less comparing to the number of infringements of drivers involved into serious RTA. Despite the fact that most of the breaches identified during case studies relate to improper use of the tachograph, in fact they were related to inadequate recording of the working and rest periods. Therefore, these violations must be seen in conjunction with a real possibility of driver fatigue and safety hazards (also including accident risk). Incomplete tracking of working hours is causally linked to a possible lack of rest and over-long real working time which, in turn, lead to increased fatigue of the drivers. In general, the drivers have not registered other work, as defined by the European Parliament and Council Directive No.2002/15/EC, also tachograph charts and cards have been used improperly, the drivers have not been able to present the necessary data as well as have observed indications suggesting manipulation of the recording equipment, record sheets or driver cards.

Conclusions

1. The aim of the second stage of the research has been reached: the number and types of infringements observed during the research of serious RTA case studies have been compared to the results of regular roadside checks of commercial vehicles. By comparing different data sets it was possible to evaluate whether and to what extent the drivers involved in severe RTA have committed infringements more frequently and in larger quantities, and which are the main infringements of social legislation requirements on drivers working and rest time periods, influencing the drivers' fatigue.
2. There is no decline of the amount of infringements in the research time period. This means that the existing system for application and control of recording equipment (tachograph) in local and international road haulage operations does not improve the real level of road safety. It would be desirable to revise and improve the commercial road transport control system to systematically eliminate the described problems.
3. The commercial vehicle drivers involved in severe RTA have committed 11.42 times more infringements than stated in the European Commission annual report on the regular checks

and 15.22 times more infringements than that specified in the reports about regular roadside checks performed by the ECR. It shows that, in overall, the observed difference between the regular check results and specific data set for severe RTA is in average 13.2 times of the total number of infringements.

4. Most of irregularities directly or indirectly are related to lack of rest and over-long actual working time, inadequate recording of the working and rest periods which, in turn, must be seen in conjunction with a real possibility of driver fatigue and safety hazards (also including accident risk).
5. Higher risk of being involved in RTA has been observed when the vehicles have been equipped with an analogue tachograph. When analogue tachographs were used, on average there has been 43.4 % higher number of irregularities per RTA registered.
6. Since the research was subjected to a data set obtained directly from the digital and analog tachograph, there is a reason to believe that information used in the conducted research is more reliable and more accurate, and indicates the actual situation more precisely. Many other research data have been obtained from the drivers' completed questionnaires concerning the working conditions, manually completed sleep and travel logs and special grids in a log book.

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