

## INFRINGEMENTS OF REQUIREMENTS OF SOCIAL LEGISLATION FOR DRIVERS OF COMMERCIAL VEHICLES INVOLVED IN ROAD TRAFFIC ACCIDENTS

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**Abstract.** At requests from several insurance companies, more than 100 advisory opinions and expert conclusions on commercial vehicle driver's infringements in the field of compliance with the rules for working and resting times as well as for application of recording equipment (tachograph) in the local and international road haulage operations have been developed from 2008 to 2013. The aim of the research is to investigate the most common infringements of social provisions committed by commercial vehicle drivers involved in road transport accidents (RTA). The data included in this paper refer particularly to infringements committed by the drivers involved in driving vehicles which were registered in the Latvian registry. The paper summarizes and evaluates most common infringements of social legislation requirements for drivers involved in RTA in accordance with the Directive 2009/5/EC of the European Commission and the corresponding Latvian Cabinet of Ministers Regulations No.411 entered into force in 2008. Offences on drivers' allowed work and rest time periods, shortcomings at record keeping and inappropriate use of recording equipment (tachograph) by drivers of commercial vehicles are characterized in this paper based on findings and conclusions of in-depth case studies, advisory opinions and expert conclusions. The paper provides evaluation of infringements of social legislation requirements by their importance in relation to road safety, by type of recording equipment fitted to vehicles, by the quantity and type of offences committed simultaneously, as well as by other minor aspects. It was found that drivers have committed up to 10 different types of infringements at a single case. Most of the infringements discovered should be defined as very serious ones. Even in those cases when only one violation was found, in half of the cases it was defined as very serious infringement. The results of this paper will be further used in the next stage of research comparing the results obtained here with the data from regular roadside vehicle checks on the quantity and type of infringements of social legislation requirements.

**Keywords:** commercial vehicles driver's hours, social legislation requirements, registration equipment (tachograph), cargo and passenger road haulage, road traffic safety.

### Introduction

At requests from three insurance companies located in Latvia, more than 100 in-depth case studies, advisory opinions and expert conclusions have been elaborated in a 6 year time period (from 2008 to 2013) evaluating the circumstances of road traffic accidents (hereinafter – RTA) and analyzing infringements of commercial vehicle drivers' in field of compliance with the legislation for work and rest times as well as for application of recording equipment (tachograph) in the local and international road haulage operations.

The objective of the research is to investigate the most common infringements of social provisions committed by commercial vehicle drivers involved in RTA.

Offences on drivers' hour rules and legislation on tachograph equipment, shortcomings at record keeping by drivers of commercial vehicles have been identified based on the findings and conclusions of in-depth case studies, advisory opinions and expert conclusions. The data included in this paper refer particularly to infringements committed by the drivers involved in driving vehicles which were registered in the Latvian registry.

Evaluation of infringements of social legislation requirements by their importance in relation to road safety, by the type of recording equipment fitted to vehicles and by the quantity and type of offences committed simultaneously, as well as by other minor aspects has been carried out in this paper.

The results of this paper will be used in the next stage of research comparing the results obtained here with the data from regular roadside vehicle checks on the quantity and type of infringements of social legislation requirements.

### Background

Driving is a highly sedentary task, involving relatively low levels of physical activity and a relatively high degree of vigilance monitoring [1]. Therefore, major role is played by valuable rest

which in practice can be restricted by insufficient rest periods and excessive work duration thus jeopardizing the traffic safety. Taking sufficient rest breaks may be an efficient means of avoiding fatigue-related decrements in driving performance [1]. Rest breaks are a potential fatigue countermeasure, and hence a means of controlling risk [1].

Sleepiness at the wheel increases the risk of causing a traffic accident, sleeping less than 5 hours in 24 hours before the accident and driving between 2 and 5 a.m. are also significant risk factors [2]. Other studies have shown that extensive duration of work is associated with sleep related accidents [2].

According to the Federal Road Transport Institute research, 19 % [3] of serious accidents in Germany are caused by driver fatigue. According to the study by IRU, over fatigue and falling asleep is the cause in about 18.6 % [3] of single truck accidents. The European Commission even estimates driver fatigue to be a significant factor in about 20 % [3] of all heavy commercial vehicle crashes.

Recent studies on traffic safety show that after 4 hours of continuous driving the accident risk is doubled and after 8 hours of continuous driving it is even ten times higher [3]. This is why it is so important for drivers to comply with the drivers' hour regulatory requirements.

Requirements of commercial vehicle drivers driving and rest periods, rules of tachograph equipment usage and record keeping for persons driving commercial vehicles in international road haulage are specified in the AETR or European Agreement concerning the work of crews of vehicles engaged in international road transport [4], The Regulation (EC) No.561/2006 of the European Parliament and the Council, Directive 2002/15/EC of the European Parliament and the Council, Council Regulation (EEC) No.3821/85 and other regulations and decisions referred to the mentioned documents.

Drivers of commercial vehicles providing inland road haulage operations within the territory of the Republic of Latvia also should follow the requirements of the Road Traffic Law and the corresponding Latvian Cabinet of Ministers Regulations No.474 (from 2007), No.279 (from 2007) and No.893 (from 2009).

Conditions for common rules and minimum conditions for checking the proper and uniform implementation of social legislation relating road haulage operations are established by the Directive 2006/22/EC of the European Parliament and of the Council [5]. Types of potential infringements and levels of severity are defined in the Commission Directive No.2009/5/EC [6] and in Annex 2 of the Latvian Cabinet of Ministers Regulations No.411 "Organization and implementation of road transportation control" [7].

Previous studies indicate substantial breaches in the field of drivers' hours and tachograph usage requirements [8-11].

According to the results of previous research and pre-set criteria, with regard to their impact on road safety, institutions of the European Community divided drivers' social legislation infringements into three levels. The levels of possible offenses of commercial vehicle drivers are defined as: minor infringements, serious infringements and very serious infringements [6].

## Methodology

At requests from several insurance companies, in a six year period (2008 to 2013) there have been analyzed 109 cases of RTA in 16 European countries where commercial vehicles were involved. The investigated cases were accidents selected by Latvian insurance companies with more severe consequences and/or with larger material damages. The evaluated data refer particularly to infringements committed by the drivers involved in driving vehicles which were registered in the Latvian registry.

The data about drivers' working and rest times and application of tachograph were obtained from original sources of information: from digital tachograph printouts, analog tachograph data record sheets, attestations of driver activities etc. Initially manual processing of data included in original information sources was done to identify infringements committed by drivers. This was followed by data systematization. Then logical analysis, classification of breaches by their nature, severity, type of tachograph and other factors were carried out following by descriptive qualitative data and case analysis.

## Results

The types of infringements on drivers' hour rules and legislation on tachograph equipment, shortcomings at record keeping by drivers of commercial vehicles have been identified and evaluated for drivers having been involved in RTA within the territory of many countries of the European Union, European Economic Area and AETR Agreement member states. It was found that most of the infringements have been committed in Latvia (46 cases), Russian Federation (19 cases), Poland (18 cases), Germany (6 cases) and Lithuania (5 cases).

By analyzing 109 RTA cases of commercial vehicles and conducting in-depth case studies, advisory opinions and expert conclusions, there were defined 298 unique infringements of social legislation requirements committed by drivers. Totally there were identified 49 types of infringements in the analyzed RTA cases:

- 18 types of all infringements are related to incorrect application of drivers allowed work and rest time periods laid down in the Regulation (EC) No.561/2006 of the European Parliament and the Council [12] and other corresponding documents;
- 29 types of infringements are related to incorrect application of tachograph equipment and record keeping rules laid down in the Council Regulation (EEC) No.3821/85 [13] and other regulations referred to this document;
- 2 types of infringements are related to other offenses not covered by the two previous documents – vehicle over speeding and the mismatch of the registered place and time of RTA with registered vehicle motion data.

Majority of types of violations are specified in the Commission Directive No.2009/5/EC [6] and the Latvian Cabinet of Ministers Regulations No.411 [7]. At the same time there were identified several types of breaches which are not listed in the mentioned documents.

At least 1 or more infringements of the defined social legislation requirements were found in 95 (87.16 %) cases, while in 14 (12.84 %) cases any violation related to social legislation requirements of commercial vehicle drivers was not identified.

In 76 cases (69.72 % of all examined cases or 80.00 % of the cases with irregularities) drivers have committed very serious infringements, but in 79 cases (72.48 % of all examined cases or 83.16 % of the cases with irregularities) drivers have committed both, very serious and serious offences at the time.

In the analyzed RTA cases, where drivers have committed offenses of social legislation requirements with regard to drivers' allowed working and rest time periods, record keeping and use of tachograph, it was found that drivers committed up to 10 different types of infringements at a single case.

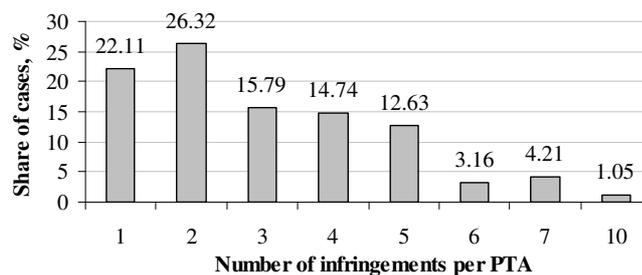


Fig. 1. Number and share of infringements per single RTA case

According to Figure 1, in most cases drivers have committed from one to five types of infringements per case. Once (1.05 %), ten types of different infringements per case have been identified.

In the RTA cases, where only one violation has identified (in total 21 such cases), the identified infringement was defined as a very serious infringement in 10 cases (47.62 %) and in one case (4.76 %) it was defined as serious irregularity despite the fact that this was the only violation in the particular RTA case. The infringements in the remaining ten cases (47.62 %) were defined as a minor irregularity.

The vehicles were fitted with an analog tachograph, i.e., with recording equipment in conformity with Annex I of the Council Regulation No.3821/85/EEC [13] in 46 (42.20 %) RTA examined cases, but in 63 cases (57.80 %) the vehicles were fitted with a digital tachograph or recording equipment in conformity with Annex IB of the Regulation No.3821/85/EEC [13].

If the vehicle has been fitted with an analog tachograph, drivers have committed offenses related to social legislation requirements with regard to working and rest time, tachograph equipment and record keeping in most cases (93.48 % or 43 of 46 cases examined). More often drivers have committed at least 2 infringements (25.58 %), 4 infringements (20.93 %) or 3 infringements (18.60 %) at a single case, see Figure 2a. If the violations were detected (43 cases for vehicles fitted with an analog tachograph), one or more of identified infringements have been defined as very serious in 41 case (95.35 %), but in 11 cases (25.58 % of the 43 cases) at least one or more serious infringements have been registered. Both, serious and very serious infringements at the single case have been identified in 9 cases (20.93 % of the 43 examined RTA cases, when violations were detected).

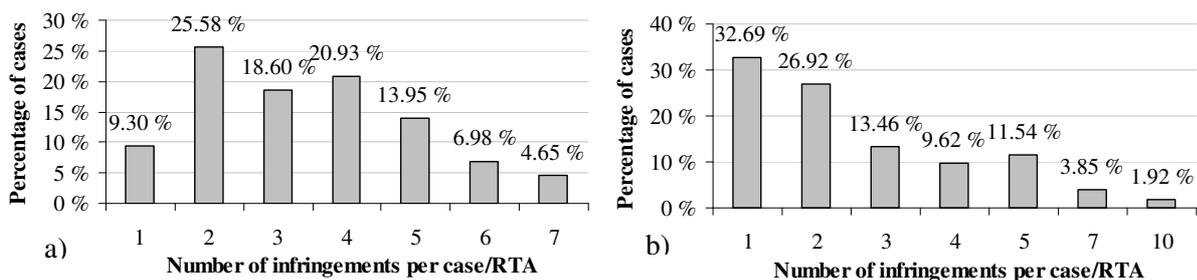


Fig. 2. **Number of infringements per RTA and percentage of cases:** a – commercial vehicles were fitted with an analog tachograph; b – commercial vehicles were fitted with a digital tachograph

The irregularities of social legislation requirements were detected slightly less in the RTA cases where the vehicles were fitted with digital recording equipment rather than with analog tachograph, accordingly, 52 cases (82.54 %) of 63 cases total examined versus 43 cases (93.48 %) of 46 cases total examined. See Figure 2b for the number of infringements per RTA and percentage of cases when commercial vehicles were fitted with a digital tachograph.

If the vehicle has been fitted with a digital tachograph, drivers more often have committed one infringement per single case (32.69 % of all examined cases with irregularities), 2 infringements (26.92 %) or 3 infringements (13.46 %) per single case, see Figure 2b.

When the violations were detected (52 cases for vehicles fitted with a digital tachograph), one or more of identified infringements have been defined as very serious in 35 cases (67.31 %), but in 8 cases (15.38 % of the 52 cases) at least one or more serious infringements have been established. Both, serious and very serious infringements at the single case have been identified in 8 cases (15.38 %).

During the research there have been detected 257 unique infringements (breaches) defined and sorted accordingly to the Commission Directive No.2009/5/EC [6] and the Latvian Cabinet of Ministers Regulations No.411 [7] and 41 breaches, where drivers have failed to comply with the regulatory requirements of driver's working and rest time legislation and tachograph record keeping rules, but the violations are not included in the referred documents.

By analyzing the detected 257 breaches in the advisory opinions, in-depth case studies and expert conclusions, one could conclude, that:

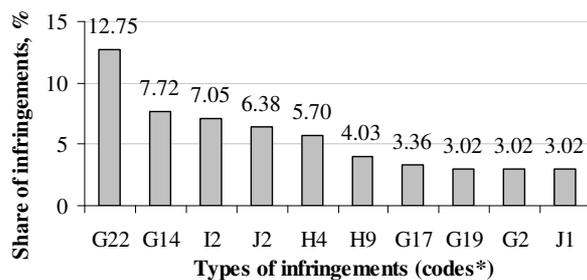
- 71.20 % (183 out of 257 breaches) should be defined as very serious infringements;
- 7.78 % (20 out of 257 breaches) should be defined as serious infringements;
- 21.01 % (54 out of 257 breaches) should be defined as minor infringements.

By analyzing all violations and sorting them by the type of infringements, it is resulted that the social legislation rules and provisions on the correct use of recording equipment and record keeping have been infringed by drivers of commercial vehicles most often. These types of infringements were subject for 84.44 % of the detected violations. More rarely offenses on driver's hour rules were found; these types of infringements were subject for 15.56 % of all detected infringements.

There were detected 217 infringements related to non-compliance with the requirements of tachograph application, data registration and record keeping in conformity with the Council Regulation (EEC) No.3821/85 [13] which are established in the Commission Directive No.2009/5/EC [6] and the Latvian Cabinet of Ministers Regulations No.411 [7]. By categorizing these offenses one can conclude that:

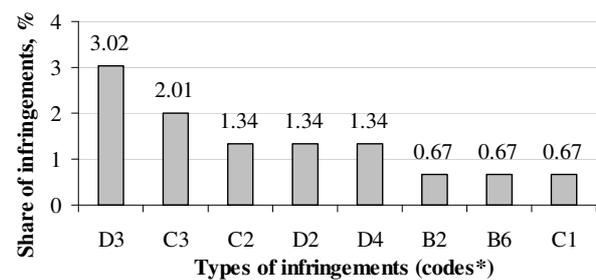
- 75.58 % (164 times out of 217) should be defined as very serious infringements;
- 3.69 % (8 times out of 217) should be defined as serious infringements;
- 20.74 % (45 times out of 217) should be defined as minor infringements.

The most common violations in relation to the requirements of the Council Regulation (EEC) No.3821/85 [13] are shown in Figure 3a. All most common violations (black columns) committed by drivers have been very serious infringements.



**G22** - incorrect use of switch mechanism;  
**G14** - incorrect use of record sheets/driver cards;  
**I2** - unable to produce records of current day;  
**J2** - manipulation of recording equipment, record sheet or driver card which may result in data and/or printouts information being falsified;  
**H4** - place of begin or end of use of the sheet missing;  
**H9** - symbol of country not entered in recording equipment;  
**G17** - record sheet or driver card used to cover a period longer than that for which it is intended but no data is lost;  
**G19** - not using manual input when required to do so;  
**G2** - recording equipment improperly used (not using a valid driver card, voluntary abuse, ...);  
**J1** - falsify, suppress and destroy data recorded on record sheets, stored in the recording equipment or on the driver card or print-outs from the recording equipment.

a)



**D3** - insufficient daily rest period of less than 11 h (...<8 h 30) if reduced daily rest period not allowed;  
**C3** - exceed uninterrupted driving time (6 h<...);  
**C2** - exceed uninterrupted driving time (5 h<...<6 h);  
**D2** - insufficient daily rest period of less than 11 h (8 h 30<...<10 h) if reduced daily rest period not allowed;  
**D4** - insufficient reduced daily rest period of less than 9 h (8 h<...<9 h) if reduced daily rest period allowed;  
**B2** - exceed daily driving time of 9 h (10 h<...<11 h) if possibilities to extend to 10 h not allowed;  
**B6** - exceed extended daily driving time of 10 h (12 h<...<14 h) if extension allowed;  
**C1** - exceed uninterrupted driving time (4 h 30<...<5 h).

\* Infringement codes according to the Directive 2009/5/EC of the European Parliament and the Council.

b)

Fig. 3. **Types and share of most common infringements:** a – in relation to requirements of Council Regulation (EEC) No.3821/85; b – in relation to requirements of Regulation (EC) No.561/2006

40 infringements have been found in conformity with the Commission Directive No.2009/5/EC [6] and the Latvian Cabinet of Ministers Regulations No.411 [7] related to the non-compliance with the requirements of driver's hour rules (working and rest time planning requirements) lied down in the Regulation (EC) No.561/2006 of the European Parliament and the Council [12]. By analyzing the detected infringements related to working and rest time planning requirements, one could conclude that:

- 47.56 % (19 out of 40) should be defined as very serious infringements;
- 30.00 % (12 out of 40) should be defined as serious infringements;
- 22.50 % (9 out of 40) should be defined as minor infringements.

The most common violations in relation to the requirements of the Regulation (EC) No.561/2006 [12] are shown in Figure 3b. All most common violations (black columns) committed by drivers have been very serious infringements.

During evaluation of driving performance in a conformity with the regulations of the working time and rest periods (drivers' hours rules) and correct use of the tachograph, there were 8 types of infringements detected that are not defined in the Commission Directive No.2009/5/EC [6] and the Latvian Cabinet of Ministers Regulations No.411 [7].

Violations of this nature detected most often (31.71 %) have been delayed start or shortage of daily rest period (infringement of requirements established by the Regulation (EC) No.561/2006), followed by (24.39 %) discrepancy of RTA registration time and vehicle motion data (infringement of requirements laid down in the Regulation (EC) No.561/2006 and/or the Council Regulation (EEC) No.3821/85).

### **Main results and discussion**

The aim of the first stage of the research has been reached: the most common infringements of social provisions committed by commercial vehicles drivers involved in RTA have been identified and investigated.

The data batched in this paper refer particularly to infringements committed by the drivers involved in driving vehicles which were registered in the Latvian transport registry. The data relate to Latvian professional drivers driving skills and their professional training.

Previous studies have identified different violations in the field of drivers' working and resting time as well as tachograph usage requirements. By analyzing 109 RTA cases there were defined 49 types of 298 unique infringements of social legislation requirements committed by drivers.

Despite the fact that most of the breaches relate to improper use of the tachograph in fact they are related to inadequate recording of working and rest time. Therefore, these violations are seen in conjunction with a real possibility of driver fatigue and safety hazards.

The research was subjected to a data set obtained directly from digital and analog tachographs. In many other researches data have been obtained from drivers' completed questionnaires concerning the working conditions [13], manually completed sleep and travel logs [13] and special grids in a log book [14]. It should be emphasized that the information used in the conducted research is more reliable and more accurately indicates the actual situation.

The data collected from digital tachographs should be considered the most objective because it is more difficult to counterfeit. This is demonstrated by the different level of the number of infringements between data sets of analog and digital tachographs.

Infringements have been identified and evaluated for drivers having been involved in transportation activities within wide territory in 16 different European countries. This indicates that the results of the study are not local in nature.

The amount of the processed data was sufficient and it creates the opportunity to make proper conclusions.

The results obtained here will be used in the next stage of the research, where the number and types of offences observed during regular roadside checks of commercial vehicles will be compared to the results presented in this paper. By comparing these two data sets it would be possible to evaluate whether and to what extent the drivers involved in RTA commit violations in larger quantities and/or more serious violations of social legislation requirements on drivers working and rest time periods, tachograph equipment and record keeping rules.

It will allow evaluating to what extent the drivers involved in RTA commit larger amount and more serious violations of driver's hour rules and tachograph equipment and record keeping rules than other drivers.

### **Conclusions**

There is very high percentage of cases, when professional drivers of commercial vehicles involved in road traffic accidents have committed various infringements of social legislation requirements before the crash occurrence. The most part of the identified offences have been classified as very serious infringements, indicating a possible considerable threat to the road traffic safety.

To evaluate to what extent the drivers involved in RTA commit violations in larger quantities and/or more serious violations of social legislation requirements on drivers working and rest time periods, tachograph equipment and record keeping rules and thus jeopardize traffic safety, the results of this study should be compared with a number and types of information observed during the regular roadside checks of commercial vehicles.

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