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VIOLATIONS OF SOCIAL REGULATION AND TRAFFIC ACCIDENTS IN ROAD FREIGHT TRANSPORT

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Abstract

The aim of the work is to analyze violations of social regulation in road freight transport and to propose solutions to prevent these violations. In the first part, we devoted ourselves to the processing of knowledge about road freight transport based on the legislation of the European Union, which is directly oriented to the conditions for the operator of road freight transport with vehicles over 3.5 tons of total weight. Since compliance with the rules also comes with their violations, it is also necessary to consider the traffic accident rate in road freight transport, we specifically identified and compared the traffic accident rate in road freight transport based on traffic accident statistics published on the website of the Ministry of the Interior. In the second part, we gradually processed and evaluated a questionnaire survey, which consisted of questions focused on the violation of social legislation by drivers. In the final part of the work, based on the analysis from the first part of the work and the results from the questionnaire survey in the second part, we proposed solutions to prevent the most frequent violations of social legislation by drivers and carriers.

Keywords: safety; dummy; TEMA Automotive; MSC Adams

1. Introduction

The following part of the work describes the work regimes of road freight transport drivers within the European Union legislation, which are oriented towards the conditions for road freight transport operators with vehicles over 3.5 tons of total weight [1]. Currently, in road freight transport, great emphasis is placed on compliance with social legislation, which has a direct impact on road traffic safety. The mission of the specialized requirements of social law in road transport is to ensure that the driver's work regime is in accordance with the specific

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requirements of the road transport process and at the same time contribute to increasing road traffic safety [2]. Among these provisions are:

Regulation of the European Parliament and the Council (EC) no. 561/2006 – in this regulation, the rules on driving times, breaks and rest periods of drivers operating in road freight and passenger transport are precisely defined, as well as to improve working conditions and related road safety. This regulation was amended on 20 August 2020 by regulation:

Regulation of the European Parliament and the Council (EC) no. 2020/1054 regarding minimum requirements for maximum daily and weekly driving times, minimum breaks and daily and weekly rest periods, and Regulation (EU) no. 165/2014 regarding positioning by means of tachographs [10, 12].

Regulation of the European Parliament and the Council (EC) no. 165/2014 – establishes requirements for the construction, installation, use, testing and inspection of tachographs used to monitor drivers' working hours [11].

Act no. 462/2007 Coll. on the organization of working time in transport – establishes sanctions for violation of social legislation in Slovakia.

The European Agreement on the work of vehicle crews in international road transport (AETR Agreement) is used in international road transport between EU member states and non-EU member states, as long as both of these states are contracting states of the AETR Agreement for the entire transport route [13].

2. Identification of traffic accidents in road freight transport in Slovakia

Operating a motor vehicle is a continuous and complex sensory-motor task, which under the influence of practice and experience becomes automatic to a level of requiring almost no conscious control from the driver [21]. The processes affecting drivers' stress reaction behavior include stress reaction perception, decision making and operation. These processes directly determine the timeliness and effectiveness of the stress reaction behavior of drivers [20]. Age differences influences driver´skills [8]. Human life has the highest price. Nevertheless, more than 25,000 people in the European Union die on the road in traffic accidents [6]. In the following part of the article, we identify traffic accidents in road freight transport, since with the observance of the rules come their violations. Based on statistical data on traffic accidents listed on the website of the Ministry of the Interior in Slovakia, we compared the period from 2017 to 2021. First, however, it is necessary to explain what a traffic accident means. It is a random, one might say unforeseen event in traffic on land roads and results in damage to health, property and life. In a traffic accident, there are always three main factors, i.e., vehicle, driver and communication [5]. The driver's behavior and condition are defined as the most important factor in road safety. It has been confirmed that there is a high correlation between vehicle speed and the likelihood of a driver dying

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in an accident [1]. A sudden decrease in engine power can cause an accident, for example, in the event of an overtaking maneuver [16]. Traffic accidents and the consequences of traffic accidents are a serious problem in most countries with a developed road transport system. Also, COVID-19 pandemic situation has a very significant impact on urban mobility, as evidenced by fundamental changes in passengers' behavior [7]. Traffic accidents and the consequences of traffic accidents are a serious problem in most countries with a developed road transport system. It is worth noting that the drivers' reaction time is one of the basic parameters that has a very strong influence on the result in the analysis of the accident because modern transport systems include a large number of vehicles [18]. As a member state of the European Union, Slovakia approaches road traffic safety in accordance with the approved binding documents of the European Union [14]. According to available data, the main causes of traffic accidents in the Slovak Republic include:

- illegal driving speed,
- incorrect turning and reversing,
- wrong driving through the intersection,
- failure to observe the distance between vehicles,
- incorrect way of driving or driving on the wrong side, the edge of the road,
- violation of the road traffic participant's duty due to disregard for traffic signs and traffic facilities, failure to adapt to weather conditions, undisciplined behavior [3].

In the Figure 1, is shown the development of traffic accidents in road freight transport categories trucks N2, N2G with a total weight of up to 12 tons by orange color, and trucks N3, N3G with a total weight over 12 tons by yellow color, the green color shows total number of accidents in the period from 2017 to the end of 2021.

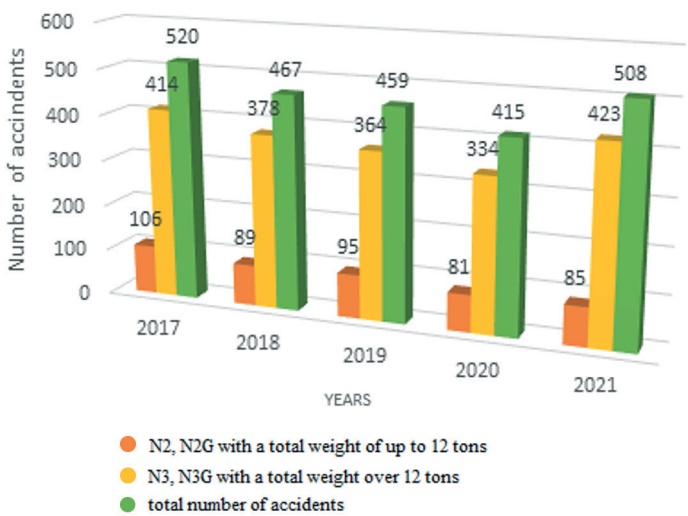

Fig. 1. Traffic accidents caused by truck drivers. Source: own collaboration based on [3]

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In road freight transport during the period from 01.01.2021 to 31.12.2021, 11,869 traffic accidents have occurred on Slovak roads, which represents a decrease compared to 2020. Of this number of traffic accidents, 853 people were seriously injured and 210 fatal accidents. The most traffic accidents occurred in the Prešov region, and the least in the Trenčín region. So far, the highest number of people have been killed in the Nitra Region, and the lowest in the Trenčín Region [3]. Based on the displayed data shown in the Figure 1, it is possible to observe a decrease in the number of traffic accidents since 2017. If we take a closer look at the year 2020, we can see a significant decrease in traffic accidents compared to other years. We can definitely include the COVID-19 pandemic as one of the reasons for the significant decrease in the number of traffic accidents in 2020. On the other hand, compared to other years, there was a significant increase in the number of traffic accidents last year.

3. Analysis of violations of social legislation by drivers

In this part of the work, we analyze violations of social legislation by drivers using a questionnaire survey. The questionnaire was created using an online Google form. The aim of the questionnaire was to analyze the requirements of social legislation and its violations for professional drivers in road freight transport. We obtained answers in three ways. The first method was communication and subsequent cooperation with a training center that provides regular training courses for drivers in the field of road freight transport. Due to the pandemic situation, another method that was used to get answers was through the social network and groups in which professional drivers working in freight transport are gathered. After the anti-pandemic measures were relaxed, we decided on the last third way of getting answers, in person. With printed questionnaires in paper form, we directly addressed drivers in parking areas in Žilina, Slovakia. Each driver filled out the questionnaire voluntarily and under the condition of complete anonymity. Answers from the questionnaire were recorded from the beginning of November to the end of February, and a total of 275 drivers answered the questionnaire. With the first method, we managed to get 63 answers. The second method managed to get the highest number of responses, while the last method received 11 responses. According to the available information as of 07.10.2021 in Slovakia, there are a total of 83,470 active driver tachograph cards [9]. In the following part, the selected answers of the respondents to the individually asked questions in the questionnaire survey are processed in the form of tables and graphs. The first questions of the survey were identification questions, the task of which was to characterize individual research participants. In the following Table 1, is shown the age representation of drivers divided into 5 age categories, where it is subsequently reflected in the percentage of all drivers who took part in the survey.

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Tab. 1. Age category of participating drivers

Age	Number of responses	% expression
21–30	59	21.45
31–40	92	33.45
41–50	76	27.64
51–60	36	13.09
61–70	12	4.36
Total	275	100

It is obvious that in the Table 1, are 33.45% of middle age drivers in the age category 31–40 took part in the survey, while 4.36% of aged 61–70, old drivers, participated the least. If we take a closer look at the above results, we see that 151 drivers are under 40 years of age, and on the contrary, 124 drivers are over 40 years of age. Despite the lack of young drivers according to the ČESMAD association, more young drivers participated in the survey than older drivers, which we can evaluate positively [17]. With the second question, we asked drivers whether they work in national road freight transport or international road freight transport.

One of our goals was to determine the assignment of a driver, whether a domestic or an international driver. In the case that drivers work in both domestic and international transportation they could select both options. The highest number of drivers who took part in the questionnaire work simultaneously in domestic and international transport. The second most frequent answer of drivers was international transportation to the question about the place of their work performance. Based on these results, we can evaluate that 76% of drivers work in international road freight transport or both international and domestic transportation, which is currently quite a large number, and on the other hand, only 24% of drivers answered that they work exclusively in domestic road freight transport. The problem is that nowadays fewer and fewer drivers are interested in the job of an international driver and with this problem, the new solutions are needed.

The most important question in the questionnaire survey was to identify reason for violation of social regulation. For this question, drivers could mark more than one option. In Table 2, is shown that up to 179 responses out of all recorded responses, which represents a percentage of 28.01%, expressed the lack of free parking spaces in parking lots and parking areas as the most common reason for violating social legislation. On the other hand, if we compare all answers from the number of participated drivers about the lack of free parking spaces, we find that almost 65.09% of drivers agreed with this problem. According to the questionnaire survey, 80 responses stated that the main reason for violating social legislation is returning to home or head office. It is also interesting to note that only three drivers, which is 1% answered that they have never violated any rules and that they always follow the regulations. If we recalculate to the total number of tachograph cards issued in the Slovak Republic, we could evaluate that only 835 drivers out of a total number of 83,470 drivers comply with the regulations 100 percent if we consider that all drivers who have tachograph cards also drive, which is unrealistic.

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Tab. 2. The most frequent violations of social legislation by drivers

Reasons for violation	Number of responses	% statement from total answer	% statement from interviewed drivers
Lack of free parking spaces	179	28.01	65.09
Traffic accidents, congestion	162	25.35	58.91
Arrival home	80	12.52	29.09
Compliance with the loading / unloading deadline	76	11.89	27.64
Driver inattention	41	6.42	14.91
Poor planing of the transport route	40	6.26	14.55
Using a magnet or other device to disable the tachograph	37	5.79	13.45
Forcing the employer to drive beyond the permitted time limits	21	3.29	7.64
I never broke	3	0.47	1.09
Total:	639	100.00	232.36

In the event that the drivers identified returning to the company as a problem, this problem may be caused by the fact that the drivers are not familiar with the current version of Regulation (EU) 2020/1054 of the European Parliament and of the Council of July 15, 2020, which amends the regulation (EC) no. 561/2006 on returning to the company headquarters or to the place of permanent residence.

4. Conclusion

The last chapter of this work summarizes the results of the research, as well as presents proposals for possible solutions to the problem of violations of social legislation by drivers. Without a solution to the parking policy and with increasing demand for freight transport and the increase in the number of shipments delivered within e-commerce it is reasonable to assume that drivers will seek parking spaces near highway exits to urban areas to find convenience and avoid congestion and undesirable conditions [15]. For this reason, the completion of new infrastructure or the expansion of the current one is necessary [10]. Another proposal to eliminate errors caused by driver inattention is to improve communication between drivers and dispatchers, so that drivers would receive notifications from the dispatcher using Garmin-type navigation through the information system shown in the Figure 2. The Garmin-type navigation unit informs the driver, i.e., on the ban on the entry of trucks, avoiding narrow bridges on the transport infrastructure. Using this unit, the driver or vehicle to communicate with the dispatcher, who can find out in advance the availability of free parking spaces, where he can plan and reserve a parking space for him in advance. In this way, it would be possible to avoid situations where drivers arrive at a parking lot where there is no free parking space, and therefore must continue entering further and are forced to exceed the permitted maximum driving times or daily driving times [19].

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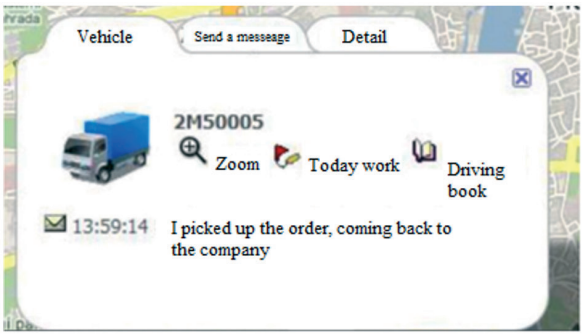

Fig. 2. Webdispatch communication [19]

By 2025 at the latest, all trucks carrying out international transport must be equipped with a tachograph II. generation (new vehicles from 2023). These tachographs will enable automatic switching of states after crossing the border, manual input of loading and unloading and more advanced remote control connected to the control of:

- daily and weekly driving time,
- continuous driving time the driver himself [4].

Based on the installation of a new type of intelligent tachographs, the use of magnets, which was identified by up to 37 drivers as a means of violating social legislation, will be completely avoided. If we look at this as a little over 13% of the responses and if we recalculate it by the number of all active drivers, we find that over 10,850 drivers are susceptible to the use of a magnet to disable the correct operation of the tachograph. For this reason, we would propose the obligation to install smart tachographs in all vehicles in freight transport, not only in vehicles that will carry out international transport. Another possible solution would be intelligent traffic signs that would indicate the distance to the nearest parking space and a digital display would be placed below it, which would show the number of free and occupied parking spaces in real time, shown below in the Figure 3.

Fig. 3. Recommended design of an intelligent traffic sign [4]

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However, this solution would require high costs, as communication and information reliability between the parking space provider and the traffic signs would have to be ensured. A solution that would simplify this system is a central database of information about all parking lots connected with their distribution to all traffic signs. A similar system is used in underground parking lots.

5. Acknowledgement

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