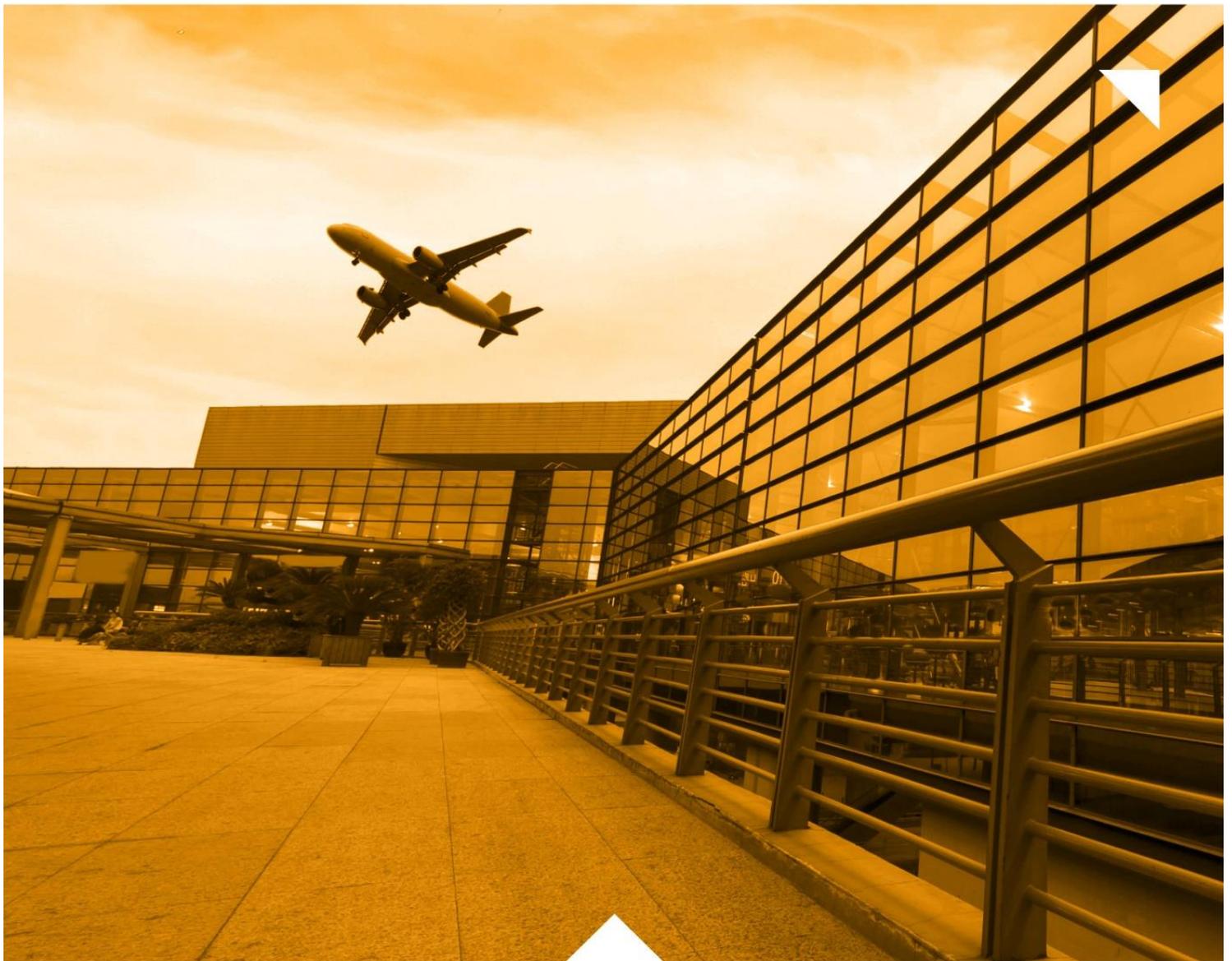


# CHALLENGES AND MODERN SOLUTION IN TRANSPORTATION

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Magdalena Kopeć, Adrianna Toboła (Eds.)





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## **Preface**

The main topic of this monograph is the challenges and modern solution in transportation. Transport is one of the key elements enabling the undisturbed flow of products and services between successive links in the supply chain. Successfully implemented transport processes condition the effectiveness of processes implemented throughout the entire supply chain and its individual links. The monograph has been divided into three parts, related to The Use of Optimization Tools to Improve Transport Efficiency, Legal and Organizational Aspects for Building Sustainable Transport Solutions and Contemporary Rail Solutions.

The first chapter presents the work of authors who showed the legal and organizational aspects of increasing safety in transport, also in the dimension of building intermodal systems, which together make up the concept of sustainable transport. It is a manifestation of contemporary trends to limit the negative impact of transport on society and the environment. One aspect of sustainable transport is the wider use of rail transport. This was reflected in the third chapter of the monograph, which presents works in the field of contemporary solutions in the field of railways. This chapter also refers to the subject of autonomous transport, which raises a very important issue in the context of the development of currently operating transport and distribution systems, and also results from the development and improvement of the concept of both Industry and Logistics 4.0.

The second chapter presents work whose authors focused on the possibilities of using analytical tools to optimize processes and improve efficiency in transport. They indicated a wide spectrum of possibilities for their use. These would be either individual trucks, buses or entire transport systems. The technological support of logistics processes implemented as part of integrated supply chains is one of the key development elements, thus determining the competitiveness of cooperating partners. The use of modern solutions in the field of concepts supporting transport processes not only enables the development and improvement of physical goods transport processes, but also supports the development of all processes carried out within the supply chains conditioned by efficiently implemented transport processes. Therefore, an extremely important element is, therefore, support for the development of transport processes with modern technologies and tools developed under this chapter, which primarily contribute to increased efficiency and reliability of process implementation, in particular transport, which is one of the most important aspects in the context of the competitiveness of supply chains.

As part of chapter three, the authors of individual subsections refer to rail transport, indicating as key to the development of this branch of transport such elements as private railway sidings or the use of modern solutions within the railway infrastructure in Poland. Under this chapter, the importance of developing rail transport in Poland in the context of the New Silk Road should also have been highlighted. The geopolitical location of Poland makes it possible to achieve a key position in the context of rail transport of shipments from China and other Asian countries, hence the development of this branch of transport seems to be particularly important in the context of the development of transport processes implemented within the supply chains.

We encourage you to read and contact the authors of individual chapters. The authors and editors, handing over this monograph to readers, hope that the presented results of the authors' research will enable establishing cooperation, building new scientific teams and conducting research relevant for the development of the logistics industry.

Special thanks to Henryk Sobolewski and Michał Adamczak reviewers of the monograph.

Maciej Stajniak, Mariusz Szuster, Magdalena Kopeć, Adrianna Toboła  
Editors

**I. LEGAL AND ORGANIZATIONAL  
ASPECTS FOR BUILDING SUSTAINABLE  
TRANSPORT SOLUTIONS**



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**THE COMPLIANCE WITH ROAD TRANSPORT REGULATIONS  
– CONTROL RESULTS IN MAŁOPOLSKA**

**ABSTRACT**

**Background:** Road transport is an indispensable and irreplaceable element of modern-day logistics systems. In recent years, this mode has seen a sharp rise in the total share of inland freight transport, particularly within the European Union. The Polish carriers have played a significant role in bringing about these changes as it is estimated that about 25% of all transport work within the European Union is performed by them. Road transport has many advantages, including the best spatial availability and the possibility of providing direct transportation services. The disadvantages include particularly negative impact on the environment and road safety. One of the key elements contributing to the reduction of the negative impact of road transport on the natural environment and road safety can be the efficient operation of state administration bodies - such as, for example, the Road Transport Inspection. The aim of this paper is to present and evaluate the results of road transport inspections performed by the Provincial Inspectorate of Road Transport in Krakow.

**Methods:** The study focuses on the in-depth analysis of road controls and in-company inspections carried out in Lesser Poland Voivodeship. All of the controls were conducted by professional Road Transport Inspectors between 2016 and 2018. The data have been made available by the Provincial Inspectorate of Road Transport in Krakow and they were analyzed using the methods of descriptive statistics as well as statistical inference.

**Results:** Study findings show that annually ca. 9% of inspections carried out by the officers of the Inspectorate of Road Transport in Lesser Poland Voivodeship between 2016 and 2018 resulted in the decision to impose an administrative penalty. In the analyzed 3-year period, the total of 40674 road inspections were conducted, with foreign carriers (53%) being more frequently controlled than the local ones (47%). In the course of these three years, the Road Transport Inspection officers performed 5285 controls of the maximum permissible laden

weight and axle load limits and checked 280667 working days of drivers during inspections at the premises of transport companies.

**Conclusions:** The analysis of the collected data makes it possible to draw a conclusion that there are still many cases of non-compliance by carriers with legal requirements related to road transport. Irregularities occurring during road transport of goods may contribute to delays in the scheduled processes, may influence the road safety and adversely affect the natural environment.

**Keywords:** road transport, motor transport, cargo transportation, road control, road safety

### INTRODUCTION

Road transport can be defined as a process of carrying goods or people between places by using roads and wheeled modes of transport. It is one of the branches of transport that has seen a very dynamic growth in recent years.

The need for transportation has been strongly felt throughout the history of mankind. The quality and access to transport infrastructure have always impacted the development of entire regions and states. In retrospect, however, it should be noted that the transport system has only limited ability to respond quickly to the current needs of the world, particular regions or local communities. That is why, it is shaped in a slow and a step-by-step, evolutionary way. The significant dynamics and the growing importance of road transport mean that this branch of transport will have a decisive impact on the future structure of transport systems.

Both in Poland and in the European Union countries, road transport is now the most commonly used mode of transportation [Freight transport statistics - modal split 2019].

The aim of the study was to analyze and evaluate the results of road transport inspections performed by the Provincial Inspectorate of Road Transport in Krakow. The data thus obtained may be useful in various ways, e.g. reveal any potential irregularities, show how entities performing transport conform to existing regulations, and what the Road Transport Inspection should be currently focusing on.

According to the Regulation (EC) No 561/2006 of the European Parliament and of the Council, carriage by road means any journey made entirely or in part on roads open to the public by a vehicle, whether laden or not, used for the carriage of passengers or goods.

J. Neider [2015] claims that transportation has two completely opposite aspects. On the one hand, it is a necessity, an indispensable part of everyday life of individuals as well as

businesses. It enables the maintenance of contact and the free movement of goods regardless of their location. However, on the other hand, it is an undesirable element of trading. It increases transaction costs, poses a threat to goods, and requires many additional activities to be taken, such as loading and unloading of cargo. In the case of developing countries, transportation also generates environmental and safety problems [Krzywonos 2018], what raises widespread reservations and fears in general public.

### **CARRIAGE BY ROAD**

Carriage by road is defined by the Regulation (EC) No 561/2006 of the European Parliament and of the Council and the Road Transport Act of 6 September 2001. Road transport is divided into road transport and non-commercial road transport. Both of these concepts are distinguished by the issue of earning money in connection with the transportation services carried out. The legislator has specified that commercial activities involving the transport of persons or goods will be called “road transport”. However, in a situation where transport operations are carried out free of charge, as if for their own purposes, such transport will be called “non-commercial road transport”. The Act of 6 September 2001 on road transport distinguishes the following conditions that must occur simultaneously for non-commercial road transport to take place. These are:

- motor vehicles used for transport are driven by the entrepreneur or his employees,
- the entrepreneur has a legal title to dispose of motor vehicles,
- in the case of a laden vehicle - items transported are the property of the entrepreneur or have been sold, bought, rented, leased, produced, extracted, processed or repaired, or in the case of passenger transport, these are employees and their families,
- it is not the transportation as part of business activity in the field of tourist services.

In recent years, carriage by road has seen a sharp rise in the total share of freight transport. Fig. 1 presents the percentage share of road transport within the European Union in 2012-2016.



Fig. 1. The share of road transport in the total transportation of goods within the European Union. Source: [Energy, transport and environment indicators 2018].

Polish carriers have had a significant share in the observed increase in road transport. According to the Eurostat data, over 28% of transport work in the European Union is performed by Polish transport companies [Energy, transport and environment indicators 2018].

For comparison purposes, Fig. 2 shows the percentage share of road transport in selected European countries and the average for all EU countries. It can be observed that the percentage of road transport carried out in Poland is lower than the average for the 28 countries of the European Union. Of all the countries presented, road transport in France represents the largest percentage share. In Germany, the percentage share of road transport is lower than in Poland, but this may be due to the popularity of inland navigation in this country. The percentage of total freight transport using this mode is 8.8%.

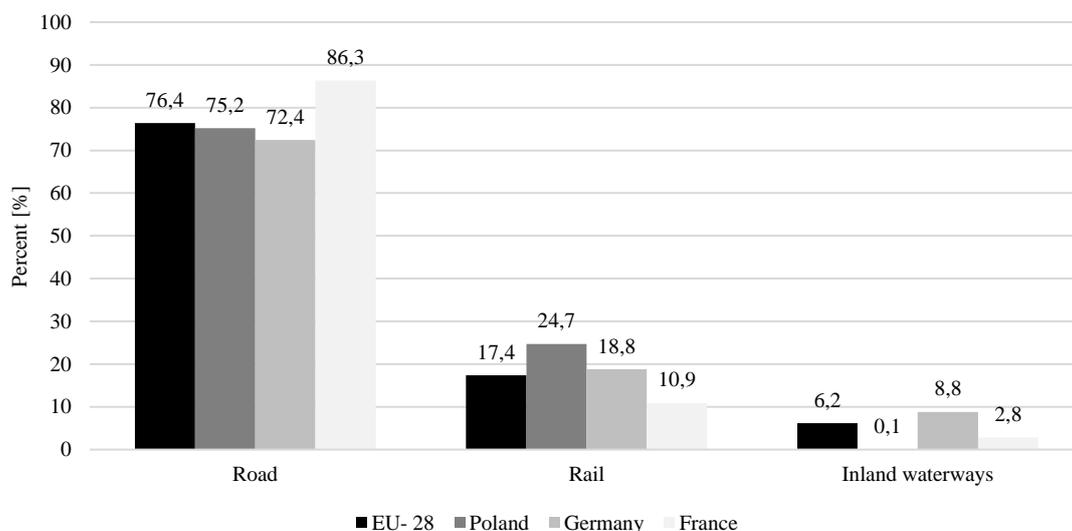


Fig. 2. Modal split of inland freight transport in 2016 (% share in ton-kilometers). Source: own elaboration based on [Energy, transport and environment indicators 2018].

The information from Eurostat presented above as well as the analysis of the reports prepared by the Central Statistics Office (GUS) in Poland [Przewozy ładunków i pasażerów... 2019] confirm the dynamic development of the road freight transport sector. The increase in road transport raises some concerns in society that are related to the environment and road safety.

The functioning of the domestic road transport market is strictly regulated by various legal instruments such as international conventions, European Parliament and Council regulations, and national laws and regulations [Bentkowska-Senator and Kordel 2016]. However, the existence of such a system does not in itself guarantee compliance with all legal requirements by road operators. Specialized inspection bodies have been set up for this purpose and in the case of road transport – it is the Road Transport Inspection (ITD).

The Road Transport Inspection was established pursuant to the Act of 6 September 2001 on road transport as an answer to the growing need for improving road safety and protecting the environment. The paper focuses on the controls carried out by Road Transport Inspections in Lesser Poland Voivodeship (Małopolska).

### **METHODS**

The research material consists of reports from various inspections performed by the Provincial Inspectorate of Road Transport in Krakow. The documentation has been shared as a result of a public inquiry to this unit.

The collected material covers the activities carried out by the Provincial Inspectorate of Road Transport in Krakow in years 2016-2018. The obtained data was analyzed using descriptive statistics methods and statistical inference [Stanisławek 2010].

### **RESULTS AND DISCUSSION**

Based on the collected data, it was determined that in 2016-2018 the Provincial Inspectorate of Road Transport in Krakow carried out 40,674 road inspections in Lesser Poland Voivodeship. The detailed number of inspections in the analyzed period and the types of the audited entities are presented in Fig. 3. In their activities, the Road Transport Inspection focuses mainly on enforcing the provisions of the following legal acts: The Act of 6 September 2001 on road transport, The Act of 20 June 1997 – The Road Traffic Law, and the Act of 21 March 1985 on public roads.

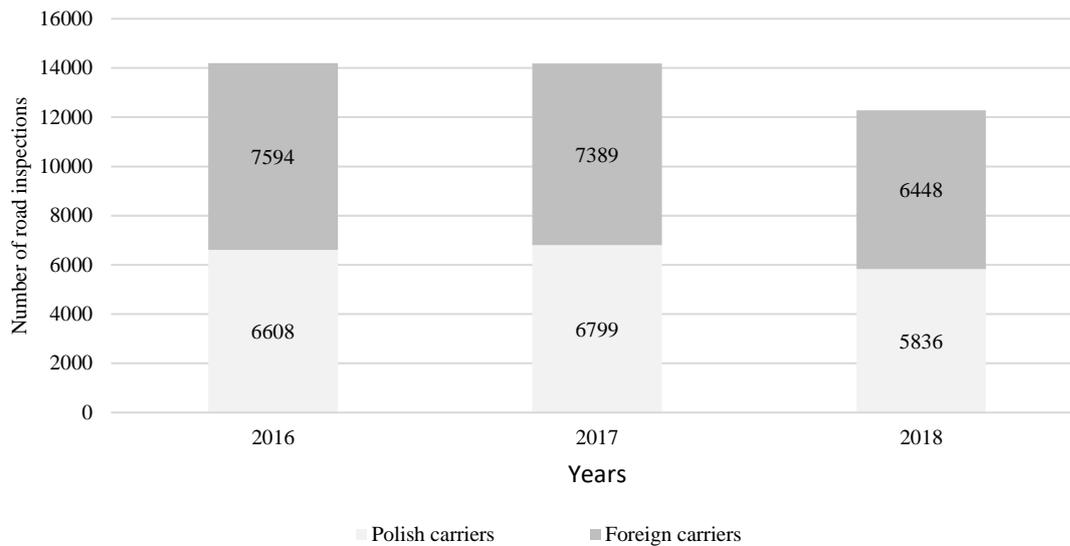


Fig. 3. The number of road inspections carried out by the Provincial Inspectorate of Road Transport in Lesser Poland. Source: own elaboration based on the Provincial Inspectorate of Road Transport in Lesser Poland data.

As can be seen in Fig. 3, the number of road inspections was the highest in 2016 and amounted to 14,202. In 2017, there were fewer of them – 14,188, whereas in 2018 – 12,284. It should be noted that according to the data made available by the Provincial Inspectorate of Road Transport in Krakow, the number of active officers was roughly the same in the analyzed period (30 inspectors). The percentage of Polish carriers subjected to roadside inspections in 2016-2018 remained more or less at the same level and fluctuated between 46-47% of all inspections. It follows that foreign carriers are subjected to inspections slightly more often than the Polish ones. This should be understandable considering the fact that Lesser Poland Voivodeship borders with the Slovak Republic and it is also a transit center for the north-south and east-west road traffic, thanks to the A4 motorway. Poland is a country on the outskirts of the European Union, which means that targeting vehicles from the outside of the EU is absolutely necessary and justified. Moreover, the activities of the inspectors are now also focused on protecting the domestic transport services market. This has become one of the top priorities for the Inspectorate. Comparing the current number of inspections with the inspections carried out in 2005-2008, it can be stated that in both periods they were relatively comparable in terms of the number of controls performed etc. For instance, back in 2005, there were 10,527 roadside inspections and in 2006, there were 11,256 [Kabaja 2012].

The number of inspections conducted in years 2016-2018, which ended in decisions to impose a penalty, have been analyzed next. These were the cases, in which officers revealed some irregularities related to the transport of goods. The results of the analysis are shown in Fig. 4. It can be observed that the number of irregularities detected by the Road Transport

Inspectors during roadside inspections in Lesser Poland Voivodeship amounted to 1411 in 2016, 1323 in 2017, and 1003 in 2018. These figures represent about 9% of the total number of roadside inspections with the highest percentage of inspections ended with a penalty and disclosure of irregularities recorded in 2016 and amounting to 9.9%, whereas the lowest – in 2018 (8.2%). It can be thus concluded that the level of irregularities detected is about the same. Yet, the presented data show that every tenth truck carrying goods on the roads of Lesser Poland Voivodeship may not be meeting legal requirements.

On the other hand, comparing the level of detected irregularities in the analyzed period with the years 2005-2008, it can be stated that these figures have sharply decreased. In 2005 and 2006, over 40 percent of road inspections in Lesser Poland carried out by the Provincial Inspectorate of Road Transport ended with the decision to impose a penalty [Kabaja 2012].

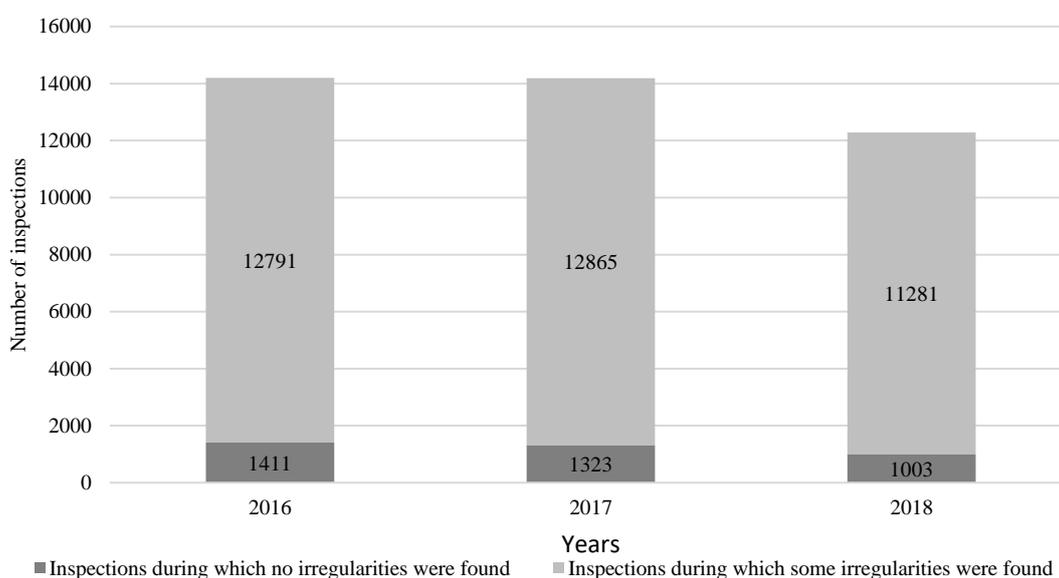


Fig. 4. The comparison of the number of inspections during which no irregularities were found with the cases of irregularities revealed.

Source: own elaboration based on the Provincial Inspectorate of Road Transport in Lesser Poland data.

Another important aspect that is usually subject to control is the permissible total weight of vehicles and axle loads. It is directly related to road safety and, in fact, to the possible devastation of the road infrastructure. In the analyzed period, inspectors conducted over 5,000 vehicle inspections aiming at detecting violations of law in this respect. The largest number of such controls took place in 2017 (2023 inspections recorded). In 2016 and 2018, there were fewer of them – 1753 and 1509, respectively.

It was found that such irregularities are very common. Statistical analysis has shown that in 2016, as many as 35% of inspections revealed irregularities related to the overloading of

vehicles performing road transport in Lesser Poland. In the following years, however, this percentage was reduced. In 2017, 532 offenses were recorded, which constituted approx. 26% of all inspections in Lesser Poland, whereas in 2018, 277 of such cases were recorded, which constituted 18% of the inspections carried out that year. More detailed information regarding the weight controls of road transport vehicles is presented in Fig. 5.

A relatively high number of offenses detected may indicate, among others, low transport rates and high competition between transport companies. These factors may induce carriers to take, oftentimes unnecessary, risks. Penalties for overloading vehicles are generally high and sometimes amount to tens of thousands of zlotys.

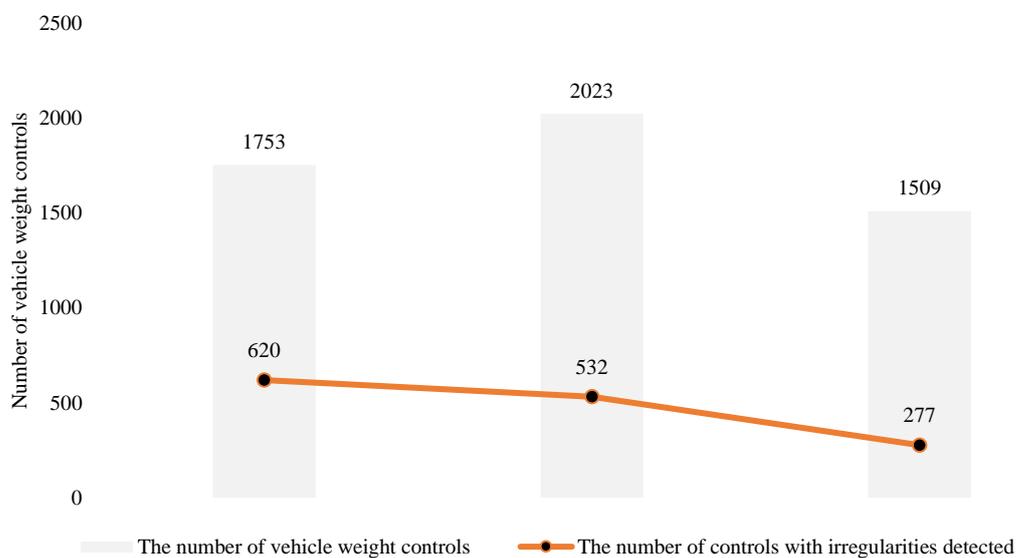


Fig. 5. The number of vehicle weight controls combined with inspections in which some irregularities were detected. Source: own elaboration based on the Provincial Inspectorate of Road Transport in Lesser Poland data.

Another particularly important area related to the supervision and control of road transport are the inspections carried out by the Provincial Inspectorate of Road Transport at the premises of enterprises, the so-called internal controls [Kierunki działania..]. They may concern the verification of compliance with various regulations e.g.: access to the carrier's market, compliance with working time, documentation keeping, and meeting the requirements arising from the ADR agreement.

From the point of view of transport safety, it is very important to meet the requirements regarding compliance with drivers' working time. The activities of the Provincial Inspectorate of Road Transport in this aspect were also assessed. Fig. 6 was elaborated based on the data provided by the Inspectorate. It presents the number of all controlled working days of drivers in companies, which have their headquarters within the territory of the Lesser Poland

Voivodeship. As it results from the presented data, the number of working days of drivers performing road transport, which were subject to control by Road Transport Inspection officers, has significantly increased since 2017 and has reached levels exceeding 100,000 working days. Unfortunately, the Provincial Road Transport Inspectorate in Krakow did not disclose data on how many of these inspections ended with the detection of irregularities.

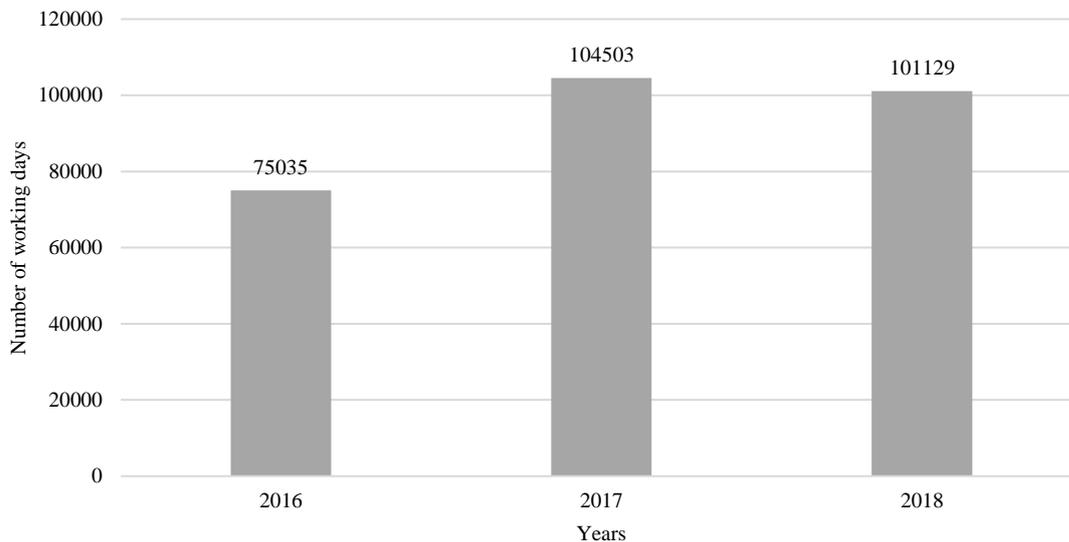


Fig. 6. The number of working days checked during inspections conducted in transport enterprises.  
Source: own elaboration based on the Provincial Inspectorate of Road Transport in Lesser Poland data.

## CONCLUSIONS

Transport systems develop very quickly and are becoming more and more necessary for the proper functioning of the global economy. However, their rapid development can generate some threats. Road transport is an example of an area of the economy that has been developing particularly fast in recent years. The consequences of such accelerated growth include increased public concern about their own safety. Both the national and the EU legal systems should guarantee the safety of transport operations and fair competition. The current legislation regarding road transport is the result of many years of regulatory development and is one of the most stringent in the world. However, to ensure its proper functioning, well-organized control entities are required, such as the Road Transport Inspection in Poland.

The analysis carried out for the purposes of this paper, though limited to one voivodeship only, confirms that the road transport industry still fails to fully conform to the legal requirements, despite the fact that the regulations have been in force for many years now.

It should also be assumed that each group of offenses may have different causes. Therefore, investigating and analyzing irregularities related to the road transport of goods can give many

answers regarding the problems of the transport sector and guide future legislative work. Unfortunately, studying this problem is not an easy task, since access to all necessary data requires the consent of the Road Transport Inspectorate.

The inspections conducted in Lesser Poland Voivodeship clearly show the existence of a certain percentage of enterprises that disregard legal requirements when carrying out their transport operations. However, the number of such cases has been decreasing in the past few years. It was also found that the transporting trucks are very often overloaded. This is evidenced by the high percentage of inspections completed with the imposition of a penalty. Yet, in the recent years, there has been a visible decline in the number of such irregularities. A possible solution that might reduce the number of overloaded vehicles is to conduct investigation and undertake administrative proceedings against shippers and companies responsible for commissioning transport of goods in such manner (allowing the vehicles to be overloaded). Extending responsibility to these entities can effectively reduce the excessive loading of vehicles in road traffic.

The observed reduction of detected irregularities during roadside inspections may result from the better training and growing experience of the Road Transport Inspection officers, as well as the introduction of the electronic toll systems that make it possible to closely monitor traffic and vehicles. It is now becoming increasingly difficult to falsify tachograph indications, while it goes without saying that all of the entities involved in transportation should strive to ensure that the general public perceives it as safe and reliable.

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