

## OPINION OF THE CARRIERS PREPARATION TO ROAD TRANSPORTATION OF DANGEROUS MATERIALS

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**Summary.** The paper presents guidelines for legal documents normalizing the land transport of dangerous materials. The requirements have been described for the carriers and transport staff in aim of assurance of safe transport of dangerous materials. On the basis of the carried out survey the acquaintance of the regulations by carriers was checked concerning the legal and technical conditions of the road transport of dangerous materials.

**Key words:** road transport, dangerous goods, transport safety

### INTRODUCTION

Road, railway or inland transportation of dangerous materials presents considerable risk of accidents. Trying to ensure the best possible conditions of safety and aiming at an assurance of reliable transportation, legal and technical requirements have been achieved in result. The majority of states have tried to introduce the principle of safe transportation of dangerous materials as legal acts.

After accession to the European Union Poland has accepted the adaptation to European directives as national right. In 2008 the directive of European Parliament was given concerning the land transportation of dangerous goods [3]. The earlier directives concerning this question were half-open [1, 2].

The guidelines recorded in the above-mentioned files found the reflection in the Polish legislation as the Law on Road Transport of Dangerous Goods [12]. Its content is also related to ADR international convention about the road transport of materials and dangerous goods, confirmed in Geneva on the 30<sup>th</sup> of September, 1957. Poland ratified this convention in 1975 [11], and the requirements of contract were to be amended in two-year cycle. A contract, except the main text, contains two clauses which are systematically amended according to the current state of technical knowledge. The first clause contains the list of dangerous materials divided into 9 classes of danger [4, 5, 8]. The conditions of individual packing are additionally described and the descriptions of transported dangerous materials as well as their signification. The second clause contains the principle of transport of dangerous materials, description of conditions of technical vehicles as well as principles of their loading and unloading. It describes the principle of marking the vehicles as well as the staff requirements and the required documentation [8]. Moreover, carriers should fulfill the definite conditions of the transport of dangerous materials, e.g. employ staff with suitable qualifications [6, 7, 8, 9].

## THE AIM AND THE RANGE OF WORK

The numerous aspects of transport of dangerous materials require from the carriers an acquaintance with both the general acts of road traffic and the suitable detailed technical and legal regulations.

The aim of this work was the analysis of carriers' acquaintance with legal conditions and technical requirements concerning road transport of dangerous materials. The acquaintance of the principles of executing the transports was checked and the required documents analyzed. The analysis took into account the kind of used vehicle, the kind of transported material and the conditions of executing the work.

## METHODOLOGY

In order to gain information on the acquaintance of the law and procedures required in the transport of dangerous materials, an anonymous questionnaire was prepared, directed to drivers. The query-sheet was made in The Department of Technology Fundamentals of the University of Sciences in Lublin. The survey contained the following questions:

Table 1. General information

1. Age		
2. The experience of work in the driver's profession (in years)		
3. The experience of work in dangerous materials transport (in years)		
4. The character of transport: (mark as appropriate)	casual	
	regular	
5. Is this the first contact with this kind of transport?	yes	no

Table 2. Information on the vehicle and kind of transported material

## A. The kind of vehicle: (mark as appropriate)

1. Lorry open	
2. Lorry closed	
3. Tank truck	
4. Delivery van	
5. Vehicle with trailer	
6. Agricultural tractor with trailer	
7. Another	

## B. The vehicle: (mark as appropriate)

1. It is always efficient technically	yes	no
2. It possesses suitable marking		
3. It possesses the warning equipment (lamp, triangle,)		
4. It possesses the additional equipment (the set emergency, the wedges, the medicine-chest)		
5. It possesses the means of contact		

## C. The kind of transported material: (mark as appropriate)

1. Large quantities	
2. Small quantities	
3. Liquids	
4. Gases	
5. Solid materials	
6. Radioactive substances	
7. Isolated packaging ( technical gases, propane - butane)	

Table 3. The acquaintance of the driver with the required records, principles of marking the vehicle as well as the conduct in case of emergency situation

## The driver knows (mark as appropriate):

1. Kinds of necessary documents to realize the transport	yes	no	partially
2. Content of these documents			
3. Instructions of safe execution of the transport			
4. Marks and warning inscriptions			
5. The rule of persons transport in time of such transportation			
6. The rule of co-operation with pilot			
7. The rule of emergency conduct ( the leakage of liquid or gas)			
8. The rule of rescue equipment usage ( the anti-gas mask)			
9. The rule of liquidation of emergency threats in relation to men			
10. The rule of liquidation of emergency threats for environment			
11. The rule of emergency conduct (damage of vehicle, road incident)			
12. The rule of stop			
13. The rule of giving first medical help			
14. The rule of material responsibility			

## The acquaintance by the driver of the principles of emergency and rescue equipment use (mark as appropriate):

1. He personally supervises the survey and the OC of his vehicle daily	yes	no
2. He supervises personally the loading and unloading of his vehicle		
3. He realizes the forwarding actions ( the loading, unloading)		
4. He knows how to use the rescue equipment (emergency)		
5. He knows how to use the equipment of personal protection		
6. He knows how to give first medical help		
7. He knows how to start fire-extinguisher		
8. He knows how to fit and turn on the warning light		
9. He knows how to use the accessible means of contact		
10. He knows the numbers of alarm telephones		

Table 5. The safety and hygiene of work (mark as appropriate):

1. The norms of drivers' work time are observed	yes	no	I don't know
2. The driver is informed about the threats from the transported material	yes	no	I don't know
3. The driver receives information about the threats from: (mark)	Dispatcher		
	Employer		
	BHP Service		
	Customer		
	From documents		
	Another source		
4. Is the driver informed about the professional hazard?	yes	no	
5. While executing the work in transport of dangerous materials the driver feels	growing threat	yes	no
	prompter tiredness		
	nervous pressure		
	stress		
6. The knowledge about transport of dangerous materials .....the feeling of threat: (mark as appropriate)	increases		
	reduce		
	it does not influence		
7. Other people in the driver's cabin (escort, second driver): (mark as appropriate)	make easier executing work		
	make difficult executing work		
	increase the feeling of threat		
	reduce the feeling of threat		
	do not influence on driver		
8. Does the driver participate in rescue action after breakdown or an accident during transport of dangerous materials?	yes	no	
9. Does he possessed knowledge and skills enabling the correct behavior?	yes	no	
10. According to the driver the training in dangerous materials transport is: (mark as appropriate)	sufficient		
	unsatisfactory		

The questionnaire was given to the drivers from three enterprises providing regular services of transport of dangerous materials.

## RESULTS

The survey was answered by 29 drivers aged from 29 to 57 who had worked in driver's profession for 4 - 35 years, and participated in the transport of dangerous materials for 4 - 30 years [Świerczek, 2004]. On this basis there was established the profile of the studied driver - aged 42, worked in the driver's profession for 20 years and worked in the transport of dangerous materials for 13 years.

The information on the kind of used vehicles is shown in Fig. 1, and on the kind of transported load in Fig. 2.

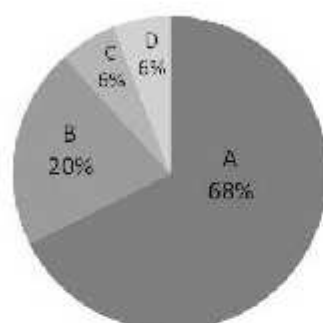


Fig. 1. The kind of vehicles used in transport:  
A- tank truck; B- delivery van  
vehicle; C- vehicle with trailer;  
D- tractor with trailer

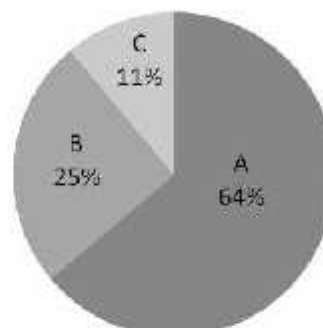


Fig. 2. The kind of transported material:  
A- liquid; B- gas;  
C- isolated packaging

All the drivers declared that the used vehicles are technically efficient and prepared to transport of dangerous materials. They also confirmed the acquaintance with documents, principles of signification and the transport of people, way of liquidation of threats as well as the principles of participation in road traffic. All the drivers executed the survey of vehicle personally, they supervised loading and unloading, they also showed the skill of operating the additional equipment. However, 3 drivers (app. 10%) did not know all the principles of giving first medical help. The awareness of threats and professional hazard has an influence on the safety and hygiene of work as well as the control of the norms of work.

From among the questioned drivers 24 (app. 83%) declared that they controlled the norms of work time, whereas 5 gave an ambiguous answer. As to hazards connected with a particular transported material 25 (app. 86%) drivers had been informed by employers and 27 (app. 93%) got information concerning professional hazard.

The consciousness of transport of dangerous materials has an influence on the awareness of higher risk during the work, quicker fatigue and the growth of stress. The results of inquiry about this question are shown in Fig. 3. The influence of the possessed knowledge about the transported load on the feeling of threat as well as the aspects of investigations of this factor are shown in Fig. 4.

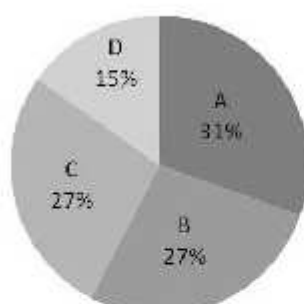


Fig.3. The influence of the driver's consciousness on the on the feeling of: A- enlarged risk; B - quicker tiredness; C - stress enlargement; D - any influence

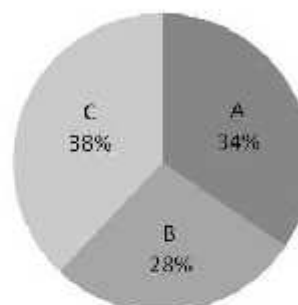


Fig.4. The influence of the possessed knowledge on the feeling of threat: A - decrease; B - increase; C - any influence

Participation of other people in transport (escort, second driver) for 26 (app. 90%) drivers does not influence their work.

Only 7 (app. 24%) drivers took part in rescue action after breakdown or an accident during transport of dangerous load. All of them confirmed that the possessed knowledge and skills were sufficient for carrying out a correct rescue action. However, 5 (app. 17%) of the questioned drivers had an opinion that the training on safety range of dangerous materials transport is insufficient.

### CONCLUSIONS

In a majority of cases (almost 70%) tankers were used for transport of dangerous materials and the transported dangerous load in over 60% cases was liquid.

The gathered information allows to confirm that the transport of dangerous loads was one of the most difficult forwarding tasks. It generates in most of the drivers (85%) the discomfort of work.

The results of investigations permit to deduce the following conclusions:

1. Transport of dangerous goods involves drivers with many years of practice in the driver's profession.
2. Transport of dangerous loads is executed by responsible workers who know the traffic regulations and the required documentation.
3. Most of the drivers get information concerning the threats from the transported materials as well as regarding professional hazard.
4. The organized training as well as the possessed knowledge let the drivers carry out adequate rescue action in case of conflict or an accident of vehicle (although almost 20% drivers is discontent with the quality of the provided upgrading courses).

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#### OCENA PRZYGOTOWANIA PRZEWOŹNIKÓW DO TRANSPORTU DROGOWEGO MATERIAŁÓW NIEBEZPIECZNYCH

**Streszczenie.** W artykule przedstawiono wytyczne do aktów prawnych normujących transport lądowy towarów niebezpiecznych. Opisano wymagania stawiane przewoźnikom i środkom transportowym w celu zapewnienia bezpiecznego transportu materiałów niebezpiecznych. Na podstawie przeprowadzonej ankiety dokonano oceny znajomości przez przewoźników warunków prawnych i technicznych wymaganych przy przewożeniu drogowym materiałów niebezpiecznych.

**Słowa kluczowe:** transport drogowy, towary niebezpieczne, bezpieczeństwo transportu