

## ADR transport on proposed lines of selected area in Slovak republic

Ľubomír Hujo, Juraj Jablonický, Ján Kosiba, Juraj Tulík, Marek Halenár

**Abstract:** *A transport of hazardous substances and objects by road goods transport is different from other kinds of transports, because it requires a compliance with various technical, operational, transport and safety conditions and requirements.*

*Our study is proposing a transport of hazardous goods on selected transport line, in accordance with ADR Agreement establishing options of hazardous substances transport in road transportation. Our study is focused on transport lines optimalization and our case study determines transportation corridors in accordance with legislative of Slovak Republic establishing hazardous substances transport on selected transportation area.*

**Key words:** *ADR, hazardous goods, transport line, interaction map*

### Introduction

A development of free market economy demands a transport of chemical substances and objects, which are basically, hazardous substances and objects, which could, during their transport, jeopardize our living environment in many ways. High efficiency of transport and manipulation is a guarantee of cost reduction per production unit (Žitňák and Korenko, M., 2011). Transport in every country is influenced by various socioeconomic factors, such as demography, regional planning, population level as well as country's integration into international trade (Hujo et al., 2013).

Transport of hazardous objects belongs to special transport area. A subject of transport are all substances, which require, in term of transport, nonstandard conditions related to packaging, manipulation; or equipment and construction of vehicle considering elimination of possible risks, which result from physical and chemical properties of transported substance. Although, there is lack of accurate statistical information about quantity of transported hazardous objects in Slovak Republic, estimation is about 30% of total goods transport.

Constant growth of road transportation, hazardous object transport included, growth of hazardous objects transport and transit vehicles capacity are increasing requirements for safe goods and passengers transport on road communications. Our study is focused on an importance of problem related to hazardous material transport. The aim of our study is an optimalization of transport lines for hazardous material transport with a interaction map design of selected area of Slovak Republic in accordance to Act No 8/2009 Coll. on Road Traffic.

### Material and methods

A preparation phase of data processing for interaction map design was a movement monitoring of cargo motor vehicles in Trnava region and follow up analyse of traffic situation considering movement monitoring of cargo motor vehicles outside of charged road stages. ADR interaction map means a design of such structure of corridors in road goods transport, which will be proposed in accordance with ADR Agreement conditions and with national Acts on road and land communications. A subject of interaction map is to mark out unchanged transport corridors in individual areas of Trnava region, which are used by companies dealing with goods transport for a purpose of road charges reduction.

Problematic area of ADR transport in Piešťany area is a road junction of Piešťany city. Agreement on traffic diversion of Piešťany city for vehicles transporting hazardous substances are adopted, in accordance to Act No 8/2009 Coll. on Road Traffic and in accordance to Act No. 56/2012 Coll. on Road Transport, because Piešťany city is a spa town, where underground water resources and important healing springs and healing mud resources are situated. Traffic flow of hazardous good transport is diverted from D1 motorway to I. class road I/61 and II. class road II/499, because alternate road is equipped

with sedimentation tanks, i.e. roads are canalized in case of biological catastrophe. Traffic diversion of D1 motorway through selected I. and II. class road communications with a distance of 8.6 km is about 1.7 km longer than direct road through motorway, where transition of vehicles carrying material, which could cause water contamination, is abandoned (Gnap and Jagelčák, 2009).

## Results

A result of our study is a generated Interaction map, with optimal, charged road stages marked out with blue colour, as well as hazardous, bypassed road stages marked out by red colour. We designed a projection of specific stages of transport road Senica – Kúty, Trstín – Trnava, Trstín – Piešťany, Trnava – Hlohovec, Hlohovec – Nové Mesto nad Váhom, Galanta – Dunajská Streda, Dunajská Streda – Veľký Meder. Designed projection provides higher safety of road transport and reduces negative effects on environment.



Fig.1. Interaction map of Trnava region (author)

Transportation sector is significantly effecting economic growth of the country and is a factor of positive functioning of economy. Transportation is influenced by various factors, such as infrastructure, country's integration into international trade, regional planning, demography, wealth level of population etc. All mention before is creating a supply and demand in the sector of transportation.

A control of hazardous material transport is amended by Directive 95/50/EC - checks on road transport of dangerous goods. This Directive is implemented into national legislative through Act No. 56/2012 Coll. on Road Transport. According to § 39, Article (1)

of Act No. 56/2012 Coll. on Road Transport are all controls of hazardous goods transport realized in order to professional inspection over fluency and safety of road traffic or in technical base of traffic participant (Halama, 2013).

### Conclusion

Economical growth over this century, which is characterized by significant growth of companies and their expansion on various markets, caused strong pressure on coordinated and monitored movement of whole material and value flow (Mojžiš et al., 2001).

A road transport of hazardous material is the most risk bearing factor of special situation formation over last years, according to practice experiences. International road transport of hazardous material is amended by European Agreement concerning the International Carriage of Dangerous Goods by Road. ADR Agreement is opened and is updated and amended in accordance to technical development. Technical-exploitation properties of vehicles are characterizing a utilization efficiency of selected vehicle and are evaluating a design of vehicle under selected operational conditions (Chrastina, et al., 2012).

Our study deals with a specific ADR transport of hazardous goods on selected road network and we designed an optimal transport line from all proposed variants considering all transport conditions. A transport has been realized through our designed transport line, considering all legislation regulations adopted in Slovak Republic. We achieved our defined object of scientific study, and we designed a model methodology for hazardous goods transport planning in Transport Company.

We proposed a solution, which will increase a safety of environment and population as well. We designed a transparent interaction map of Trnava region, which is warning the Ministry of Transport, Construction and Regional Development of the Slovak Republic about most problematic transportation corridors.

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**The report is reviewed.**