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REAL-TIME LOADS TRACKING ON RAILWAY TRANSPORT ROUTES

Using fast developing telematic technologies becomes an element, which improves the competition of railway freight transport according to road transport. One of the examples is an introduction of real time tracking of wagons and unit loads. The potential possibilities of tracking systems of wagons and unit loads and their exploitation benefits for transportation companies and their customers are mentioned in this lecture. This solution could be potential element of increasing the railway freight transport in total carriage of cargo.

ŚLEDZENIE RZECZYWISTEGO OBCIĄŻENIA NA SZLAKACH KOLEJOWYCH

Zastosowanie szybko rozwijających się technologii telematycznych staje się czynnikiem polepszającym konkurencyjność transportu kolejowego ładunków w stosunku do transportu drogowego. Przykładem takiego działania jest wprowadzenie systemów śledzenia wagonów i jednostek ładunkowych w czasie rzeczywistym. Przedstawiono potencjalne możliwości systemów śledzenia wagonów i jednostek ładunkowych oraz korzyści z eksploatacji systemów dla przedsiębiorstw transportowych i klientów. Przedstawione rozwiązanie może być elementem zwiększenia roli transportu kolejowego w przewozach ładunków ogółem.

1. INTRODUCTION

In last years the transport companies have searched some solutions making their activity the best and reducing their prime costs. The development of telecommunication and informatics favours quick technology of information's circulation. The information has become a factor which determines the development of company. The quick circulation of information enabled the improvement of companies' activity, including transportation companies.

The telematics matters a lot also in railway transport. The quick circulation of information in railway transport is connected with wagon or unit loads tracking in real time.

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2. LOADS TRACKING IN RAILWAY TRANSPORT

For technical reasons the systems of wagon and loads tracking can be shared onto two categories:

- satellite tracking,
- tracking using track equipment.

The most popular tracking systems are systems based on GPS and GSM/GRPS. Those systems are characterized by precision of wagons and loads localization and possibility of transmission of additional information. Using of GPS and GSM/GPRS technologies and the possibility of using the existing infrastructure is undeniable trump card.

The systems of unit loads and wagon tracking based on track devices are less popular. One of the obstacles is building of infrastructure which enables wagon or loads localization on rail roads. The important thing is also the possibility of robbery or devastation of the track devices. Especially in Poland it could be a serious problem. The tracking systems based on track devices could become widespread during the introduction of ERTMS/ETCS.

The satellite tracking systems are developing very quickly, because they are based on the verified technology and infrastructure used in other branch of transport. Apart from localization of the wagons, it is a possibility of monitoring parameters of wagons and unit loads.

3. THE POSSIBILITIES OF REAL-TIME TRACKING OF WAGONS AND LOADS

In items [1], [2] and [3] the conception of satellite localization systems of rail vehicles and using of telematics in dangerous goods' transport was shown. Analyzing those items we can say, that real-time loads and wagons tracking systems could enable:

- the managing of unit loads and wagons stock,
- identification of empty/loaded wagon,
- identification of empty/loaded unit load,
- identification of open/closed wagon,
- identification of open/closed unit load,
- the diagnostics of wagon or unit load,
- the monitoring of discharge valves in wagon,
- the monitoring of load displacement in wagon or unit load,
- the monitoring of load parameters in wagon or unit load (temperature, pressure).

The managing of unit loads and wagons stock serves as an optimization of using of wagons or unit loads owned by a transport company. The diagnostics of wagon or unit load during the process of transport decreases a probability of permanent and irreversible devastation of whole wagon or unit load or of a part of them. All this leads to decrease of company running costs and costs of management.

Those possibilities of tracking systems of wagons and unit loads enables the protection of loads. The plague of railway freight transport in Poland are thefts from wagons or unit loads. Using the real-time tracking enables the precise localization of time and place of the theft, what influences the probability of thieves detection and recovery the load. This is also the preventive aspect: a consciousness of wagon or loads monitoring could possibly reduce the number of potential thefts. The introduction of transportation documents in electronic

form could also decrease the possibility of theft by persons having access to classical information of the load.

The monitoring of load displacement and parameters of load could prevent a destruction or devastation of wagon, unit load or load. In the transport of dangerous goods this is a great possibility of prevention or decreasing the number of ecological accidents.

4. THE BENEFITS OF WAGONS AND LOADS TRACKING FOR THE TRANSPORTATION COMPANIES AND THEIR CUSTOMERS

Using of real-time wagons and loads tracking systems can influence the operational costs of company in positive way. Apart from optimization of using some kinds of wagons and unit loads, it could influence the safety of transportation. The result of this can be decrease of insurance rate for wagons and unit loads and finally makes the decreasing of transport charge in railway transportation.

A transport company has a possibility of attract its transport offer by constant access of customer to information about the load during a process of transport.

Using of real-time wagons and unit loads tracking will influence the increase of reliability of whole transport process in railway transport. It is a possibility to optimize the handling and delivery of loads by road transport.

5. A PROPOSAL OF EXEMPLARY DEVICE FOR WAGON TRACKING

In last years many railways started to interest in GPS using for wagons tracking on the net of railways. However, some companies renting special wagons have got the biggest interest in it. Those companies want to optimize the management of their rolling stock. In Poland, there are also transport companies, which are interested in satellite wagon tracking, especially wagons for dangerous goods and goods, which are exposed to thefts. On the Fig.1 there is a transversal view of tank wagon with marked place of possible GPS/GSM device attachment.

The tracking device for railway transport should be characterized by following features:

- power-supply by a battery of large capacitance, which enables the constant work of device between periodical overhauls (no more than 3 years; freight wagons don't have electric installation),
- integration under one cover of aerial, GPS/GSM devices and power-supply battery,
- the cover, which make difficult the theft of device.

The cost of this device should differ from device for road transport in cost of feeding battery and cost of the cover (cover in form of plastics coating). The possible cost of tracking device shouldn't overstep the price of 4000 PLN.

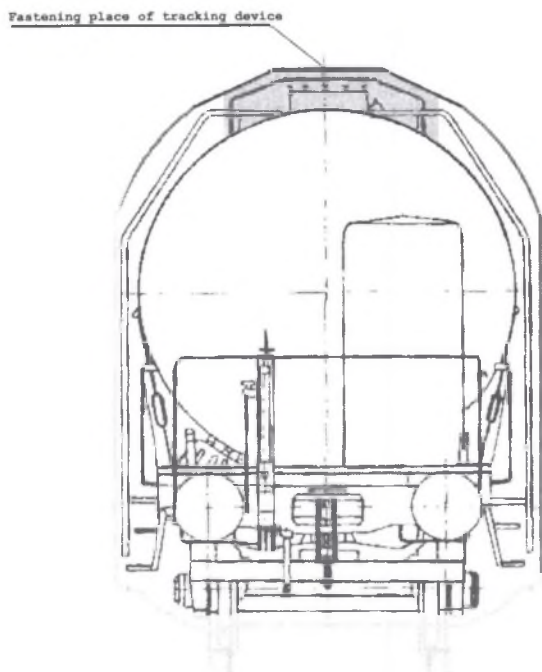


Fig. 1. Tank wagon profile with proposal fastening place of tracking device

6. SUMMARY

The real-time wagons or unit loads tracking systems could influence the activity of transportation companies and their offer. The transport offer, which enables the load tracking during the process of transport could possibly make an interest amongst potential customers, satisfying them.

The real-time wagons or unit loads tracking in connection with a transportation documents in electronic form should be one of the factors, which improves the transport offer in railway transportation and increases the competitiveness of this branch of transport.

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