

*R. Domin, Iu. Domin, G. Cherniak, A. Mostovych, V. Konstantidi, P. Greenday: **Investigation of the Some Problems of Running Safety of Rolling Stock on the Ukrainian Railways** (Badanie wybranych problemów bezpieczeństwa ruchu taboru na kolejach ukraińskich)*

The results of the evaluation of the running safety conditions of railway vehicles are presented by means of computer simulation. The localization of possible damages of bearing structures of high-speed train is determined with the help of calculation of the strength characteristics and the method of non-destructive metallography. There is the information about the development of software and hardware complexes providing an instrumental assessment of the technical condition of railway vehicles.

Keywords: rolling stock, derailment, computer simulation, strength characteristics, testing

*Natalia Karkosińska-Brzozowska: **The Feasibility Study of Application of Energy Storage Devices on Railways on the Example of Pomeranian Metropolitan Railway** (Możliwości zastosowania zasobnikowych jednostek trakcyjnych na liniach kolejowych na przykładzie Pomorskiej Kolei Metropolitalnej)*

In this paper the feasibility of applying the energy storage devices for powering the train on unelectrified railway sections was analyzed. The innovativeness of this method was demonstrated on 2 examples of application: first on Utsunomiya – Karasuyama line in Japan operating since 2014 and second line tested in Great Britain named IPEMU (Independently Powered Electric Multiple-Unit).

This paper presents the examples of modern energy storage devices and functioning traction unit powered by those devices. It was proved that analyzing the application of energy storage devices on Pomeranian Metropolitan Railway is purposeful. By simulating the theoretical drive and analyzing its results it was concluded that this method can be an alternative for overhead catenary systems. In selecting the energy storage devices the parameters of supercapacitors were indicated, which can be an obstacle in application and they were compared to the parameters of modern electrochemical batteries.

The results and fast growing energy storage technology point to the need for further research to find the most effective solutions, especially when there are still new energy storage tested. It seems that further research on the selection of type of the energy storage device and the economic efficiency will allow autonomous electric traction units to become a future technology for short sections of railway lines planned for electrification.

Keywords: energy storage devices, battery electric multiple unit, autonomous drive, Pomeranian Metropolitan Railway

*Wiesław Krasoń, Tadeusz Niezgoda, Wiesław Barnat: **Innovative System for Intermodal Transport Based on the Wagon with Rotatable Platform** (Innowacyjny system do transportu intermodalnego na bazie wagonu z obrotową platformą)*

There hasn't been implemented a system to intermodal transport in our country so far. In European railway transport in recent years, have been implemented combined systems based on horizontal or vertical reloading or others systems. These systems require developed reloading terminals equipped, for example, with vertical reloading devices of accurate load capacity or other expensive and complicated devices enabling loading and unloading

activities. The innovative system proposed in the paper based on the special railway wagon with a rotatable, low and flat loading floor. It can be used for transporting various types of vehicles, for example, tractors, trucks, trailers, semitrailers, cargo containers. The railway system used special wagons allows quick and convenient, self loading and unloading of vehicles (no cranes needed); no platform infrastructure is required, instead of hardened, flat, surface; no need for hubs, terminals or special logistics; each wagon can be operated separately. Idea of the intermodal system with innovative railway wagons and used constructional solutions will be presented in the paper.

Keywords: special wagon with the rotatable loading platform, intermodal transport system, selected problems in the application of the existing infrastructure

*Ireneusz Mikłaszewicz, Robert Bińkowski: **Cases of Rail Cracks in the Light of FEM Calculation** (Przypadki pęknięcia szyn w świetle obliczeń MES)*

The article presents cases of rail cracks during railway line exploitation, which resulted mostly in accidents of railway vehicles. The rail cracks occurred both in plain track and installed rail turnouts. Finite elements method (FEM) calculations were applied to explain the cracks of rails. Three cases of rail cracks were simulated during operation on the track. The summary features conclusions that strain in rails, the process of their production and consequently the quality of material exerted big influence on cracks of rails during exploitation.

Keywords: fatigues cracks of rails, finite elements method (FEM)

*Tomasz Nowakowski, Tomasz Staśkiewicz: **The Influence of Track Ballasting on Paraseismic Vibrations in Tram Operation** (Wpływ balastowania torowiska na drgania parasejsmiczne w eksploatacji infrastruktury tramwajowej)*

The increased tram traffic in urban areas is often the cause of increase paraseismic vibration level. Minimizing the negative influence is conducted among other things: through the development and implementation of different track types. The most commonly used technology in Poland is ballast track, but even built based from the same type of components, individual realizations differ among themselves in terms of track ballasting. In the presented paper presents a the problem of paraseismic vibration related to the implementation of transport due to operation trams in heavily urbanized areas. The study included experimental methodology of comparative studies tram tracks in the aspect of paraseismic vibrations generated around of the track. The research was realized on two separate tracks in Poznan tram network under normal operating conditions of one type of tram. On the basis of measurements of vibration acceleration signals carried out quantitative and qualitative analysis of the recorded signals. The analysis of the results compiles for differences in execution of tracks and the technical condition specified by the infrastructure manager.

Keywords: tram tracks, tram, paraseismic vibration, experimental studies

Franciszek J. Restel: Issues of Reliability and Safety Modeling of the Railway Transportation Process (Zagadnienia modelowania niezawodności i bezpieczeństwa procesu przewozowego w systemie transportu szynowego)

The highest process integration and scheduling level applies to the railway transportation system. At this moment the research is focused on the transportation process in relation to the railway system reliability. Accordingly, there are a number of problems related to the theoretical description of the real system. The paper shows the most important problems arising during reliability research of railway systems. It also shows motivation for modeling of events with small effects. The paper shows events are seemingly insignificant, but have influence on occurrence of serious rail accidents. A review of information sources on unwanted events occurring in the railway transportation system was made. It has allowed to make a distribution of sources depending on the nature of analyzed problem. It was also pointed the research potential of operational data collected already in the system, but currently not widely used. The overall conclusion is that the carried out investigation is very promising and is now moving to the formulation of a general theoretical model and further development of simulation models, to-wards the freight trains. The development of theoretical models for timetable assessment will allow a priori optimization activities which increase punctuality while minimizing unnecessary temporary reserves. As a result, the attractiveness of railway transportation should be improved. The paper is a synthesis of carried out research on the issues of reliability and safety of railway transportation system.

Keywords: reliability, safety, railway system

Iwona Wróbel, Szymon Klemba: Review of National Transport Plan and Proposals for Improvement (Rewizja krajowego Planu Transportowego i propozycje zmian)

The article features the reasons and needs of changes of National Public Transport Sustainable Development Plan and main data describing transport in Poland. The progress in achieving of the targets defined in the national public transport sustainable development plan, which has been obligatory since 2012, is presented. The key topic of the paper is how to find new, better, variants of public interregional train connections network organised by the Ministry, which is responsible for transport, where the interregional connections network means a number of interregional trains on each fragment of the railway network and location of interregional trains stops. The criteria of organization of railway connections network are also described. Moreover, the document presents some important indicators to be achieved in railway transport by 2023. The main conclusion is that appropriate organization of transport service could reduce the deficiency of interregional public trains while increasing the number of train-km of this type of trains.

Keywords: transport plan, public collective transport, international services, interregional services