

Michele Barbagli: Low Noise Barriers – High-pressure Water Mist Active Firefighting Systems: First Testing Experiences According to Italian Standard UNI 11565

The paper presents the preliminary testing experience of Fogtec in testing and assessing on-board high pressure water mists systems for fire fighting in passenger areas of rolling stock according to the new Italian standard UNI 11565:2014. The testing has been conducted in EN 17025 certified laboratories in Italy and Germany. The outcomes collected in this preliminary campaign – as well as similar ones by other manufacturers – constituted the base of the UNI 11565:2014 review process started in September 2015 and finalized in May 2016 with the publication of the UNI 11565:2016.

Keywords: UNI 11565:2014, UNI 11565:2016, fire protection, firefighting, water mist, testing, safety, standard, rolling stock

Michał Bigus, Wojciech Ulatowski: Fault Detection and Tolerable Hazard Rate in UniACI System (Wykrywanie usterek i tolerowalny poziom intensywności zagrożeń na przykładzie systemu UniACI)

In the presentation, the hazard analysis methods considering different types of failures and a difference between optimistic and pessimistic approach are presented. It shows analytic solutions helpful in calculation of hazard rate for complex electronic structure, which is characterized by different dynamic of processing blocks and different fault detection times. What is more the presentation shows a method of adding hazard rate of undetected failures.

Keywords: safety, railway safety, axle counting system, railway signalling, hazard analysis

Artur Dłużniewski, Łukasz John, Mieczysław Laskowski: The Amendment of the Standardization Rules Concerning Testing of Rolling Stock in Terms of EMC

The paper presents the methodology of radiated and conducted disturbance emission measurement in on-board rolling stock power low voltage network in reference to current obligatory normative standard requirements PN-EN 50121-X-X. The article presents in detail the methodology of measurement, permissible levels of radiation disturbance emission during stand and during vehicle ride and the levels of conducted disturbance emission in on-board low voltage power network. In conclusion, the paper outlines the comparison of obligatory, normative standard requirements in this range along with a new edition of rail standards, which will be implemented soon, due to the old editions of current standards documents based on rolling stock should be tested in terms of EMC in order to fulfill normative requirements.

Keywords: rolling stock, methodology of measurement, electromagnetic compatibility, radiation disturbance emission, conducted disturbance emission

Dieter Hohenwarter: Experience Gained from Fire Tests According to EN 45 545-2 and DIN 5510-2 for Testing of Seats

Results of fire tests according to ISO 5658-2 and ISO 5660-1 are shown for different products. The results of GFK products are extensively analysed. The result of a body shell painting is analysed according to ISO 5658-2 and ISO 5660-1, but this painting does not have to be analysed according to DIN 5510-2. Measurements of heat release rate of tram seats show that it is difficult to fulfill the requirements of fire behaviour and at the same time to fulfill the demands for comfort and mechanical requirements of tram seats. Different possibilities to improve the fire behaviour of railway coaches are presented as well as the fact that the combination of the foam and the textile covering is essential.

Keywords: fire tests of railway materials and seats, fire tests of tram seats

Grzegorz Kiesiewicz, Tadeusz Knych, Paweł Kwaśniewski, Artur Rojek: Development and Testing of New Solutions of Overhead Contact Line Accessories

The overhead contact line (OCL) consists of various kinds of supporting structures and elements that allows the installation of the contact wire horizontally to the track. OCL is a complex mechanical and electrical system, that has to ensure the proper electric power transfer to the traction vehicle. During the exploitation of contact line accessories (extension arms, cantilevers, tensioning devices etc.) different kinds of problems appear, significantly affecting the railway traffic. Further-more, the outdated design is the reason for difficulties with assembly and daily use.

Research results, stress characteristic numerical analyses, clamping force relaxation experimental results and contact line equipment corrosion resistances of present in-use devices are presented. An OCL new generation concept was developed. Stress distribution and safety factor tests were conducted at operationally loaded construction.

Obtained results showed that currently used equipment at the operational loads has effort close to the material yield strength. Tested elements have also different kinds of design defects, low corrosion resistance and rheological resistance at a level of 8–10% degree of relaxation. Conducted research showed that newly designed elements have a safe level of effective stress and high safety factor – all tested under an operational load regime.

A new solution of no-load tensioning device was designed and tested. The contact wire or catenary wire tensioning force is generated by device spiral springs. Properly designed elements application – cams – allowed to obtain a constant tensioning force in full contact wire length variation range.

Keywords: overhead contact line, contact line accessories, numerical research

Roksana Licow, Franciszek Tomaszewski: Cost of Track Modernization Based on the Railway Line 131 (Koszty modernizacji na przykładzie linii 131)

In the search for the optimal use of financial resources railway company (PKP PLK) and time planning repairs of tracks created life of the track model. Model in its assumptions is based on technical – exploitation parameters of railway line No. 131. The article presents two variants of the process of life of the track. The first option assumes cleaning the track, the second to carry out upgrading. For both options, the costs of work associated with cleaning and

upgrading works tracks and identifies the impact of these variants on the environment. The article also presents the scope of upgrading works and works related to the surface rail of a continuous repair.

Keywords: upgrading, initial quality, track durability

Vitalij Nichoga, Igor Storozh, Volodymyr Storozh, Oleg Saldan: **Defect Signal Detection Within Rail Junction of Railway Tracks**

The method of signal detection from transverse crack within rails joint is presented in the article. Using of correlation analysis of this signal after subtraction of averaged rails joint signal from it is proposed. The signal alignment for averaging is based on the mean value crossing point.

Keywords: railway diagnostic, defect, joint

Richard Nowell: **EN 45545 in Transition – a GB Perspective**

This paper describes from a RSSB perspective the transition from national standards in Great Britain (GB) to a full application of European regulations and the GB strategy for a full implementation of European Standards, the issues that arise and how the process is being managed.

Keywords: LOC&PAS TSI, EN 45545, GB national standards, Fire, Seats, RSSB, Research

Jolanta Maria Radziszewska-Wolińska: **Influence of the Ignition Source on Passenger Seat Burning**

The paper describes the results of first stage of studies conducted in the framework of a project funded by Railway Institute. The first stage of the work refers to tests on the furniture calorimeter according to the draft of the new European standard constituting a modification of the method according to EN 45545-2: 201. Above tests performed on different upholstered passenger seats, which met the PN and the UIC fire requirements, showed that none of the standard seats meets current requirement MARHE for HL3 category. Next part presents the results of research on the furniture calorimeter using different ignition sources (paper bag, travel bag, gas burner) with a power of 7 kW to 67 kW. Results showed that, for the MARHE, HRR and TSP a logarithmic increase in value with the increase of the power sources of ignition was achieved. At the same time it was found that the maximum values of HRR and TSP occurred in less than 4 minutes after seat ignition, which is a very important time for the evacuation of passengers.

Keywords: fire protection, passenger rolling stock, heat release rate, travel bag, furniture calorimeter, EN 45545-2

Tomasz Staśkiewicz , Tomasz Nowakowski: **Analysis of Interaction Between Tramway Wheel and Rail in Regular Operation** (Analiza współpracy koła tramwajowego z szyną w warunkach rzeczywistej eksploatacji)

The paper is focused on the problem of mutual compatibility and cooperation of assorted tram wheel profiles and rail types commonly exploited in Poland. Within the scope of preparation to the analysis, the two-dimensional models of wheelsets and tracks were created. Geometric analysis returned images of wheelset position on tracks and contact points distribution. Many cases of wheelsets' positions were investigated (e.g. on straight track, in curve, on worn track), for various configurations of wheel profiles. Selected cases were discussed in the paper. Contours of worn wheel and rail profiles were used to reconstruct regular operation conditions. It was noticed, that it is vital for correct cooperation to select the appropriate association of wheel and rail profiles. Otherwise it may cause improper location of contact zone or increase in contact stress. Moreover it was found, that due to actual standards, zero wheel-rail clearance can occur.

Keywords: tramway, wheels-rail interface, exploitation

Mateusz Zając , Justyna Świeboda: **Model of Implementation of Selected Operation at an Inland Terminal** (Model wybranych operacji w intermodalnym terminalu przeładunkowym)

Intermodal transport based on the exchange of containers needs efficient, performance and reliable operation at inland terminals. In the literature a lot of attention focused on the efficient operation of ports, whereas in a land-based terminals is not developing as much scientific solutions. This is due to with limited capability and range inland intermodal hubs. This article presents a practical solution container handling in relation wagon – yard at the inland container terminal according to the method of comparing the values of the parameters characterizing the container intended for handling, yard and road transport. The rest of this article presents a review of available scientific solutions from the discussed range. This paper presents a general solution for the problem. Then a verification effectiveness of the proposed solutions and solutions for some real cases.

The paper presents heuristic method for linking the issue of work scheduling machine and travelled by her route in transportation orders in relation wagon – yard. The method is implemented in three stages: compared dates of the containers to the end user, evaluating the implementation of tasks and evaluating the cumulative value of the given tasks. Verification method was based on actual data collected at an intermodal transshipment node. The obtained value method allowed us to save time during the unloading of containers in relation to the actual value. Further work involves an increase in computing capabilities when determining the order of execution of tasks and the introduction of random failures of the system.

Keywords: intermodal transport, container yard, container handling, scheduling of handling