
Dariusz Brodowski, Mateusz Flis: **Experimental Verification of Contactless Heating Method in Railway Turnouts Heating System**

In winter conditions, railroad turnouts are an element of railway infrastructure that is particularly vulnerable to weather conditions such as snowfall, blowing of freezing rainfall, low temperatures. To maintain them in full operability during un-favorable weather conditions turnouts heating systems are used. The basic system used for decades on European railways is the electric heating of turnouts (ETH). This system uses resistance heaters, is characterized by high energy consumption and low efficiency. Railway authorities, in many European countries, look for new solutions in the field of electric turnouts heating. In this paper experimental verification of a new ETH concept is presented. The new methodology uses contactless heaters instead of the classic ones and is based on an innovative way of heat distribution. As a reference object for the contactless heater, the classic ETH was used. Experimental research in real conditions were carried out at turnouts exploited in the Polish State Railways (PKP) network. The research was carried out in various weather conditions. As a part of the test, thermo-vision measurements were done, as well as measurements by thermo-couples and a melting rate was observed. In each case, comparative tests were carried out. The results were gathered, analyzed, concluded and presented in the paper.

Keywords: electric turnouts heating ETH, optimization of ETH system, contactless electric turnout heating

Paweł Gradowski: **Fulfilment of the Essential Requirements of the Control-command and Signalling Trackside Subsystem on the Railway Infrastructure of Transshipment Terminals**

The implementation of many railway investments indicates as the main goal increasing the efficiency of the railway system, and thanks to its features it becomes easier to integrate it in the competitive transport market. Increasing the integration of the transport sector is one of the cornerstones of the completion of the internal market and rail is an important part of the transport sector moving towards sustainable mobility. The modernized railway lines, which are part of the Trans-European Transport Network (TEN-T) or European Rail Traffic Management System (ERTMS) corridors, also constitute the network of rail freight corridors (RFC). Pursuant to the requirements of European law, setting the dates for implementing interoperability, the infrastructure of comprehensive networks will be forced to adapt to these requirements. Using the example of the control-command and signalling subsystem, this article outlines the scale of the problem related to the implementation of interoperability in relation to rail-road terminals constituting the comprehensive network of the RFC network.

Keywords: core network, comprehensive network, certification, control-command and signalling subsystem, ETCS, GSM-R

Dariusz Kowalczyk, Andrzej Aniszewicz: **Experimental and Simulation Tests of the 1 MN Screw Coupling**

The article describes the requirements that screw couplings must meet before they can be put into service. In the paper, the results of fatigue testing simulating a 30-year service life of a

screw coupling are presented, as well as the results of CT and Nondestructive Testing, NDT, non-destructive magnetic particle inspection, and then, the test results are compared with the results obtained with the application of Finite Element Method, FEM.

Keywords: FEM, screw coupling, crack

Maciej Ruciński: Minimum Access Package to Railway Infrastructure Versus Services in Service Facilities – a Gloss to the Judgment of the Court of Justice of the European Union of 10 July 2019 in Case C-210/18

An in-depth analysis of the legislation and legislative material with reference to the professional literature leads to the conclusion that the Court of Justice's interpretation is incorrect and leads to problems in distinguishing between the minimum access package and the scope of services in service facilities.

Keywords: railway infrastructure, minimum access package, service facilities, passenger stations, platforms, freight terminals

Andrzej Zbieć: Aerodynamic Phenomena Caused by the Passage of a Train. Part 3: Slipstream Effect

In the series of articles describing the aerodynamic phenomena caused by the passage of a train, the effects of a train running at high speed on itself, on other trains, on objects on the track and on people are characterized. This impact can be of two types – generated pressure and slipstream. Apart from the literature analysis, the author's research is also taken into account. The third part presents the characteristic features of the slipstream and its impact on the environment (in the form of forces acting on objects) and railway infrastructure.

Keywords: rolling stock, high speed railways, aerodynamic phenomena