Łukasz Antolik: **Methodology of Fatigue Cracks Detection in Railway Axles in Comparison with European Standards Requirements** (Metodyka wykrywania pęknięć zmęczeniowych w osiach kolejowych a wymagania norm europejskich)

In this paper, the sources of fatigue cracks formation in railway axles are presented. There is shown a comparison of internal integrity requirements that need to be met for a new railway axis and for a one that has been already in-service. The source documents are presented, which regulate the research methodology with a comparison of a unified research methodology with a type A visualization according to PN-EN 12668-1:2010 and with a type D visualization (Phased Array), which is inconsistent with PN-EN 12668-1:2010 and widely used in industry.

The carried tests and the analysis of the results allow the conclusion that Phased Array technique is a technique for future, much shortening ultrasonic scanning of railway axis and partially eliminating the process of results interpretation. However, there is a serious barrier to be overcome before the PA technique will be successfully implemented. The method validation must be performed, which is expensive and time-consuming, as well as, the research instructions of railway axis, taking into account new technique, must be developed. The obtained results indicate the need for detailed tests to validate the method in order to place it in service by railway carriers. It is necessary though to establish a coordinating body to take action in terms of design and unification of national requirements for wheel-sets in-service with the European railway market in order to maintain the rolling stock in-service at the highest possible level.

**Keywords:** railway axis, derailment, reliability, ultrasonic testing

Mariusz Fabijański: **Properties of Polyamide Designed to be Used in the Elastic Rail Fasteners** (Właściwości poliamidu przeznaczonego na wkładki dociskowe stosowane w przytwierdzeniu sprężystym szyn)

One of the basic constructional polymeric materials used in rail transport is a polyamide. It occurs in many different varieties and with different properties. Among other things it is used for the resilient mounting pads for railway rails in the railway surface for. In order to achieve adequate strength characteristics, it is necessary to carry out a process to condition material. This paper presents information on the study of the mechanical properties of polyamide 6 and polyamide 6 with 30% glass fiber content intended for mounting pads as well as the testing of final product. It also discusses how the properties of the material are affected by the method of conditioning and its dictation.

**Keywords:** polymeric materials, the resilient attachment, polyamide, conditioning
Magdalena Garlikowska: **Factors that Influence on Perception of Railway Transport as Reliability** (Czynniki wpływające na postrzeganie transportu kolejowego w kategoriach niezawodności)

In article were discussed some problems relating to reliability of functioning railway. These factors are characterized that can influence the perception of railway transport by its users as reliable.

Chapter 1 and 2 presents shortly meaning of railway in European Union and general assumptions of european railway policy. In chapter 3 was discussed condition of railway transport in Europe and its evolution from the second half XX century. In chapter 4 were presented research conducted in group of 300 travellers. On the basis of these research are specified and discussed factors that users have indicated as evidence of railway reliability.

Chapter 5 has been dedicated to the railway safety. There were quoted legal acts that regulate safety of railway transport in European Union. In last chapter were presented action which are taken to form safe behaviours of railway users, especially on level crossing. In summary were contained research conclusions and conditions to improve of reliability railway transport in European Union.

**Keywords**: railway policy, reliability, safety, users’ behaviours

Szymon Klemba: **Reliability Factor in Passenger Transport Modelling** (Czynnik niezawodności w modelowaniu podróży i prognozowaniu ruchu)

In the article possibilities of implementation of reliability factor in the modelling transport are considered. The four-step model is presented, especially the modal-split: part of this model, which is a potential place to implementation of reliability characteristic in passenger trips models. As the relevant characteristics of reliability, technical readiness is taken into account. Finally, the example of model-split function, which shows the influence of reliability, is presented.

**Keywords**: modelling transport, reliability, passenger transport, travel time

Dariusz Kowalczyk, Robert Bińkowski: **Perspectives Development of Design the Bogie Frames with the Present Safety Standards** (Perspektywy rozwoju konstrukcji ram wózków pojazdów szynowych przy zachowaniu obecnych standardów bezpieczeństwa)

The article describes directions of development of bogie frames: use of the finite element method in the design, use of new materials, improvement of quality of welds and production technology. It describes the study of scraper for removing items located on the rails, for example boughs of trees. The project of scraper was made using SolidWorks software with MES module built-in. Strength tests of fragment of the bogie with the scraper of new design show that the reduction of weight of the scraper about 25% was obtained while reducing stress field larger than 280 MPa from 10% to 0,25%. Conclusions include proposal of adoption of the described method to modification of the whole structure of bogie frame.

**Keywords**: bogie, bogie frame, rail vehicle, rolling stock
Aleksei A. Matusevic: **Launching Fast Passenger Trains, and Improvement of the Current Passenger Trains Classification in Ukraine** (Внедрение железнодорожного скоростного пассажирского движения и совершенствование существующей классификации пассажирских поездов в Украине)

Considered: the introduction of high-speed passenger rail traffic as a way to improve the efficiency of passenger transport, cost of technical and economic parameters. After analyzing the existing classification of passenger trains in Ukraine, developed proposals for its improvement. According to the research study, an algorithm for the introduction of new economic classification of passenger trains.

*Keywords*: efficiency, speed classification, passenger train, transportation, railway, index

Ireneusz Miklaszewicz: **The Decarburization and Surface Head Rail Defects** (Odwęglenie a wady powierzchni główki szyny)

The size of the decarburization of the head rails has been tested by means of hardness measurement. The overview of defects, taking place during exploitation process, connected with decarburization. Shows a possible reason of creation of (head check) defect and waves of rail surface connected with decarburization and method of limitation of this defects. The test carried out on demands, according with the PN EN 13674-1:2011 norm and Warunków Technicznych Id-106:2010.

*Keywords*: rail surface defects, defect causes, prevention

Y.I. Sokol, S.G. Buryakovskiy, Ar.S. Masliy: **Energy-Efficient Electric Drive of Multifunctional Turnout**

Along with the improvement of the existing switchgears by replacing unreliable elements, global companies create its new types in order to improve the reliability, operating speed and to achieve high speeds of motion on pointers. Therefore in this work the way of modernization of the existing turnouts is offered based on switched reluctance electric motor, and also the design of direct-drive turnout on the basis of linear electric motor.

*Keywords*: switched reluctance electric motor, linear electric motor, turnout

Grzegorz Stencel: **Measurement Methods of Railway Track Used in the Estimation of its Durability** (Metody pomiarów nawierzchni kolejowej wykorzystywane przy ocenie jej trwałości)

The paper presents the possibility of measurement used to estimation the durability of the railway track. Measurement methods of geometry track and switches, as well as research opportunities of railway track elements were described. The possibilities of measurements both rail geometric parameters as well as non-destructive testing were presented. In the field
of measurement fastening systems a novel instrument for measuring the contact force of elastic clamp in track. The results of a switch study using a system with capable of measuring continuous flange in the crossing were presented. For the selected measuring instruments examples of the results of measurements were presented. Article draws attention to the need for knowledge of measurement techniques for assessing the results of those measurements. The importance of such knowledge and skills are shown by way of example. In summary assesses the usefulness of the measurement methods and their importance in the analysis of the durability of the railway track.

*Keywords*: railway track, durability, measuring method

**Zuzanna Zelek: Geosynthetics in the Construction of Railway Bed** (Geosyntetyki w konstrukcjach podtorza)

This paper presents geosynthetic products possible to use as a layer to prevent deformation occurring in the subgrade during its operation. Discusses the types of manufactured geosynthetic materials, their characteristics and the basic applications in the construction of the railway subgrade, depending on the deformation occurring.

*Keywords*: geosynthetics, subgrade, deformation, strengthening