

■ Introduction – <i>Andrzej Żurkowski</i>	1
---	---

Short notes

■ Discussion panels referring to EFSI and instruments centrally managed by the European Commission, i.e. HORIZON 2020, COSME and financial instruments	2
■ The Railway Research Institute has handed in the first EU certificate to Shandong Hi-Speed Rail Equipment and Materials Co., Ltd.	2
■ The Railway Research Institute to obtain 4.7 million PLN from the EU for the Improvement of Rresearch Facilities ...	2

Articles

■ The Development of the IK Electric Power Department's Research Facilities – <i>Artur Rojek</i>	3
■ New Test Stands at the IK Materials and Structure Laboratory – <i>Danuta Milczarek</i>	3
■ New Test Stands at Signalling and Telecommunications Laboratory – <i>Marek Sumiła</i>	4
■ Digital Model of Polish Railway Network – <i>Szymon Klemba</i>	5
■ Tests of the Stand for Pairs of Rail Friction Shoes – <i>Jacek Kukulski</i>	6
■ Badanie Testing Ballast Chemical Stabilization with the Application of STABILTRAK Resins – <i>Adam Dąbrowski, Jerzy Cejmer, Krzysztof Ochociński, Waldemar Szulc</i> ..	8
■ 10th UIC World Congress on High Speed Rail in Ankara – <i>Agata Pomykała</i>	9
■ IK's participation in Shift ² Rail JU within EUROCC – <i>Magda Antolik</i>	10
■ The NCBR and PKP PLK projects – <i>Renata Barcikowska</i>	11

News

■ InnoTrans 2018, Berlin	12
■ Global Debate on Mobility Challenges for the Future Society	12

Editor's
Andrzej Żurkowski
Director of the Railway Research Institute


The Railway Research Institute in Warsaw (Instytut Kolejnictwa) was established in 1951 and until 2000 was within Polish State Railways (PKP) structures. At present, as an independent entity, it is subordinated to the minister responsible for transport. Since its beginnings, the Institute has been the centre of competence for technology, technique and organization of operation and services in rail transport, particularly in respect to innovation. One of its fundamental tasks also includes activities connected with safety which are car-

ried out in close cooperation with the National Safety Authority, i.e. the Office of Rail Transport.

At the same time we have participated in the process of upgrading and modernization of the rail network in Poland. Experience in high speed rail gained thanks to international cooperation and basing on our own effort to increase speed on railway lines in Poland (so far 200 km/h) is included in the monograph "Koleje Dużych Prędkości w Polsce" (*High Speed Rail in Poland*) published in 2015 for the benefit of the Polish reader and in the latest publication in English entitled "High-Speed Rail in Poland. Advances and Perspectives".

azurkowski@ikolej.pl

Discussion panels referring to EFSI and instruments centrally managed by the European Commission, i.e. HORIZON 2020, COSME and financial instruments

On the 5 April 2018, a conference was organized by the Ministry of Investment and Development and held at its seat referring to activities undertaken within the European Commission's centrally managed instruments i.e. Horizon 2020 (the biggest EU Research and Innovation programme ever), COSME (Programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises).



Photo IK

The Railway Research Institute has handed in the first EU certificate to Shandong Hi-Speed Rail Equipment and Materials Co., Ltd.

On 29.06.2018 in the Railway Research Institute, the first EU certificate was handed in to the Chinese manufacturer of pre-stressed concrete sleepers Shandong Hi-Speed Rail Equipment and Materials Co., Ltd. The issued EU Quality Management System certificate confirms the compliance of produced pre-stressed concrete sleepers type IIIc with the requirements of the Commission Regulation No. 1299/2014 of 18 November 2014 relating to the 'infrastructure' subsystem of the rail system in the European Union (OJ EU no. L356 of 12.12.2014). Director of the Railway Research Institute Notified Body no. 1457 Mr. Andrzej Żurkowski handed in the certificate to Mr. Qing Tian, the authorized representative of the manufacturer and the President of the Polish – Chinese Foundation of Economic and Cultural Exchanges located in Warsaw.



Photo IK

The Railway Research Institute to obtain 4.7 million PLN from the EU for the Improvement of Research Facilities

The Railway Research Institute will soon obtain EU financial support to purchase state-of-the-art laboratory and research equipment. Thanks to this funding, it will be possible to carry out complex work relating to rail transport safety. Due to the decision of the Mazovian Voivodship's authorities, the project will receive over 4.7 million PLN co-financing within the framework of the Regional Operational Program of the Mazovian Voivodship 2014 – 2020 (RPO WM). The agreement in this matter has been signed by Adam Struzik, the Marshal of the Mazovian Voivodeship and Andrzej Żurkowski, the Director of the Railway Research Institute.



Photo IK

The Development of the IK Electric Power Department's Research Facilities

Artur Rojek

Head of Electric Power Department



The Electric Power Department carries out tests of, inter alia, electrical apparatuses (breakers, contactors, switchgears) designated for application in rolling stock and electric traction supply system. These tests are compliant with national regulations and standards of EN 50123 and EN 60077 series. The Department also conducts tests of power electronic devices such as static inverters or

power supplies to be built in the rolling stock. In order to continue the process of improvement, the Management of the Department has undertaken activities to extend the scope of performed tests by the modernization and upgrading of the research infrastructure, e.g. acquiring co-financing from the Regional Operational Program of the Mazovian Voivodship 2014 – 2020 (RPO WM). This investment will include the purchase of the state-of-the-art research and laboratory equipment such as a special 6.3 MVA transformer with adjustable output voltage for the stand for short-circuit and load current tests. It will allow carrying load and electric durability tests of DC supplied electrical apparatuses in the range of 400 to over 4000 V, at 3400 A. The next device is a climatic chamber of 3 x 3 x 2 m dimensions for testing large-sized equipment. It will allow carrying tests of actually all currently produced electronic power devices and eclectic apparatuses. Essential equipment used in tests performed by the Electric Power Department includes voltage and current power supplies. The exploited machinery will be replaced by electronic high-power supplies that allow supplying the tested objects with direct and alternating voltages of 16.7 Hz and 50 Hz frequencies and allowing tests connected with current transmission up to 6.5 kA DC. These supplies will be used for testing static inverters and electrical apparatuses, including heating tests. One of basic electric equipment tests are insulation durability tests. Therefore the Electric Power Department will be equipped with an impact generator of normalized impact voltage up to 35 kV. While conducting R&B projects of the utmost importance for the economy, the primary objective of the project is, to improve the quality of research projects carried out by the Railway Research Institute as well as to strengthen the cooperation with companies implementing high-tech innovative solutions, which operate in the region and with other Polish and foreign research institutions from the rail transport area. The implementation of the Project will allow carrying out R&D work including, inter alia:

- developing and implementing into production the power supply systems of low-voltage non-traction equipment using energy from 3 kV DC overhead contact line,
- developing and implementing into production new solutions of DC switchgear and distribution equipment as well as power electronic supplies and converters,
- developing and implementing into production new solutions of power electronic switchgears and inverters,
- conducting tests of OCL elements,
- conducting static tests of pantographs.

arojek@ikolej.pl

New Test Stands at the IK Materials and Structure Laboratory

Danuta Milczarek

Specialist, Deputy Head of Materials & Structure Laboratory



Due to the agreement signed with the Mazovian Unit of EU Programmes Implementation (MJWPU) on financial support from the Regional Operational Programme of the Mazowieckie Voivodeship 2014-2020 (RPOWM) for the investment project within activity 1.1 Research and development activities of the scientific entities, the IK Materials and Structure Laboratory has been granted co-financing to purchase state-of-the-art research equipment.

The Materials & Structure Laboratory's project will be linked, inter alia, with the development of fatigue tests and will enable shortening of test durations for majority of prototype materials and construction elements and accessories having innovative character of construction and technology. The project foresees also the purchase of equipment in the scope of fire tests of materials and elements for rolling stock which will enable a proper preparation of large sized objects for tests. The Laboratory will be capable of performing a full scope of tests required by the Technical Specifications for Interoperability without foreign subcontracting, thereby with shortening of orders' performance times and lowering of their cost. The project realization will also enable a comprehensive approach to rolling stock fire safety matters and undertaking research topics which are taking into account the fact that a fire in a moving coach is a complex phenomena characterised also by differentiated speeds and quantities of heat emissions, smoke propagations and toxic gases emissions.

Consequently, the Laboratory will be equipped with:

- a test stand equipped with a set of actuators from 10kN to 160 kN for fatigue tests (10 kN- 1 pc.; 20 kN - 1 pc.; 160 kN - 2 pc.),
- 6 dynamometers within the range of +/- 300 kN,
- dynamometer - 5000 kN/+3000 kN,
- a strength testing machine up to 250 kN,
- control and measurement devices (including tensometric jumpers to measure strains, universal measurement cards) compatible with systems already acquired,
- MES/FEM software as well as software for tensometric jumpers and universal measurement cards,
- a stand for measuring toxicity of combustion products according to NFX-70-100,
- a stand for measuring temperature with glowing/hot wire compliant with EN 60695-2-211,
- a stand for small flame tests compliant with EN 60695-11-10,
- a stand with equipment for large-sized objects air conditioned before fire-testing (including the air conditioning system and a device for permanent registration of environment parameters).

dmilczarek@ikolej.pl

New test Stands at Signalling and Telecommunications Laboratory

Marek Sumiła

Engineering and technical specialist, Signalling and Telecommunications Laboratory



The Signalling and Telecommunications Laboratory has been operating basing on the management system in compliance with the requirements of PN-EN ISO/IEC 17025:2005 standard since 2000, when the Laboratory was granted accreditation by the Polish Centre for Accreditation (PCA) belonging to ILAC. The Laboratory offers a wide range of

laboratory tests that are required by EN 50155:2018, EN 50121-2, EN 50121-3-1, EN 50121-3-2, EN 50121-4, EN 61000-6-2, EN 61000-6-4, EN 50500, EN 50125-3 standards referring to assessments of vehicles and equipment concerning exposures to EMC as well as environmental – climatic exposures. The tests which are recognized all over the world aim at confirming the compliance of vehicles and equipment to the requirements of standards to be applied in railway conditions.

As part of an ongoing process of improvement, the Laboratory's Management have undertaken activities in order to obtain funds for the enlargement of the scope of laboratory tests included in AB310 Accreditation by building new test stands. Consequently, this year a stand to measure DC voltage dips and interruptions in compliance with EN 50155:2018 standard has been deployed. The tests carried out on that stand have contributed to the positive extension of the current accreditation scope.

Moreover, a new climatic chamber will be put into service this year. Its working capacity is 6 m³ (size 2000 x 1500 x 2000) to simulate environmental conditions including changes of temperature (from - 60 °C to +150 °C), humidity (from 10 % to 98 % RH in the temperature range from +20 °C to +85 °C) for testing large-sized equipment. The new test stand will allow performing tests according to methodologies included in environmental standards of EN 60068-2 series, in the range of A, B, Cab, Db and N tests.

The chamber's software ensures the possibility to program test cycles, edition of existing cycles, reading and edition of reports from conducted tests and a graphic visualization of the test course on the chamber's panel. The software enables recording test parameters in real time in a manner that protects them from data loss in the event of a power failure as well as an automatic return and continuation of the test when the power supply is restored. In addition, there is an option to set an individual sampling time (from 1/s value) for each test. The stand's construction was funded by the Railway Research Institute's own financial resources.

Another test stand that the Laboratory will be equipped with this year is the stand for EMC tests of immunity to conducted disturbances induced by radio frequency fields. Tests performed at this stand in compliance with EN 61000 -4-6 standard will allow checking the correct operation of equipment in the event of inducing frequencies from 150 kHz to 80 MHz by power supply ports or signal (teletransmission) interfaces/ports.

Another major Signalling and Telecommunications Laboratory's development investment is the construction of an anechoic chamber for specialist EMC tests. This test stand is designed to test electrical and electronic appliances in the scope of immunity to strong interference fields and these devices' emission for the environment. The test stand's measurement reliability is ensured by a special shielded construction of the anechoic chamber as its inside walls will be lined with special absorbers that absorb electromagnetic waves and prevent from internal reflections and interferences.

Devices tested inside the chamber will be protected against external electromagnetic fields and impulses of frequency from 10 kHz do 40 GHz. The selection of a proper chamber will allow a wide range of studies in compliance with methodologies included in EN 61000-4-3 standard and the measurement of interferences radiated by these devices according to the methodology included in EN 55016-2-3 standard. The construction of the anechoic chamber stand will be financed from Regional Operational Programme of Mazovian Voivodship 2014 – 2020.

The same Project will also involve building a goniometer stand for the measurement of the light and colour distribution of lamps. This stand will allow determining luminous intensity curves both in the optical axis and accurate setting of angles for the measurement of luminous intensity direction of the lamp.

The tests will provide the possibility to analyse light signals of the train front and rear. The goniometer along with the photometer and relevant software represents a fully automated system to measure lamp and headlamp distribution. This stand could also be used to carry out routine measurements as well as research work connected with new light sources using LED technology.

All the aforementioned laboratory stands will be the subject for AB 310 accreditation extension in the next PCA Assessment. This will allow extending the current scope of tests accredited in the Laboratory and will allow conducting the Railway Research Institute's research and development work.

msumila@ikolej.pl

Digital Model of Polish Railway Network

Szymon Klemba

Senior engineering and technical specialist, Railway Track and Operation Department



Projects concerning the development of the transport system and transport network shaping require the application of computer simulations which allow examining interdependencies between individual means of transport and the environment. One of the Railway Research Institute's area of activity is transport system modelling. Models

represent a simplified mapping of a fragment of reality, however, in the time of the accessibility of IT techniques which are characterized by a large calculation capacity they are a proper tool for transport operation analyses.

In the transport systems' modelling area, a project entitled "Digital Model of Transport Network (CMST) – Stage 1: Railways" has been recently accomplished at the Railway Research Institute. The aim of the project was to develop a digital model of the Polish railway network as the first stage to build all-Poland transport network model in specialist software designed for transport systems' modelling – PTV VISUM.

The model created within the 1st stage of works consists of the following elements: transport systems (19 systems taking into account further development of the model), links (6,493 sections), places of goods and passengers' service (3,448 points), transport zones (according to the administrative division into 380 counties (*poviats*) and 2,478 communes), connections of transport zones with transport network – connectors (1,270 connectors – the other zones do not have access to the railway network).

The practical application of the model after the 1st Stage is limited due to the initial phase of the CMST. However, this model can be used now e.g. for simplified analyses of spatial accessibility to railway transport on the county and commune levels, analyses of railway lines' parameters, preparation of graphics presenting the railway network on the background of social and economic data.

The framework of directions for further work on the model development was set. They include both the activities to complete the model's database with selected parameters and the model's extension with new modes of transport (road transport in particular), as well as a further construction and implementation of the transport offer model and transport demand model.

The next, 2nd Stage of building the all-Poland Transport Network Model is to include the current transport offer including the network of railway connections (transport lines – train routes), time of train runs and the number of connections for the entire railway network in Poland, coded in the model. This will allow using the model for work connected with analyses of railway transport time accessibility for individual communes / counties, simplified forecasts of train services and analyses of passenger train traffic on particular sections of the railway network.



Fig. Sample railway network mapping

Based on: Klemba Sz., *Cyfrowy model sieci transportowej: Etap 1 – sieć kolejowa*, "Digital Model of Transport Network (CMST) – Stage 1: Railways" IK Project no. 8814/11

sklemba@ikolej.pl

Tests of the Stand for Pairs of Rail Friction Shoes

Jacek Kukulski

Head of Pairs of Rail Friction Shoes Section



The braking system is one of the major rail vehicles' elements responsible for safety. Tribological properties of pairs of rail friction shoes essentially affect further safety and the braking system efficiency. Therefore very rigorous requirements and assessment criteria are applied for friction materials used in interacting friction pairs during the attestation and certification processes.

These issues are particularly important for producers of pairs of rail friction shoes in the braking system. Tribological tests are carried out on specialist research stands. The Railway Research Institute is equipped with such an inertia braking system stand to test pairs of rail friction shoes. The test stand was built from scratch by German company ZF Passau in 1996-98. In 2001 it received UIC homologation for universal braking system stands for maximal velocity of 420 km/h (for wheel diameter of 890 mm) and axle load up to 30 t. Figure 1 presents the stationary test stand as well as the test cabin.

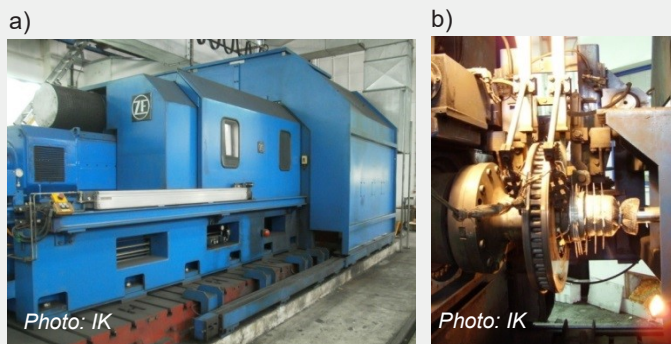


Fig. 1 Stationary test stand: (a) general view, (b) test cabin

The construction of the stand allows testing friction pairs of railway pneumatic brakes for interconnected high-speed trains, multiple units, locomotives and rail buses in their natural size corresponding to real conditions.

The measuring equipment and parameters of the stand allow performing homologation tests of friction materials in compliance with:

- Research programmes of friction materials defined in the UIC leaflets in force: UIC 541-3, UIC 541-4 and European standards PN-EN 16452:2015-08;
- Research programmes for railway wheels compliant with UIC 510-5 and PN-EN 13979-1+A2:2011 standard including, inter alia, testing their resistance to thermal loads;
- Research programmes included in Technical Specifications for Interoperability (Loc & Pas and Wag. TSI);

- Research programmes for brake discs compliant with PN-EN 14535-3:2016-02;
- Research programmes according to ERA/TD/2013-02/INT ver. 3.0 (European Railway Agency)

The basic technical parameters of the inertia test stand are presented in Table 1.

Table 1

No.	Parameter	Value
1	The scope of the vehicle velocity (for a wheel of Φ 890 mm)	3.5 ÷ 420 km/h
2	Maximum rotation speed	2500 rpm
3	Power of propulsion engine at 1150 rpm	536 kW
4	Torque in the range up to 1150 rpm	4450 Nm
5	Maximum braking torque: - braking to a halt, - continuous braking	3000 Nm 4450 Nm
6	Range of inertia moments of masses with electrical simulation	150 ÷ 3000 kgm ²
7	Maximum simulated mass per friction pair	15 t
8	Range of aggregate adjustment of brake shoe clamping force in a disc brake	0 ÷ 60 kN
9	Range of aggregate adjustment of brake shoe holder clamping force in a shoe brake	0 ÷ 100 kN
10	Measurement range of brake disc temperature (driving wheel)	0 ÷ 1000 [°C].

Apart from standard equipment of the test stand, additional devices are used, inter alia, for measuring roughness, thermal camera (Fig. 2), the system measuring noise generated in the test cabin (Fig. 3) as well as the system of additional temperature recording in tested objects.

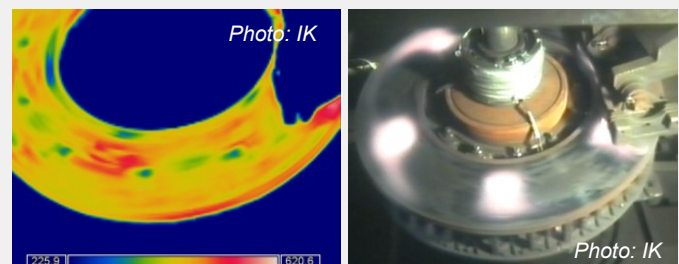


Fig. 2 Thermal and visual image of hot spots created on the tested brake disc

Tests of the Stand for Pairs of Rail Friction Shoes

Tribological tests take a long time and require significant financial effort from friction materials' producers. The specific requirements of research programmes presented above include several typical research problems, inter alia:

- testing friction properties (behaviour of the material in dry and wet conditions);
- testing resistance to thermal loads;
- testing residual stresses in monoblock wheels;
- simulation of longterm operational loads;
- wear of friction material, brake discs, wheels.



Fig. 3 Location of a microphone for measuring noise in the test cabin

Figures 4 and 5 present selected effects of pairs of friction shoes' tests for extreme loads applied at the test stand.

a)



Photo: IK

b)

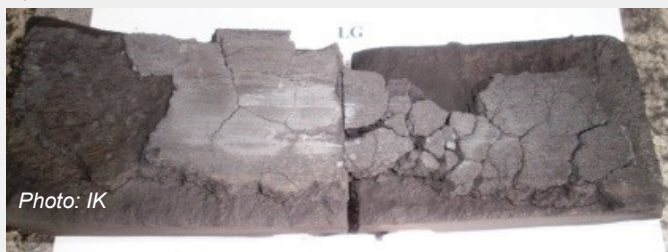


Photo: IK

Fig. 4 View of a damaged object: (a) mono-block wheel, (b) brake block

a)

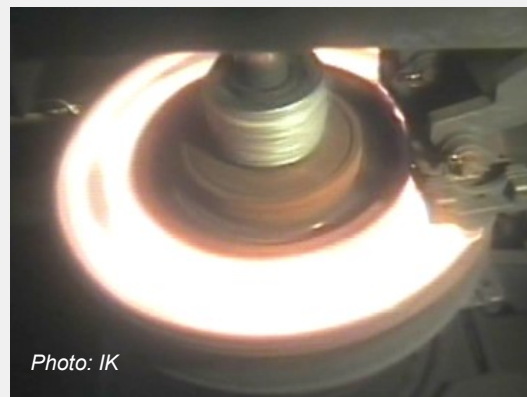


Photo: IK

b)

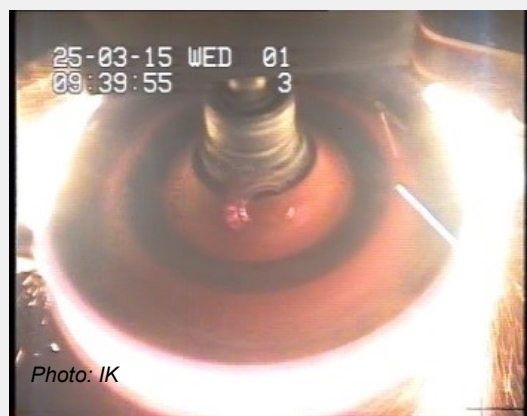


Photo: IK

Fig. 5 View of thermal rings during tests checking resistance to thermal loads (a) of a disc mounted on an axle (b) mono-block wheel

The dynamometer test stand at the Railway Research Institute allows carrying out tests, inter alia, in an automatic mode according to a defined research programme. Not only do the conducted tests include the ones according to standard programmes defined in normative documents but also research specifications prepared by the customers. Their requirements as well as new research programmes concerning, inter alia, bigger clamping force exerted on brake blocks or discs, taking into consideration railway line profiles where the railway vehicles equipped with tested elements will operate enforce adjusting to these requirements. In order to meet the clients' technical expectations, there will be carried out modernization and adaptation work on the stand which will cover, among others, the mechanical part of the stand, the control and result processing parts.

jkukulski@ikolej.pl

Testing Ballast Chemical Stabilization with the Application of STABILTRAK Resins

Adam Dąbrowski

Research-technical specialist, Railway Track and Operation Department

Jerzy Cejmer

Chief engineering-technical specialist, Railway Track and Operation Department



One of the adverse phenomena occurring in conventional track superstructure is the dislocation or sliding of gravel. The problem is visible particularly in areas of strong dynamic impacts directed to the superstructure, e. g. at high train speeds, considerable axle loads of the rolling stock, in horizontal curves with a small radius, in places of significant change of the

superstructure stiffness (transition zones) and in areas of illegal ("wild") crossings. One of the common (and checked abroad) ways to counteract dislocation of ballast is its consolidation using bonding resins.

In 2017, the Railway Research Institute and COVER Technologies Sp. z o.o. established cooperation with regard to test ballast chemical stabilization with the application of STABILTRAK resins. Tests carried out so far have given positive results. As regards combustibility it has been found that covering the track bench with STABILTRAK 101 resin with antypirine flame retardant at 1.5 kg/m^2 application does not threaten spreading the fire while track maintenance work. As far as water permeability is concerned, it has been proven that the ballast layer glued with the resin does not limit the possibility to discharge water from the superstructure.

In order to carry out further tests on the turn of the second and third quarters of 2018, three testing grounds were prepared at the Test Track in Żmigród. The first of them was located on a curve with radius $R = 900 \text{ m}$ in Section 15, where on 4.288 – 4.588 km new concrete sleepers PS-83 with SB-4 fastenings had been placed and where the ballast had been cleared and completed. Having tamped and stabilized the track with DGS tamper, the slope of the superstructure in the curve external side (from the level of track bench to the rail base excluding sleepers) was covered with resin of two different doses (comparative tests) on the total section of approx. 130 m (220 sleepers). The other two testing grounds were located on illegal crossings (i.e. unauthorized and not controlled passages of pedestrians through the track), having profiling the damaged ballast in their area (on one of them additionally having complemented with key aggregate), then the slope of the superstructure was covered with resin on side of the crossings so as to conduct comparative observations.

When appropriate resin resistance is achieved there will be carried out tests, i.a. density tests of the superstructure

Krzysztof Ochociński,

Head of Railway Track and Operation Department

Waldemar Szulc

Head of Test Track Centre Żmigród

slopes, scour tests of ballast and in case of illegal crossings – observations, how this solution affects the behaviour of pedestrians using them.

Launching of STABILTRAK resins tests in operational conditions is planned in the near future on specially selected sections of the Polish railway network.



Photo. 1 The end of the superstructure section covered with resin on the curve $R = 900 \text{ m}$



Photo. 2 Resin application on an illegal crossing on the Test Track in Żmigród

adabrowski@ikolej.pl

jcejmer@ikolej.pl

kochocinski@ikolej.pl

wszulc@ikolej.pl

10th UIC World Congress on High Speed Rail in Ankara

Agata Pomykała

Senior engineering and technical specialist, Section Project Coordination and International Cooperation



On 8 – 11 May 2018, the 10th UIC World Congress on High Speed Rail was held in Ankara, Turkey. The theme of this year’s edition was “Sharing Knowledge for Sustainable and Competitive Operations”. It was attended by 1000 participants from 30 countries. Over 150 presentations were delivered in 25 thematic sessions. The opening ceremony which

gathered over 300 persons representing railway organizations and companies from all over the world took place under the high patronage of the Prime Minister of the Republic of Turkey, Binali YILDIRIM, and with the presence of the Minister of Transport, Maritime Affairs and Communications, Ahmet ARSLAN, Renato MAZZONCINI, CEO of Italian Railways FS Italiane, UIC Chairman, as well as Jean-Pierre LOUBINOX, UIC Director-General, and as the Host of the world congress, Isa APAYDIN, President of the Board and Director-General of TCDD, UIC Vice Chairman, who addressed the participants. Apart from the official speeches of the hosts and the invited guests of honour, there were held discussions in the various round tables and sessions moderated by Jean-Pierre LOUBINOX, which concerned:

- Competition and Cooperation Between High Speed Rail and Other Transport Modes, attended by: Marie-Pierre MEYNARD - High Speed Advisor, SNCF, Renato MAZZONCINI - CEO of Italian Railways FS Italiane, UIC Chairman as well as Iñigo IZAGUIRRE GUERRICAGOITIA - Head of International Cooperation and Institutional Relation, RENFE;
- Expectations of the Society Concerning High Speed Rail), with the participation of: Prof. Andrew McNAUGHTON - Strategic Technical Advisor of HS2 Ltd and the Chairman of HS Committee, UIC, WANG Tongjun - Vice-President CR., Masahico NAKAI;
- Progress for Efficiency of High Speed Rail, the speakers included: WANG Tongjun - Vice-President CR., Phillipe CITROEN - Director General of Unife, Isa APAYDIN – President of the Board and Director-General of TCDD, UIC Vice Chairman.

The Polish representatives’ presentations were delivered during the first and second days of the Congress during the thematic session:

- Gradual improvement instead of breakthrough – development of high quality passenger services in Central-Eastern Europe (Andrzej, MASSEL Deputy Director, Railway Research Institute (IK);

- The ED250 (Pendolino) experiences in Poland - first years of exploitation (Jan RACZYNSKI, Expert, Railway Research Institute);
- The New Station Lodz Fabryczna as Model of Multimodal Hub Integrating Conventional and High Speed Railway with Local City Transport (Agata POMYKALA, Jan RACZYNSKI, Ewa RACZYNSKA-BULAWA* Expert, Railway Research Institute, Poland, *Expert, Lodz Agglomeration Railway);
- Development of airports connections by high speed and conventional railway in Poland (Andrzej ZURKOWSKI, Jan RACZYNSKI, Railway Research Institute).

An additional Polish accent at the conference was chairing the Commercial & Economy & Society Socio-Economy Service Quality session by Prof. Andrzej Szarata from Tadeusz Kościuszko Cracow University of Technology.

The rich programme of the Congress included, inter alia, a visit of a rolling stock maintenance centre and a visit of the city of Konya, organised by taking the high-speed train from Ankara, and a ride in the driving cab at 250 km/h.

The exhibition which accompanied the Congress was an opportunity to get acquainted with products, solutions and innovations offered by 51 producers from both Asia and Europe.

The next two editions of the UIC World Congresses on High speed rail were announced by Jean-Pierre Loubinoux, UIC Director General, during the closing ceremony. The 11th Congress will be held in China at the end of 2019 or 2020 whereas Morocco will host the 12th edition in 2021.

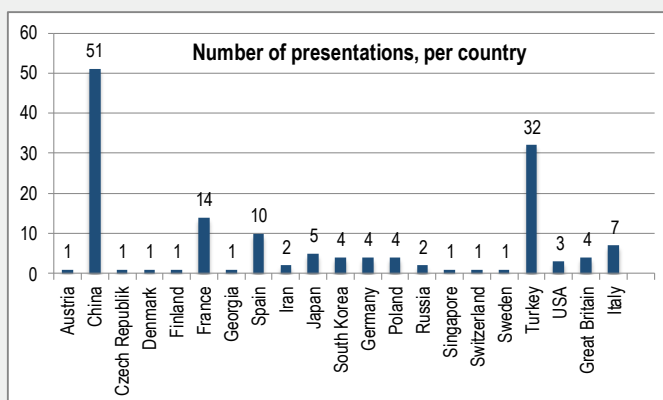


Fig. 1 The number of presentations, per country, delivered during the 10th UIC World Congress on High Speed Rail in Ankara

apomykala@ikolej.pl

IK's participation in Shift²Rail JU within EUROC

Magda Antolik

Technical and engineering specialist, Section of Project Coordination and International Cooperation



European Rail Operating community Consortium (acronym: EUROC) is a consortium of legal entities from the railway operating community companies (ROC) of 8 countries, such as: BLS AG, Switzerland, CP, Portugal, Finnish Transport Agency (FTA), Finland, Infraestruturas de Portugal S.A. (IP), Portugal, ÖBB – Infrastruktur AG, Austria, PKP S.A., Poland, ProRail B.V., The Netherlands, SBB – Swiss Federal Railways, Switzerland, Slovenske železnice d.o.o., Slovenia, Türkiye Cumhuriyeti Devlet Demiryolları İşletmesi Genel Müdürlüğü (TSDĐ), Turkey. Partners intend to collaborate and seek the activities to develop within the Shift²Rail Joint Undertaking. Each partner within EUROC contributes actively to the implementation of the Master Plan, the Multi-Annual Plan (MAAP) and other action plans of the Shift²Rail JU as well as to cooperate, perform and fulfill, promptly and on time, all of its obligations under the activities in which Consortium will engage within the Shift²Rail Initiative.

land, ProRail B.V., The Netherlands, SBB – Swiss Federal Railways, Switzerland, Slovenske železnice d.o.o., Slovenia, Türkiye Cumhuriyeti Devlet Demiryolları İşletmesi Genel Müdürlüğü (TSDĐ), Turkey. Partners intend to collaborate and seek the activities to develop within the Shift²Rail Joint Undertaking. Each partner within EUROC contributes actively to the implementation of the Master Plan, the Multi-Annual Plan (MAAP) and other action plans of the Shift²Rail JU as well as to cooperate, perform and fulfill, promptly and on time, all of its obligations under the activities in which Consortium will engage within the Shift²Rail Initiative.



According to the Shift²Rail Master Plan there are 5 Innovation Programmes (IP) and a Cross-Cutting (CC) activities group. EUROC is involved in the following projects within particular IPs:

- IP1 Cost-efficient and reliable trains, including high-capacity trains and high-speed trains: PIVOT,
- IP2 Advanced Traffic Management and Control Systems: X2RAIL, X2RAIL2,
- IP3 Cost-Efficient and Reliable High-Capacity Infrastructure: IN2TRACK, IN2SMART, IN2STEMPO,
- IP4 IT Solutions for Attractive Railway Services,
- IP5 Technologies for Sustainable & Attractive European, Rail Freight: ARCC, FR8RAIL, FR8HUB,
- CCA: IMPACT-2.

IK as a Third Party linked to PKP S.A. is engaged into IN2STEMPO project “Innovative Solutions in Future Station, Energy Metering and Power Supply”. The project presents the

objectives of three Technology Demonstrators (TD) of the S²R IP3 and details the methodology/process that will be implemented to deliver mentioned TDs:

- TD3.9 – Smart Power Supply Demonstrator: to develop a smart railway power grid in an interconnected and communicated system,
- TD3.10 – Smart Metering for Railway Distributed Energy Resource Management System Demonstrator: to achieve a fine mapping of Energy flows within the entire railway system, as a basis of any Energy management strategy,
- TD3.11 – Future Stations Demonstrator: to improve the customer experience at railway stations.

The Railway Research Institute (IK) contributes in the selection of use cases in standard&emergency operations of crowd management at large stations, as well as, in the creation of different models adapted to different situations for passenger flows management in large stations. These models will be afterwards used in the SE-Star 3D simulation system to represent a situation in real time and experiment their efficiency and relevance to a real situation. They will also be evaluated from a training standpoint by the creation of „what-if” scenarios and their dynamic modification during execution.

Moreover the IK participates in delivering significant improvement in the design of low capacity stations and optimizing the design process from the concept to construction by developing standardized solutions and modules available for implementation. This will enable a reduction of construction and operational costs at railway station facilities. The design will also take into account evolving needs of passengers, the opportunities for low-energy usage and use of autonomous smart solutions supporting digital and web-based services. Furthermore, the IK within IN2STEMPO project carries out the work on improved accessibility to trains for all passengers groups by addressing issues related to platform-train-interface (PTI). The majority of existing platforms support a variety of rolling stock with a varying floor height. Also the curvature of existing platforms creates gaps between trains and platform. The reconstruction of existing platforms is very expensive and cannot be justified where rolling stock is variable. On the basis of this state-of-the-art, there will be firstly provided specifications and technical problems with PTI, secondly – proposals of technical solutions to improve accessibility to trains for all groups of passengers (including people with reduced mobility PRM) and finally – final report on recommended strategies for PTI.

mantolik@ikolej.pl

The NCBR and PKP PLK projects

Renata Barcikowska

Head of the Section of Project Coordination and International Cooperation



The National Centre for Research and Development (NCBR) PKP Polskie Linie Kolejowe S.A (Polish Railway Lines) have earmarked over 35 million zlotys for a joint enterprise dedicated to the programme to support research and development in the area of railway infrastructure, further called “BRIK Badania i Rozwój w Infrastrukturze Kolejowej” (Research and Development in Railway Infrastructure).

NCBR has launched a competition in five thematic areas, i.e. the digitalization and processing of railway traffic parameters, the decrease of railway transport negative impact on the environment, the improvement of availability and durability of facilities and objects connected with providing services for passengers, the increase of railway infrastructure resistance to climatic factors, third parties’ interference as well as the improvement of the process of railway infrastructure maintenance and upgrading.

Thirty applications were submitted to the competition. Finally, ten innovative projects were selected for co-financing and the Institute is engaged in five of them.

Table 1. IK participation in BRIK projects as a leader

Name of the project	Co-financing from NCBR for IK
Designing and implementation of OCL anti-theft system elements in rail transport	444 075.00 PLN
Developing an innovative system of lighting infrastructure control on the network managed by PLK S.A.	416 675.00 PLN
Standardization of selected computer interfaces of railway traffic command control and signaling system and equipment	1 872 481.49 PLN
Optimization of ultrasonic transducers system to detect rail internal defects according to the Catalogue of Defects binding in PLK S.A.	366 938.75 PLN
<i>Total co-financing from NCBR to IK</i>	3 100 170.24 PLN
<i>Total co-financing from NCBR for consortium members</i>	4 438 371.98 PLN

The Railway Research Institute is the leader of a consortium for which 2.8 million zlotys has been allocated. The cooperation of specialists from the Institute as well as from Siled Sp. z o.o., Zakład Automatyki i Urządzeń Pomiarowych AREX Sp. z o.o. from ABZ Consulting Sp. z o.o. will provide the development of command control and monitoring of lighting systems of railway premises. The undertaken work will allow adopting lighting to real train flows on stations and to the presence of travellers on platforms.

Table 2. IK participation in BRIK projects as a consortium member

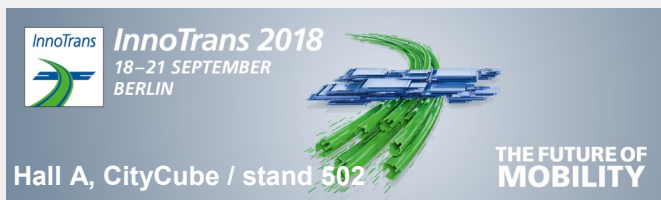
Name of the project	Co-financing from NCBR for IK
Innovative solutions in people’s and buildings’ protection against railway traffic-induced vibrations	708 256.25 PLN
<i>Total co-financing from NCBR to IK</i>	<i>Total co-financing from NCBR to IK</i>
<i>Total co-financing from NCBR for consortium members</i>	2 136 439.62 PLN

Innovative solutions which will reduce the negative impact of railway transport on people and environment should also be mentioned. Activities in this area will be carried out by Warsaw University of Technology, Instytut Ochrony Środowiska (Institute of the Environmental Protection) within the consortium with Budimex. The tables above present all projects with IK participation that received co-financing.

The new solutions developed in the course of design work will contribute to guarantee high reliability of railway transport. Thanks to them the Polish railway infrastructure will be more available for passengers whereas modern information systems and technologies will improve safety.

rbarcikowska@ikolej.pl

InnoTrans 2018, Berlin



We would like to invite you to visit the stand of **Instytut Kolejnictwa - Railway Research Institute** (Stand 502 Hall A City Cube) during the International Trade Fair for Transport Technology InnoTrans 2018 organized in Berlin from 18 to 21 September 2018.

Global Debate on Mobility Challenges for the Future Society



One of the UIC working bodies is the International Railway Research Board (IRRB) has taken the initiative to plan and organise a future oriented event, called the “**Global Debate on Mobility Challenges for the Future Society**”, which will be held at the Intercontinental Hotel, in Warsaw City Center, Poland on 15th and 16th November 2018.

The Debate will be focused on the following areas:

1. New mobility system concepts.
2. Towards an integrated transport system.
3. IT – new opportunities and threats.
4. Competitiveness of transport stakeholders.
5. Sustainability and resilience of the transport system.

The Global Debate will be launched by an opening ceremony, featuring presentations by Mr. Jean-Pierre Loubinoux - UIC Director-General, Prof. Boris Lapidus – IRRB Chairman and Dr Andrzej Żurkowski, the IRRB

Vice-chairman, as well as a number of invited local officials.

Following the official opening, five key-note speeches/sessions moderators will be given, linked to each of the five areas mentioned above. The afternoon session will be split into five thematic parallel debates focused on these areas.

At the beginning of the second day, the conclusions of these parallel debates will be presented by their moderators. It will be followed by the general debate, the main element of the event. The conclusions of this final main debate will be summarised by Prof. Boris Lapidus, the IRRB Chairman.

It is our expectation that the outcome from this Global Debate, using a wide range of transport research results as well as multi-faceted insights from around the world, will constitute also a crucial input to the update of the Global Vision for Railway Development document.

The UIC will be supported in the organisation of the Global Debate by the IRRB vice-chairman Dr. Andrzej Żurkowski, PhD, the Director of the Instytut Kolejnictwa (Railway Research Institute), which organisation will also co-host the event in Warsaw.

We would be very pleased if you could inform us as soon as possible (preferably via mail address to: Mr. Dennis Schut - IRRB Secretary schut@uic.org) about your attendance.

Editors:

Dr Renata Barcikowska, Editor-in-chief
 Jolanta Cybulska-Drachal
 Izabella Grzegrzółka
 Jolanta Olpińska
 Małgorzata Ortel
 Andrzej Szmigiel

IK - Railway Research Institute
 04-275 Warsaw, Poland
www.ikolej.pl
 e-mail: ikolej@ikolej.pl

Copyright © 2018 IK - Railway Research Institute
 All rights reserved.