IK
INSTYTUT KOLEJNICTWA
IK - Railway Research Institute

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IN THIS ISSUE

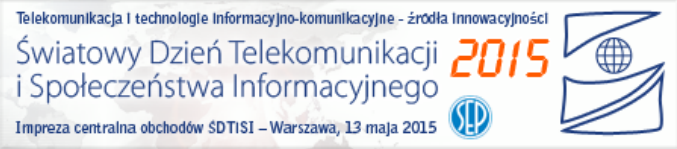
Editor's

Marek Pawlik
Deputy Director for Railway Interoperability

The Railway Research Institute has been acting as a designated body since it was founded in 1951 – for over sixty years. Since Poland entered the European Community in 2004 the Institute has been acting also as a body notified to the European Directives on the interoperability of the rail system within the Community. At the beginning the Institute was notified to directives 96/48/WE and 2001/16/WE dedicated respectively to the trans-European high speed rail system interoperability and trans-European conventional rail system interoperability. Now the Institute is notified to directive 2008/57/EC, which is dedicated to the interoperability of the whole European rail system within the Community – to the directive, which has replaced already quoted previous ones. The directive does not define details, which are necessary to assess technical solutions, but it is supplemented with Technical Specifications for Interoperability, European specifications and European Standards. In the same way Polish Railway Act does not define the rules necessary to assess technical solutions against Polish requirements. European and Polish detailed regulations, technical requirements and assessment procedural modules are evolving towards more and more common and comprehensive. The Institute is closely following these changes to ensure not only technical, but also legal correctness of the documents closing verification and assessment processes conducted against European and Polish requirements. Being legally entitled and technically competent Institute verifies and assesses permanent way, station infrastructure, control command and signalling, mobile communication, traction power supply, and rolling stock from wagons to traction units and on-track machines against applicable European and Polish requirements. Our competences have just been proven against new Technical Specifications for Interoperability, which are bounding from this year. More details you will find inside this newsletter.

16th Round Table Conference – Poland on the Way Towards Information Society

On 13 May 2015 in the Polish Parliament there was organized 16th Round Table Conference – Poland on the Way Towards Information Society – "Telecommunication and IT Technologies: Sources of Innovation". At the invitation of the Association of Polish Electrical Engineers (SEP), the Director of the Railway Research Institute (IK) Mr Andrzej Żurkowski presented a paper on current condition and perspectives of IT and communication technologies in railway industry. Telecommunication and IT systems, which basic task is to provide safety of railway traffic.



Moreover, in passenger traffic it is important to support passengers in area of information and check-in, and in freight traffic – freight tracking. There are many recipients for such solutions in railway industry.

Conference on Control and Telecommunication in Railway

On 27–29 May in Ożarów Mazowiecki took place a Conference on Control and Telecommunication in Railway which aim was to present the latest signaling and telecommunication solutions and technologies from perspective of needs of railway infrastructure managers. Thematic scope of the conference included train dispatcher communication, cable and radio communication sources, GSM-R technologies, ERTMS/ETCS systems on all technological levels of control and signaling equipment, track-side and on-board equipment and track and point control systems. In the event took part the Director of the Railway Research Institute (IK) together with the Scientific Secretary.

During the plenary session the Director of the IK presented information on the extensive scope of authorities of the IK in area of certification of control command and signaling products and systems in railway. In the substantive part of the conference prof. Mirosław Siergiejczyk presented the paper on broadband networks in rail transport, including technical solutions and operational problems.

The Railway Research Institute was Awarded with two Certificates from Polish Centre for Accreditation

In July in the headquarters of the Polish Centre for Accreditation (PCA) the Railway Research Institute (IK) was awarded with two certificates:

Director of the PCA Lucyna Olborska and Director the IK Andrzej Żurkowski

- Accreditation Certificate for the unit authorized to certify products AC 128.
- Accreditation Certificate for the unit authorized to certify QMS management systems AC 185.

Achieved by the IK scope of accreditation includes among others conformity assessment and authorization of all conformity assessment modules according to regulations of the European Commission and the European Parliament No 2010/713/EC (UE).

Thereby the IK became the only institution in Poland and the first recognized by the PCA as competent to carry out the EC conformity assessment processes and the EC verification in full scope.

Railway Product Certification

Wojciech Rzepka
Head of the Quality and Certification Centre of the Railway Research Institute

On 21 August 2015 the Railway Research Institute (IK) according to the Decision no. DZTI-WI.811.6.2015.IM reobtained authorization of the Office of Rail Transport (UTK) for realization of certification processes in the European Communities of interoperability constituents and interoperable railway subsystems. Thereby the scope of authorization of the Railway Research Institute as a notified body no. 1467 to the directive of the European Parliament and Council 2008/57/EC of 17 June 2008 regarding interoperability of railway system in the Community (OJ.EU.L.2008.191.1) covers certification of all interoperable railway subsystems as well as all the interoperability constituents by using all modules of conformity assessment procedures requiring engagement of the notified body specified in the Decision of the European Commission No. 2010/713/UE of 9 November 2010 regarding modules of conformity assessment procedures, suitability for use and verification of the EC used in the technical specifications of interoperability by virtue of Directives of the European Parliament and Council 2008/57/WE (OJ.EU.L.2010.319.1). Thereby the Railway Research Institute became the only notified body in Poland with such vast, maximum scope of recognition.

According to the Law on the conformity evaluation system of 30 August 2002 with further modifications (Journal of Laws 2014.1645) and the Law on the railway transport of the 28 March 2003 r. with further modifications (Journal of Laws 2013.1594) the UTK authorization was preceded by obtaining by the Quality and Certification Centre of the IK the full range of accreditation of the Polish Centre for Accreditation (accreditations no. AC 128 and AC 185) as a body certifying products and a body certifying management systems.

Placing the railway products on the market process depends on type of the product. The basic rule is to meet the essential requirements. In relation to rail transport, the following essential requirements apply:

1) safety;
2) reliability;
3) health;
4) environmental protection;
5) technical compatibility;
6) accessibility.

While the essential requirements are given in general terms, the specific requirements are described in the Technical Specification of Interoperability. They are dedicated to the particular railway subsystems, such as: Rolling Stock, Infrastructure, Power Supply and Signalling – On Board Equipment and Signalling – sidetrack equipment.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ACCREDITATION CERTIFICATE FOR PRODUCT CERTIFICATION BODY
Nr AC 128
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Ośrodek Jakości i Certyfikacji
ul. Józefa Chłopickiego 50, 04-275 Warszawa
spełnia wymagania normy PN-EN ISO/IEC 17065:2013-03
meets requirements of the PN-EN ISO/IEC 17065:2013-03 standard
Akredytowana działalność jest określona w Zakresie Akredytacji Nr AC 128
Accredited activity is defined in the Scope of Accreditation No AC 128
Akredytacja pozostaje w mocy pod warunkiem przestrzegania wymagań jednostki akredytującej określonych w kontrakcie Nr AC 128
This accreditation remains in force provided the Body observes the requirements of Accreditation Body defined in the Contract No AC 128
Certyfikat akredytacji ważny do dnia 14.05.2018 r.
The certificate of accreditation is valid until 14.05.2018
Akredytacji udzielono dnia 15.05.2006 r.
Accreditation was granted on 15.05.2006
p.o. DYREKTORA
POLSKIEGO CENTRUM AKREDYTACJI
LUCYNA OLBORSKA
Warszawa, 16 lipca 2015 roku

However, one should remember that particular specifications may apply to several subsystems as well as to particular railway system more than one specification applies.

The Technical Specifications of Interoperability may not regulate all the essential requirements, leaving so called 'open points'. Also, due to specification of railway lines in the member countries, an evaluation of meeting of conformity requirements with already existing railway network is often necessary. In such cases, the evaluation is carried out by the notified or authorized bodies, or possibly by the appointed bodies. These bodies are formally recognized as independent from entities placing products on the market, and carry out product certification in order to prove that duly identified product or its manufacturing process meets the general or specific requirements. Thus, to the particular product (interoperability costituent, railway subsystem) at the same time may apply the


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SYSTEMY ZARZĄDZANIA
ACCREDITATION CERTIFICATE FOR MANAGEMENT SYSTEMS CERTIFICATION BODY
Nr AC 185
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OŚRODEK JAKOŚCI I CERTYFIKACJI
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spełnia wymagania normy PN-EN ISO/IEC 17021:2011
meets requirements of the PN-EN ISO/IEC 17021:2011 standard
Akredytowana działalność jest określona w Zakresie Akredytacji Nr AC 185
Accredited activity is defined in the Scope of Accreditation No AC 185
Akredytacja pozostaje w mocy pod warunkiem przestrzegania wymagań jednostki akredytującej określonych w kontrakcie Nr AC 185
This accreditation remains in force provided the Body observes the requirements of Accreditation Body defined in the Contract No AC 185
Certyfikat akredytacji ważny do dnia 15.07.2019 r.
The certificate of accreditation is valid until 15.07.2019
p.o. DYREKTORA
POLSKIEGO CENTRUM AKREDYTACJI
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Warszawa, 16 lipca 2015 roku

Community and the national law.

The national law applies everywhere, where the Community law does not apply and where the Community law does not regulate the issues provided for in the national law.

Each conformity assessment concludes either with the refusal to issue the conformity certificate or with issue of it. The conformity of interoperability constituents with the specific requirements is confirmed by the EC conformity certificates and the conformity of railway subsystems by the EC certificates of verification. The EC certification is carried out by using the EC conformity assessment procedure modules given in the Commission Decision 2010/713/UE.

These modules are:

a) for the interoperability constituents conformity assessment:
   - Module CA – internal production control;
   - Module CA1 – internal production control and product verification by individual examination;
   - Module CA2 – internal production control and product verification at random intervals;
   - Module CB – EC type examination;
   - Module CC – conformity to type based on internal production control;
   - Module CD – conformity to type based on quality management system within manufacturing process;
   - Module CF – conformity to type based on product verification;
   - Module CH – conformity based on full quality management process;
   - Module CH 1 – conformity based on full quality management process and design examination;
   - Module CV – type validation by in-service experience.

b) for the EC verification of the railway interoperability elements:
   - Module SB – the EC type examination;
   - Module SD – the EC verification based on quality management system within manufacturing process;
   - Module SF – the EC verification based on product verification;
   - Module SG – the EC verification based on unit verification;
   - Module SH 1 – the EC verification based on full quality management system and design examination.

After successful conclusion of the interoperability constituents conformity assessment process, the EC conformity certificate is issued, and after successful conclusion of the subsystem conformity verification – the EC certificate of verification. The following certificates are issued depending on which issue they refer to (interoperability constituents, interoperable subsystem, constituents of interoperable subsystem, stage of interoperable subsystem, quality management system):

1) the EC Conformity Certificate (for A1, CA1, CA1, CF, F conformity assessment procedure modules);
2) the EC Certificate of Verification (for SD, SF, SG, SH1, SH2 conformity assessment procedure modules);
3) the EC Type Examination Certificate (for B, CB, SB conformity assessment procedure modules);
4) the EC Design-Examination Certificate (for CH1, H2, SH1, SH2 conformity assessment procedure modules);
5) the EC Certificate of Suitability for Use (for CV, V conformity assessment procedure modules);
6) the EC Intermediate Statement of Verification (for SB, SD,SF, SG, SH1,SH2 conformity assessment procedure modules);
7) the Quality Management System Certificate (for CD, CH, CH1, D, SD, H1, H2, SH1, SH2 conformity assessment procedure modules).

Because the notified bodies are not involved in CA and CC conformity assessment procedure modules, the EC conformity certificates are not issued for the interoperability constituents assessed by these modules. The producer, however, must provide the EC declaration of conformity, for which he bears full responsibility.

Certification Processes are carried out by the Quality and Certification Centre of the IK on the base of submitted certification applications, the forms for which, as well as other information for customers may be found on www.ikolej.pl

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International GSM-R System and Equipment Research Possibilities of the Signalling and Telecommunication Laboratory of the Railway Research Institute

Krzysztof Tchórzewski
Engineering and Technical Specialist
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The Signalling and Telecommunication Laboratory of the Railway Research Institute in order to meet changes within PKP PLK S.A. especially those resulting from realization of ambitious modernization plans of railway lines due to provide interoperability, develops its ETCS and GSM-R certification and R&D competences. In reference to GSM-R the development of research and measuring possibilities is particularly visible: modern equipment was purchased, new research procedures were developed and there are continuously being undertaken actions aimed at confirming and expanding area of accreditation already issued by the Polish Centre for Accreditation (Polskie Centrum Akredytacji) to new research methods. The main tasks of the Laboratory which refer to certification and implementation of GSM-R on selected railway lines are:

- verification of the EC railway lines encasing projects;
- technical expertise within Quality Management System of companies implementing GSM-R;
- analyses and feasibility studies of GSM-R;
- Tests of manual, on-board and stationary GSM-R transceivers in required scope;
- GSM-R functional tests;
- intensity tests and quality of services factors tests;
- electromagnetic fields level measurements in general environment in frequency range of 30 MHz – 3 GHz.

Currently the Laboratory has got Accreditation No AB310, expanded to few measuring methods and a special attention should be paid to accreditations of GSM-R systems and equipment:

- tests of GSM-R transceiver interface selected parameters;
- GSM-R frequency electrical intensity tests;
- electromagnetic field levels emitted by radio communication objects in general environment.

Fig. 1. Radio communication tester CMU 200

Andrzej Toruń
Chief Researcher
Head of the Railway Traffic Control & Telecom Division

Tests of selected parameters of GSM-R transceiver interface are carried out by using Rohde & Schwarz universal radio communication tester CMU 200.

The Laboratory has got accreditation for testing radio parameters in accordance with EN 300 607-1 v.8.1.1. norm. Certification area (indicated Norm points) are related to the following parameters:

- GSM-R frequency error and transmitter phase error, pt. 13.1;
- GSM-R transmitter power output and packet time structure, pt. 13.3;
- Spectrum of transmitted GSM-R signal, pt. 13.9;
- GPRS frequency error and transmitter phase error, pt. 13.16.1;
- GPRS transmitter power output, pt. 13.16.3;
- GSM-R signal reception quality factors in static conditions, pts. 14.2.7 and 14.2.9.

For electrical intensity tests in GSM-R frequency the Signalling and Telecommunication Laboratory has got accreditation for self-developed research method. In tests there is used Rohde & Schwarz complex intensity measuring system, the core of which contains of two TSML-CW scanners, distribution and signal triggering system, and measuring laptop, collecting and analyzing data by using dedicated ROMES software. It should be noted that currently in measurements there is used measurement signal triggering system based on encoder installed on one of the vehicle's driving axles. The advantage of the encoder based solution is its high precision in localization of measurement points – measurement is taken as a function of the distance only at the moment of running of the measuring car. Moreover, independently from weather conditions and track-side infrastructure information about position of measuring car on the railway line is collected, thereby excluding problems occurring while using GSM-R, in the same way as it is made while using other measuring systems of this type.

Intensity measurement system is equipped with two mobile test terminals – TTS-S75 and TTS-TRC-3. Terminals are used for verification of selected signal quality parameters as well as for quality of service (QoS)

factors evaluation in accordance with reccomendations of Procurement & Implementation Guide V. 1.0., EIRENE SRS 15.4, UIC ERTMS/GSM-R Operation Group and GSM-R industry Group (Document No. O-2475 3.0).

The Laboratory has already carried out measurements of GSM-R implemented on E-30 line and the Pomeranian Metropolitan Railway (Pomorska Kolej Metropolitalna) and is during carrying out measurements on E-65 line Warszawa – Gdynia section and E-20 line Kunowice – Łowicz section, i.e. all sections in Poland, on which GSM-R is being currently implemented.

The Signalling and Telecommunication Laboratory in its offer of accredited tests of GSM-R implementation in Poland has got also measurements of electromagnetic fields levels emitted by radio communication devices in general environment in accordance with the Regulation of the Ministry of Environment of 30th October 2003 (Journal of Laws No. 192, item 1883). Developed research procedure is used for determining electromagnetic field levels around broadcast installations, determining places where electromagnetic radiation exceeds limit values described in the Regulation and setting boundaries of remote field area with limited use.

It includes frequency range generated by mobile networks base station devices and others radio communication installations using frequency from 30 MHz up to 3 GHz for electromagnetic fields in general environment. Measurements are made with NARDA selective radiation meter with isotropic antenna from 27 MHz up to 3 GHz with integrated GPS receiver.

The Laboratory has already verified electromagnetic field levels of selected radio objects located on E-30 line (Legnica – Węgliniec – Bielawa Dolna, Legnica – Wrocław – Opole) and on radio communication objects on the Pomeranian Metropolitan Railway.

Fig. 2. Electromagnetic field level measurements in general environment

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Elements of Tactile for the Blind - Types, Solutions and General Requirements

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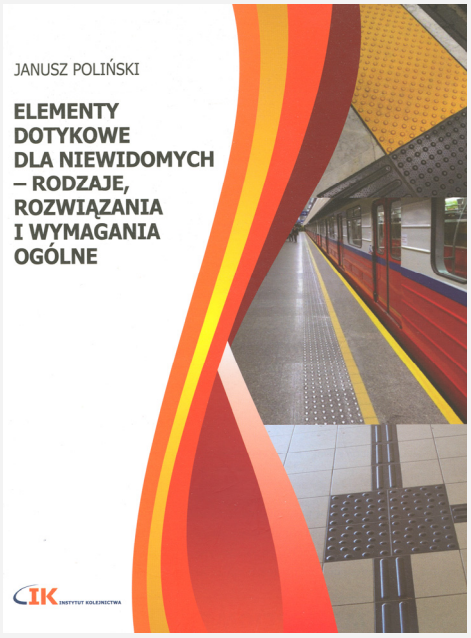
The monograph presents in details rules of using tactile elements – warning panels, guiding paths and tactile maps in different countries. Not only existing solutions were described, but also their advantages and disadvantages. There were also analyzed - on the basis of available sources – legal bases of design and use of tactile elements in public space including railway transport. Collected evidence enabled to develop several guidelines, realization of which should significantly improve accessibility of railway infrastructure and rolling stock for the blind.

We invite you to reading.

The study may be purchased in the Railway Research Institute by ordering via email: *bkowalska@ikolej.pl*



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The Metal Materials Research Workshop in the Materials and Structure Laboratory

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Head of Metalic Material Section
Materials & Structure Laboratory

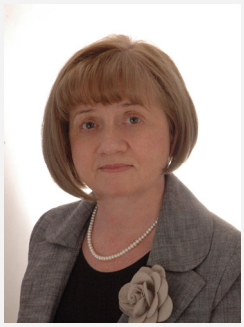
Jolanta Maria Radziszewska-Wolińska
Chief Researcher
Head of Materials & Structure Laboratory

The Metal Materials Research Workshop in the Materials and Structure Laboratory has at its disposal a stand for examination of oversized objects of a research area of 5 m x 4 m x 8 m such as: bogie frames, traction poles, traction portals elements: trusses, frameworks, and other. We owe also a special stand for examination of fastening systems, which is in line with requirements of the PN-EN 13146 norm and a LFV Instron Schenck testing machine with scope of work +2500 kN /-4000kN (250 tonnes of pull/400 tonnes of compression). Within accreditation area for research in the railway field there are among others: examination of boogie frames (EN 13749:2011), examination of fish plate joints, including welded joint, isolated joints, rail examination, examination of sleepers made of long-line prestressed concrete, examination of 850 kN and 1350 kN couplers, examination of elements of fastening and fixing systems (clips, rail pads, isolation fish-plate blocks, verge rings, sleeper screws, springs, spring washers), examination of elements of railway road – traction poles, portals.

Fig. 1. Stand for examination of bogie frames and oversized objects

We have a highly qualified staff with qualification in the field of UT, MPI non- destructive inspections (ultrasonic testing, magnetic particles method).
The great majority of issues conducted in the Laboratory is directly or indirectly related to the safety of railway traffic. Among the most responsible ones there are post-accident expertizes. In the described works the aim is not only to determine a cause and a course of an accident, but also to present actions and solutions that may help to avoid such situations in the future. Accordingly to the complexity of an issue, expertizes

Fig. 2. Stand for examination of sleepers made of long-line prestressed concrete and draw gears on LFV +2500 kN /-4000 kN testing machine



very often require a great amount of examinations: precise meteorological measurements, endurance testing, ultrasonic testing, magnetic particles method, tests, as well as material and microscope examinations including scanning observations or calculations and FEM (finite -element method) simulations. In relation to the above, the research area is very vast and research experience as well as experience in the railway field are required.

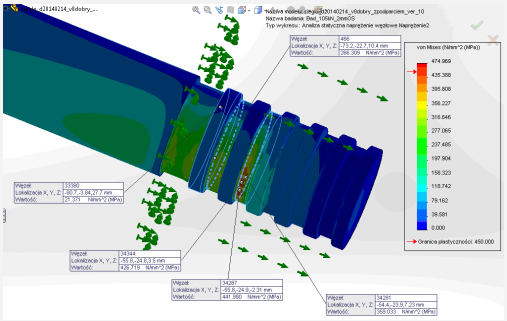


Fig. 3. Distribution of stress fields in draw bar of inter-car coupler

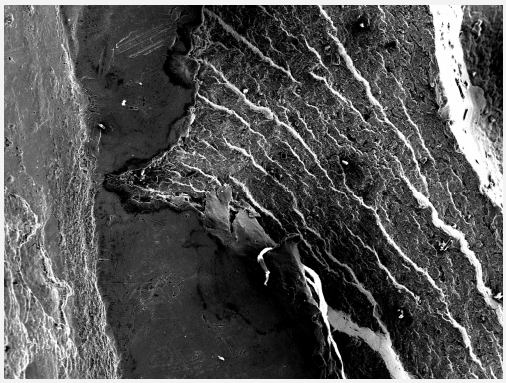


Fig. 4 Observations of state of surface of post-accident elements

Examples of expertizes conducted recently in the Laboratory are as follows: determination of causes of a crack of a point-lock plunger, determination of causes of a crack of a rail, determination of causes of breaking of a draw bar of an inter-car coupler, determination of causes of an ale deformation, determination of causes of appearance of superficial defects on rails, determination of causes of excessive wear if switch blades.

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Power Supply Laboratory and Operational Tests for M2 Line of the Warsaw Metro Carried Out by the Electric Power Division the Railway Research Institute

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Introduction

The Electric Power Supply Division of the Railway Research Institute in years 2013-2015 carried out laboratory and operational tests of power supply infrastructure to be used in M2 line of the Warsaw Metro. The tests were a part of the approval for the operation process of the following power supply equipment:

- Return circuit,
- Substation high-speed circuit-breaker UR60-81S,
- Substation high-speed circuit-breaker UR40-81S.

According to the Regulation of the Ministry of Infrastructure and Development of 13 May 2014 on approval for the operation defined types of buildings, equipment and rail vehicles, mentioned above equipment requires Certificate of approval for the operation type.

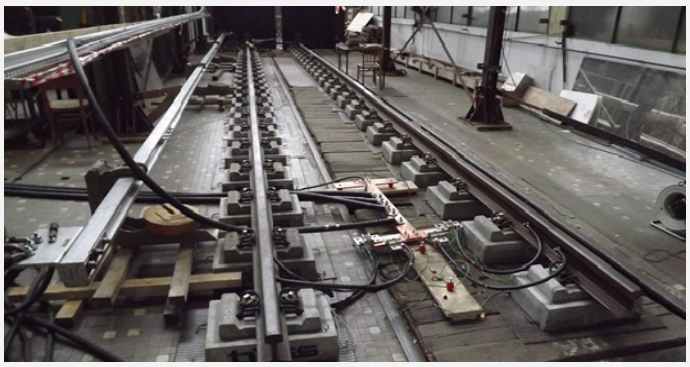

Fig. 1 View of return circuit model

Return circuit tests

In the Power Division laboratory the 15-meter prototype of insulated return to be used on M2 of the Warsaw Metro line was constructed. Each stretch of rails S49E1 consisted of typical welded joints and fish-platings with copper railbonds. Rails were put on block support EBS49E1. In comparison to already existing insulated return system of M1 line of the Warsaw Metro a new element was added – additional wire lengthwise the track and special panel joining reinforcing cable with the rails. In Fig. 1 example of return circuit built in the Power Division laboratory is presented.

Tests were carried out in the following areas:

- short-circuit and load current conduction;

a) temperature measurements on return circuit elements;

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Chief Researcher
Head of Electric Power Division

b) measurements of current dimensioning on individual return circuit elements;
- electric shock protection effectiveness – contact voltage tests;
- tests of dynamic reaction of flowing current.

High-speed circuit-breakers UR60-81S and UR40-81S tests

Laboratory tests of high-speed circuit-breakers installed in M2 line power supply system were carried out in relation to requirements of §13.1 of Regulation of Ministry of Infrastructure and Development of 13 May 2014 on approval for the operation defined types of buildings, equipment and rail vehicles. In the Power Division laboratory among others the following tests were carried out: mechanical tests, temperaturerise, electrical endurance, mechanical endurance. Searching for level of critical currents and their break-time. Fig. 2a presents the circuit-breaker during tests, fig. 2b – 80A critical current break-time oscillogram.

Operational tests

Achieved positive test results allowed the authorized research unit to give a positive technical opinion regarding accordance of the high-speed circuit-breaker and

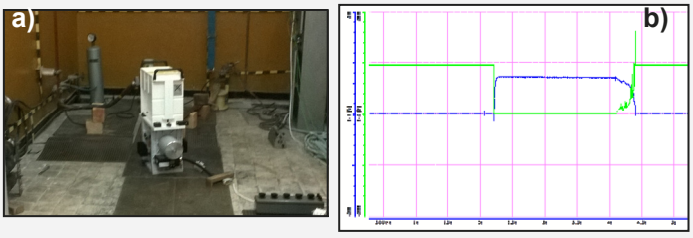

Fig. 2. The circuit-breaker during tests, a) – general view in test chamber, b) - 80A critical current break-time oscillogram

return circuit with the area of tests required to obtain certificate of acceptance for operation of types of defined types of buildings, equipment and rail vehicles. The next stage of the acceptance for operation process was carrying out operational tests. The tests were carried out in the place of installation of the equipment and confirmed its usability for operation on M2 line.

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Development Strategies on the Example of the Logistic Valley

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Introduction

The Logistic Valley it is a functional area that creates wide space, in which transport infrastructure (road, rail and sea infrastructure), both already existing and planned, requires better integration of the systems based on public rail-road terminal Gdynia Port . It forces reconstruction of access to port and its surrounding industrial backup area. This initiative uses TEN-T core network Baltic-Adriatic Corridor. It is an important N-S transport axis in the European Union that enables communication of Central and East Europe with the Mediterranean basin using road, rail and intermodal transport. The corridor has multimodal character and gives opportunity to use each type of transport.

The strategic area for the Logistic Valley is Gdynia – Rumia – Kosakowo zone with the possibility of its development in direction of Reda and Wejherowo. Connected with this zone expected so called 'cores' indicate on dispersed character of railway communication infrastructure, which demands ensuring appropriate areas and their transport connection and from organizational point of view – management beyond administrative divisions.

Issues and Function

In 2015 a group of experts from the Railway Track and Operation Division of the Railway Research Institute in cooperation with other executioners created a team of authors of the Sustainable Development Strategy for the Logistic Valley 2020 Functional Area with 2050 Perspective and The Operational Program for Transport Development for the Logistic Valley 2020 Functional Area with 2050 Perspective.

Both documents were created on the basis of integrated territorial approach, including dynamic functional and spatial relations that extend traditional borders of formal administrative divisions. The papers contain diagnosis of current state and tasks to realization for six territorial units of the Pomeranian Voivodship: the city of Gdynia, towns of Rumia, Reda and Wejherowo and municipalities of Kosakowo and Wejherowo. Additionally they include possibilities of development and needs of strategic partners of the Logistic Valley initiative including the Port of Gdynia, infrastructure managers, logistics operators, TSL industries and others.

Krzysztof Ochociński
Head of Railway Track & Operation Division

Key Projects for the Logistics Valley

The identification of problem areas in the Logistics Valley functional area that have influence on its socio-economic development and require intervention as well as improvement from point of view of companies and economic entities, enabled to extract key projects, realization of which is expected until year 2020. These projects are:

- Building of the Red Road and the Tri-City Agglomeration Northern Ring Road;
- Building of public rail-road terminal Gdynia Towarowa within Gdynia Port station structures;
- Revitalization of the Central Coal Trunk-Line on Gdynia Port – Nowa Wieś Wielka section;
- Modernization of the Kwiatkowski Route.

The scope of activities of the Railway Track and Operation Division of the Railway Research Institute includes among others cooperation with local authorities of various levels, due to elaborate plans of transport development for needs of policies and strategic documents created by those authorities. Transport development plans created by the experts team include local requirements and particular area specification.

Realization of mentioned above projects will enable to achieve efficient and effective transport connections within the functional area and its immediate surroundings. It will cause increase of communication safety which will influence on significant improvement of road and rail accessibility to the Port of Gdynia within the trans-European Baltic – Adriatic transport corridor. Mentioned above investments are crucially important for socio-economic development, contributing to economic activity increase through investment plots attractiveness improvement and generation of new services which will lead to increase of employment and staff education needs in area of TLS activity.

More information about the Logistics Valley can be found on http://www.dolinalogistyczna.com/pl

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New Brake Shoe Inserts Materials for Freight Cars

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Thanks to entering into force of new regulations describing maximum noise level emitted by rail vehicles, a number of changes is implemented in order to reduce the noise level. One of the methods includes using new friction materials in brake shoe inserts, which in cooperation with wheel cause lower emission of harmful noise during turning.

Examinations on obtaining new friction materials used for production of brake shoe inserts were carried out in the following, various directions:

- metal materials,
- non-organic materials,
- organic materials.

Works on obtaining metal materials concentrated on modification of cast iron as a classic and already used material.

An idea of using non-organic materials assumed using china, basalt and concrete, however these materials turned out not to give positive results.

Experiments on organic materials produced the most promising results, thanks to which noise level may be reduced and friction product may be lowered. As a result of these experiments we are currently able to use composite brake shoe inserts divided into three groups:

- LL type inserts with average coefficient of friction from 0,10 to 0,15,
- L type inserts with average coefficient of friction from 0,15 to 0,25,
- K type inserts with average coefficient of friction from 0,24 to 0,30 (it applies also to sinters).

During operational tests some characteristic of the composite materials were observed:

- overheating of wheel rim surface,
- excessive and characteristic wear of the running surface of the wheel cooperating with the insert,
- properties strongly dependent on weather conditions,
- application of metal material on the friction surface of the insert (currently called metallic patch).

Taking into consideration mentioned above characteristics, the UIC commission working on brakes issues presented guidelines for using composite brake shoe inserts in rail vehicles. Below there are presented the most important requirements on using composite brake shoe inserts of K and LL types:

- composite brake shoe inserts could be used only in cooperation with monobloc wheels (in accordance with PN-EN 13979-1 excluding ER2. BV2, ER8 and ER9 material types),
- for K type inserts there is recommended to use wheels with reduced flange thickness (30,5 mm) and for LL type inserts it is obligatory,
- passenger cars equipped with composite brake shoe inserts should be marked in accordance with the UIC card No 545 (the type of the insert written on the car body),
- during braking of a train with a speed lower than 50 km/h it is necessary to apply the brake first or apply brakes with higher level of control.
- In winter conditions it is necessary to maintain positive temperature of friction pairs by electric braking every 10-15 min or 20-30 km,
- In cars equipped with composite brake shoe inserts due to lower (than in cast iron inserts) static coefficient of friction, it is recommended to apply hand brake/stop brake on doubled number of cars in comparison with similar train equipped with cast iron brake shoe inserts.

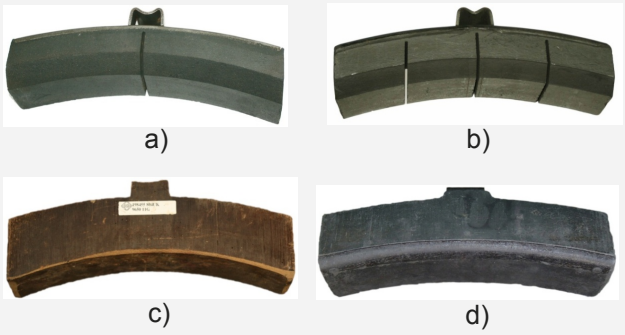

Fig. 1 – Types of brake shoe inserts: a) - Cofren C810, b) – Frenoplast FR513, c) – Cosid 804 UK, d) – TVS AF 0003

Guidelines of the UIC commission for using composite brake shoe inserts include the catalogue of failures, in which there are presented the most common failures in operation and how to interpret them. The catalogue of failures is an extension of Appendix 9 to General Contract of Use for Freight Wagons (AVV).

The Brakes Workshop of the Rolling Stock Testing Laboratory of the Railway Research Institute carries out operational tests of new friction materials placed on the market with new cars.

Below there is presented line wear of brake shoe inserts K type of three producers, for 1 million km mileage. Dimensions of the new inserts were 320x80x60 mm and wheels (nominal diameter 920 mm) were made of ER7 material. Operational tests were carried out on PKP PLK tracks with time-tablespeed, using four-axles freight cars. Average mileage of cars was 120 thousands km.

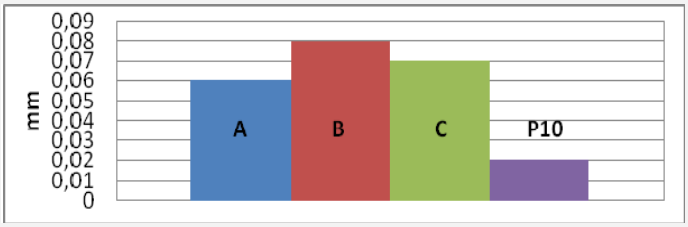

Fig. 2 – Comparison of wear of K type brake shoe inserts and cast iron inserts in freight cars

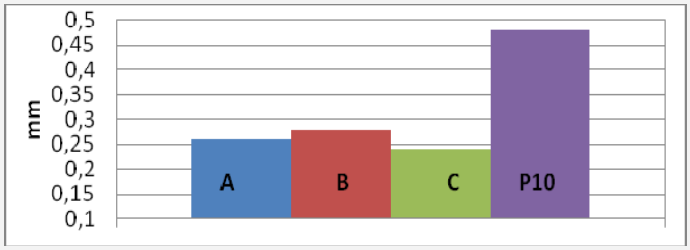

Fig. 3 – Comparison of wear of wheels cooperating with K type and cast iron inserts

Some of the EU countries (e.g. Germany) announce an absolute ban on access to railway infrastructure for cars equipped with cast iron brake shoe inserts. One of the methods of avoiding logistic problems on the territories of these countries is to implement LL type inserts changeable to cast iron inserts. Still one should remember about limits occurring when using only monoblock wheels in cars and about obligatory re-profiling of the wheel flange to 30,5 mm.

However, tests carried out by the Brakes Workshop in the Test Track Centre of the Railway Research Institute near Żmigród showed that LL type brake shoe inserts are not in 100% compatibile with cast iron inserts. Braking distances of examined cars with LL type inserts did not cover the results achieved with the same cars with cast iron inserts. Occurred differences may result with too intensive or too weak braking which leads to failure of friction materials, wheels block or extension of braking distance.

The results of the test suggest carrying out continuity tests before changing LL type brake shoe inserts to cast iron inserts. Possible differences in length of braking distances for particular type of cars may be corrected with braking system regulation.

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Polish Scientific Association for Recycling (PSNR)

On 9 October 2009 was registered the Polish Scientific Association for Recycling (PSNR), the Chairman of which for the next term of office is dr hab. inż. Andrzej Wojciechowski (of the Institute of Precision Mechanics in Warsaw).

Among 33 founding members of PSNR was also dr inż. Jolanta Maria Radziszewska-Wolińska (of the Railway Research Institute) who became a member of the Programme Council of the Association, and in by-elections during the general meeting of the Association on 22 June 2015 was elected for the Member of the Board.

Currently there are 51 Members of the Association.

The Association unites in its ranks recycling specialists, both in area of vehicles, fuels, municipal solid waste and chemical waste. The Members of the PSNR play active part in revision of legal acts on ecology, environmental protection and recycling.

Dr inż. Radziszewska-Wolińska during the international Advanced Rail Technologies conference (ART) organized by the Railway Research Institute together with the Faculty of Transport of the Warsaw University of Technology on 18-19 November 2014 in Warsaw, led a thematic panel called ‘Materials Engineering and Recycling in Rail Industry’. Such panel is also planned for this year’s ART conference, and we kindly invite all interested in this topic to take active part in it.

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High Speed Rail in Poland

On 14 December 2015 in Poland the first 200 km/h connection on modernized line was opened. According to Regulation 2008/57 EC mentioned connection is classified as a high speed connection. Occuring need for further technology development and promotion of technical knowledge requires new scientific descriptions. The Railway Research Institute (IK) took the initiative of issuing essential study including organizational, technical, socio-economic and economic issues of demand for transport services and education of high speed rail design and operation personnel in Poland. The paper presents monographic approach, authors of which are outstanding representatives in the field of modern technologies.

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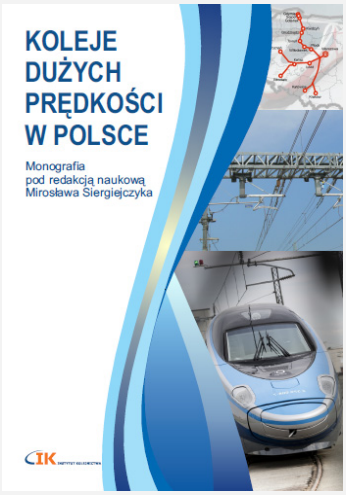

Monograph edited by Mirosław Siergiejczyk

Monograph can be purchased in the Railway Research Institute by ordering via email: bkowalska@ikolej.pl or Warsaw Technical University Bookstore, ul. Noakowskiego 28/20, 00-668 Warsaw. tel. +48 22 234 6233

The IK – DB Systemtechnik Cooperation Has Got a New Dimension

The 3 of July 2015 has seen an important event, which paves the way towards more integrated and interoperable railways the European Union. The representatives of the Polish Railway Institute (Instytut Kolejnictwa) in Warsaw, and the German company DB Systemtechnik (a member of the Deutsche Bahn holding, based in Minden), signed the framework agreement on cooperation. Both parties are research units, and also act as Notified Bodies, certified by the European Commission.

Both parties recognized several fields of cooperation, with perspectives of extension in the future. One of the most important is *Two in One* certification procedure of rolling stock, an offer addressed to the railway market. Whereas cross-acceptance is at the moment a long-term perspective in the EU, possibility of getting two certificates, both for German and Polish networks in one run, might be interesting for many producers of railway vehicles.

Another important issue is speeding up railways in Poland. Gradual implementation of 200 km/h operation raises challenges both in diagnostic and maintenance of Polish railway infrastructure. As German railways has run passenger trains with 200 km/h since 1977, they has collected a lot of experience, which may be helpful to Polish colleagues. Irrespective of concrete research or innovative projects Parties declared to intensify general activities as exchange of information, publications, organization of technical visits etc. Promotion of the initiated cooperation will take place during TRAKO 2015 fair in Gdańsk.

Zbigniew Szafrański – *Head of Unit for Coordination of Projects and International Cooperation.*

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