

## Activities of the OSJD Commission on Infrastructure and Rolling Stock in 2023

*From 7 to 9 November 2023, experts and representatives of the railways of OSJD member countries, affiliated OSJD enterprises and international organisations once again gathered at the OSJD Committee (Warsaw) for the final meeting of the OSJD Commission on Infrastructure and Rolling Stock to review the outcomes of activities over the past year and determining further tasks for the next period. The Chairman of the OSJD Commission on Infrastructure and Rolling Stock, Radovan VOPALECKY, in his article dwells on the results of work which were noted during the annual meeting following the activities of the past year in this area, and on the tasks which were identified for implementation for the next period.*

The OSJD Commission on Infrastructure and Rolling Stock (5<sup>th</sup> Commission) is one of the recognised international platforms for cooperation in the field of railway operation, exchange of technical information, the experience of highly qualified experts, as well as the best practices of railway companies of the OSJD member countries. The active participation in the activities of the 5<sup>th</sup> Commission by the world's largest carriers and railway infrastructure managers represents vivid examples of consistent technical cooperation in OSJD and has ensured for many years the presence of leading holders of duties on almost all subjects within the competence of the Commission.

That is why the consideration of the outcomes of the Commission's activities over the past year during the final meeting held from 7 till 9 November at the OSJD Committee in a hybrid format attracted the attention of a wide range of experts and representatives of the railways of the OSJD member countries from: Azerbaijani Railways CJSC (AZD CJSC), Beyerussian Railway (BC), State Enterprise "National Railway Infrastructure Company" (NRIC, Republic of Bulgaria), Hungarian State Railways Co. (MAV Co. and MAV-START Co.), "Kazakhstan Temir Zholy National Company" JSC ("KTZ NC" JSC/KZH), Railways of the Democratic People's Republic of Korea (ZC), Railway of Moldova State Enterprise (CFM),

Ulan-Bator Railway JSC (UBZD), Russian Railways OJSC (RZD OJSC), Railways of the Slovak Republic (ŽSR), Ukrainian Railways JSC (UZ), Czech Railways JSC (CD JSC); OSJD affiliated enterprises – Railway Research Institute (Instytut Kolejnictwa, Poland), Russian University of Transport (RUT (MIIT)), as well as OTIF and the OSJD Committee.

Opening the final meeting, Secretary of the OSJD Committee Attila Kiss informed the meeting participants about the decisions taken at CGD meeting XXXVII, as well as emphasised the importance of the issues under consideration for ensuring the technical interoperability of railways in the organisation and implementation of cross-border transportation between the OSJD countries.

As part of the agenda, the final meeting reviewed the results of the work of the OSJD



*Presidium of the final meeting of the OSJD Commission on Infrastructure and Rolling Stock (07-09.11.2023, OSJD Committee)*



*In the hall of the final meeting of the OSJD Commission on Infrastructure and Rolling Stock (07-09.11.2023, OSJD Committee)*

Commission on Infrastructure and Rolling Stock over the past year on topics within the competence of the Commission, and also agreed on the draft Report on the results of the work of the Commission, the Work Plan for 2024 and the Work Program for 2025 and subsequent years, including the draft decision of the CGD on the work of the V Commission, for their further submission to the OSJD governing bodies for approval.

Issues and proposals for improving the work of the 5<sup>th</sup> Commission were also discussed, including the organisation of work related to the development of an innovative railway communication system based on 4G/5G technology in the framework of OSJD.

***The subject “Rolling stock gauges in international traffic, taking into account the requirements for interoperability”*** was considered at an expert meeting on 4-6 April 2023 (at the OSJD Committee).

As part of the subject, the final meeting of the Commission agreed to continue the development of the draft new methodology for assessing the existing (operating) rolling stock (RS) in order to determine its suitability for running and recommended parameters for the designed new PS (rearranged 1520/1435 mm gauge wagons), in an interoperable international traffic running on sections of OSJD railways with a gauge of 1435 mm, taking into account the proposals of MAV Co. and ŽSR.

It was agreed to consider the issue of developing contrailer traffic in international traffic from the point of view of the rolling stock gauges, loading gauges, construction gauges and clearances of platforms.

To this end, the Commission’s working staff expects information to be provided by the participants/duty holders regarding the organisation of contrailer traffic in their countries: existing routes, types of flat wagon models for the transportation of contrailers and a promising fleet of wag-

ons, the availability of mobile diagnostics tools for checking contrailer routes, current loading dimensions for the contrailer traffic.

***Within the subject “Railway track and artificial structures”*** a number of expert meetings were held on the following subtopics (*for more details, see OSJD Bulletin No. 4-5/2023*):

- on subtopic 2.1 “Development of a set of issues on rails, rail fastenings, continuous-welded track, mechanisation of track maintenance and repair works” (4-6 October 2023, OSJD Committee, using the videoconferencing mode);
- on subtopic 2.2 “Consideration of a set of issues on the track formation and engineer structures” (16-18 May 2023, OSJD Committee, and additional expert meeting – 19 October 2023, OSJD Committee, using the videoconferencing mode);
- on subtopic 2.3 “Comprehensive diagnostics of the railway track” (21-22 September 2023, OSJD Committee, using the videoconferencing mode);
- on subtopic 2.4 “Reinforced concrete sleepers, beams, turnout switches and their diagnostics” (10-12 October 2023, OSJD Committee, using the videoconferencing mode).

The final meeting of the Commission approved the works carried out by the experts in 2023 on four subtopics and recommended their continuation in 2024. Furthermore, the follow-

ing OSJD leaflets of a recommendatory nature were approved:

- R 720 “Construction of a ballast-free railway track”, 3<sup>rd</sup> edition;
- R 799 “Recommendations for the use of noise-protective walls, their design, functionality and operation”, 1<sup>st</sup> edition.

Herewith, the following leaflets have been annulled:

- R 720 “Construction of a ballast-free railway track”, 2<sup>nd</sup> edition, dated 23.10.2009;
- R 760 “Catalogue of defects and deformations of the track formation”, 2<sup>nd</sup> edition, dated 27.10.2000.

The meeting of the OSJD Commission on Infrastructure and Rolling stock decided to continue in 2024 the works related to updating the following existing OSJD leaflets:

- R 734 “Ultrasonic testing of rails welded by aluminothermic method” (1<sup>st</sup> edition as of 5 November 2004);
- R 739 “Recommendations for the organisation and technology of repairing rails on the track and at rail repair enterprises” (2<sup>nd</sup> edition dated 27.10.2000);
- R 744 “Recommendations as to terminology “Rails” and “Rail fastenings”

(1<sup>st</sup> edition as of 27.10.2000);

- R 762/1 “Recommendations for increasing the bearing capacity of the main track formation site” (1<sup>st</sup> edition dated 30.10.2003);
- O+R 764 “Recommendations for new track formation designs” (1<sup>st</sup> edition dated 27.04.2007);
- O+R 764/1 “Use of geogrids in the construction of subgrade” (1<sup>st</sup> edition dated 27.04.2007);
- R 765 “Recommendations for the use of geosynthetic materials in the construction of subgrades” (1<sup>st</sup> edition dated 10.11.2021);
- R 775 “Diagnostics of engineering structures” (2<sup>nd</sup> edition dated 22.10.2010);
- R 779 “Recommendations as to terminology ‘Railway bridges’” (2<sup>nd</sup> edition dated 12.10.2012);
- R 786/3 “Requirements for the geometric parameters of rails for the fast-speed and high-speed traffic, including for straightness and control methods” (1<sup>st</sup> edition dated 27.10.2000).

The works were agreed to be continued on the draft Leaflet “Maintenance of rail elements of turnout switches” with the inclusion of the definition of acceptable parameters for performing works, technology and maintenance



*Participants in the final meeting of the OSJD Commission on Infrastructure and Rolling Stock (07-09.11.2023, OSJD Committee)*

tools (leading duty holder – “MAV” Co.), as well as on the information materials on the following subjects:

- “The use of unmanned aerial vehicles (UAVs/ drones) in the supervision of engineering structures” in the format of preparing recommendations for the implementation of unmanned aerial systems technologies on railway infrastructure to carry out comprehensive diagnostics of the condition of the track, crossings, track formation, of the areas endangered by landslides, mudflows, avalanches and rock-fall, of adjacent territory (right of way) and engineer structures” (leading duty holder – “MAV” Co.);
- “Protective structures for railway tracks (protective fences, protective safety nets)” (leading duty holder – ŽSR);
- “Technical conditions for the intersection of utility networks with the railway underground” (leading duty holder – SZ);
- “Assignment of repairs, interrepair periods during the service life of engineering structures (bridges and roadbed)” (leading duty holder – RZD OJSC);
- “The influence of the category of turnout crosspiece (physical and mechanical properties) and the presence of hardening on the operational properties of the crosspiece and its service life” (leading duty holder – RZD OJSC);
- “Non-destructive testing of materials of turnout switches and special (in terms of material structure and geometry) elements of turnout switches” (leading duty holder – “MAV” Co.);
- “Conditions for crossing the railway bridges by rolling stock and determination of the speed of movement depending on the technical condition”.

The final meeting of the Commission agreed to continue the works in the field of updating the following existing OSJD leaflets:

- O+R 771 “Recommendations for the use of high-strength bolts in the construction, main-



***Expert Meeting on the subject “Rolling stock gauges in international traffic, taking into account the requirements for interoperability” (04-06.04.2023, OSJD Committee)***

- maintenance and strengthening of metal bridges” (3<sup>rd</sup> edition dated 01.05.2008);
- O+P 772 “Recommendations for corrosion protection of metal railway bridges” (1<sup>st</sup> edition dated 27.04.2007);
- R 773/11 “Polymer composite underlay under slabs of ballastless bridge deck” (1<sup>st</sup> edition as of 25.10.2018).

The Ukrainian Railways JSC has confirmed its readiness to continue works on updating the existing OSJD leaflets as the leading duty holder, as well as on the material “Repair of metal spans of railway bridges using welding with high-frequency mechanical peening” and the draft Leaflet “Recommendations for the designs of ballastless bridge decks used on railway bridges.”

***In the framework of the subject “Signalling, interlocking and communications networks”, 2 expert meetings were held during 2023: on 10-12 May and an additional one on 17-18 October (OSJD Committee, using the video conferencing mode).***

The final meeting approved the works carried out by the experts in 2023 on this subject, and recommended to continue in 2024 the development of new and updating the existing leaflets, taking into account the modern means of railway automation and telemechanics being introduced, as well as to start works for the development of an innovative railway communication system based on the 4G/5G technology.

The following OSJD leaflets of a recommendatory nature have been approved:

- R 852 “Requirements for power supply devices of microprocessor complexes of railway automation and telemechanics”, 2<sup>nd</sup> edition;
- R 853 “Recommendations for preparing signalling, interlocking and communications devices for the operation in winter conditions”, 2<sup>nd</sup> edition;
- R 863 “Recommendations as to the stowing, installation, operation and maintenance of systems for automatic monitoring of the technical condition of the rolling stock during its movement”, 2<sup>nd</sup> edition.

The following leaflets have been cancelled:

- R 852 “Requirements for power supply devices of microprocessor complexes of railway automation and telemechanics”, 1<sup>st</sup> edition dated 23.10.2009;
- R 853 “Recommendations as to preparing signalling, interlocking and communications devices for operation in winter conditions”, 1<sup>st</sup> edition dated 06.11.2008;
- R 863 “Recommendations as to the placement, installation, operation and maintenance of systems for automatic monitoring of the technical condition of the rolling stock during its movement,” 1<sup>st</sup> edition as of 26.10.2007.

The final meeting of the Commission on Infrastructure and Rolling Stock agreed to continue the works in 2024 on updating the following OSJD leaflets:

- R 808 “Conventional symbol on information display devices for computer systems of signalling, interlocking and communications networks”, 2<sup>nd</sup> edition dated 23.10.2009;
- R 816 “Operational and technical requirements for track circuits used in train traffic control and safety devices”, 1<sup>st</sup> edition as of 30.10.2015.

Within the framework of the subject “**Power supply and power traction equipment**”, an expert meeting was held (7-8 September, OSJD Committee) at which it was recommended to continue in 2024 the development of new and

updating of existing leaflets, taking into account modern technologies and changed operating conditions in regard to the power supply devices.

The OSJD leaflet of a recommendatory nature R 680 “Recommendations on the optimal parameters of alternating current switches for voltages from 6 to 35 kV for railway traction substations, transformer substations and linear devices of the railway traction power supply system” (1<sup>st</sup> edition) was approved. A decision was made to continue the works in 2024 to update the OSJD Leaflet R 600 “Terminology of power supply equipment in the railway branch” Part. I “Power supply”, 1<sup>st</sup> edition dated 31.10.2013.

The issues within the subject “**Rolling stock for railways. Technical requirements as to its elements**” were considered at the expert meetings on subtopics: 5.1 “Locomotives” (25-27 April and 2-3 October in the OSJD Committee using the videoconferencing mode) and subtopic 5.2 “Wagons and coaches” (26-28 September).

The final meeting of the Commission has approved the results of the experts’ work on this subject and recommended that it be continued in 2024. The following leaflets of a recommendatory nature have been approved:

- R 528 “Recommendations for the development of technical requirements for new passenger rolling stock (electric trains/ EMUs) without harmful emissions into the atmosphere” (edition for railways with a track gauge of 1435 mm and 1520 mm), 1<sup>st</sup> edition;
- R 688 “Recommendations for the rational organisation of the use of diagnostics for locomotives in the system of their technical maintenance”, 3<sup>rd</sup> edition.

Meanwhile, the following leaflet has been annulled:

- R 688 “Recommendations for the rational organisation of the use of diagnostics for locomotives in the system of their technical maintenance”, 2<sup>nd</sup> edition dated 6 November 2008.

In 2024, works will be continued to update OSJD Leaflet R 604 “Terminology of electric, diesel and alternative types of traction. Part

II. Traction rolling stock”, 2<sup>nd</sup> edition dated 24.10.2014.

Experts at the meeting on subtopic 5.2 “Wagons and coaches” decided to continue in 2024 their work on updating the following leaflets:

O 514 “Unification of axle box bodies”, 3<sup>rd</sup> edition dated 28.04.2006;

R 514/1 “Unification of axle boxes and rolling bearings of freight wagons for 1520 mm track gauge”, 1<sup>st</sup> edition dated 06.11.2008;

O 514/2 “Solution as to the unification of types and main dimensions of roller antifriction bearings for wagons operating in international traffic”, 2<sup>nd</sup> edition as of 29.04.2005;

O+R 515 “Freight wagons for the chassis with the replacement of wheelsets of one track gauge with wheelsets of track gauge 1435 mm/1520 mm”, 1<sup>st</sup> edition dated 01.01.1999.

In the field of “Migration of joint OSJD/UIC leaflets into draft international technical solutions in the field of railway transport” (International Railway Solutions/IRS), it was noted that the instruction of CGD meeting XXXVII has been fulfilled – the Regulations of the Joint OSJD/UIC Group for the reviewing and converting the OSJD/UIC joint leaflets into draft OSJD/UIC international railway (IRS), which were approved within OSJD, have been sent to the UIC.

Continuation of work on introducing amendments and updates into the draft Leaflet O 517 “Rolling stock gauges” has become possible based on the results of work of ŽSR and “MAV” Co. within the framework of subject No. 1 “**Rolling stock gauges in international traffic, taking into account the requirements for interoperability**”:

- elaboration of a new methodology for assessing existing (operating) rolling stock (RS) in order to determine its suitability for running, as well as recommended parameters for the designed new PS (wagons with replaced wheelsets of 1520/1435-mm track gauges), in interoperable international traffic, running on the OSJD railway sections of 1435-mm track gauge;
- development of new rolling stock gauges with the assignment of designations 1-BM (1435)

and 0-BM (1435) based on dimensions 1-BM and 0-BM, respectively, and introduction of updates and amendments into draft Leaflet O 517.

Preparations for a high-level meeting (“round table”) have been agreed upon:

- on the issue of innovation in infrastructure and rolling stock on all key subjects within the competency of the Commission on Infrastructure and Rolling Stock (“Rolling stock gauges in international traffic, taking into account the requirements for interoperability”, “Railway track and engineer structures”, “Signalling, interlocking and communications networks”, “Power supply and power traction equipment”, “Rolling stock for railways. Technical requirements as to its elements”);
- to create a new standard for railway communications based on the 4G/5G technology.

The final meeting noted the need to improve the work of the Commission and consider the issues of a strategic nature, taking into account the innovation focus for the following reasons:

- because of increased competition from alternative modes of transport, accelerating the pace of their development in the field of advanced technologies, adjustments are urgently required to be made to the activities of the Commission and to update the long-term technical heritage of the OSJD in order to avoid falling behind in the member countries;
- today the need to develop an OSJD document taking into account the innovation focus is dictated by solving the problems of ensuring competitiveness and increasing the efficiency of railway transport, which should take into account the areas of activities of all OSJD Commissions;
- today it is important to give new impetus to the Commission on Infrastructure and Rolling Stock as a fundamental platform, which is the innovative technical “core” of the Organisation; it is important to introduce a systematic approach to the main activities of the Commission – the preparation of recommendations, standards and requirements for infrastructure and rolling stock;
- the Commission shall consider promising and innovative areas, such as modern railway digital radio communications based on the

4G/LTE and 5G technologies, automation and robotisation of the infrastructure maintenance process using artificial intelligence technologies and digital modelling tools/digital twins, digital automatic coupling;

- the specificity of OSJD, which members are a wide variety of countries and railways of the Eurasian region in terms of different climatic conditions, geographical landscape, level of technological development and the enormous extent of railway infrastructure,

creates a high potential for the creation of new promising competitive, universal and inclusive transport products, technologies and services, which will make it possible to obtain a significant synergistic effect by creating new jobs, increasing the level of well-being and prosperity of the population of the countries of the Eurasian region, thus contributing to the achievement of the UN sustainable development goals.

The final meeting considered the topical issue of organising the work for the development of an innovative railway communication system based on the 4G/5G technology at the OSJD platform.

Today, leading railways in many countries around the world have recognised the relevance of using broadband digital radio communications systems. The creation and implementation of a new railway communication system based on the 4G/5G technology will allow railway companies to:

- speed up the transportation of goods and passengers by reducing the downtime of trains being processed at marshalling yards and reducing inter-train intervals, which will provide an additional tangible release of the throughput and carrying capacity of railways;
- improve traffic safety and reduce operating costs;
- improve the quality of service for passengers and customers by creating additional digital



*Working staff of the OSJD Commission on Infrastructure and Rolling Stock during the expert meeting on the sub-topic “Comprehensive diagnostics of the railway track” (21-22.09.2023, OSJD Committee, using the videoconferencing mode)*

services that allow receiving information in real time mode;

- give new impetus to the development of international freight and passenger transportation (including multimodal).

The meeting put forward the proposals for organising works using the OSJD platform to create new railway communications based on the 4G/5G technology: in order to build a systematic approach to the harmonized development and application of broadband digital railway radio communications systems in the OSJD space, it is important to create a separate sub-topic within the framework of subject No. 3 “Signalling, interlocking and communications networks” of the OSJD Commission on Infrastructure and Rolling Stock with the participation of concerned railways of OSJD member countries (with the involvement, if necessary, of developers and manufacturers of telecommunication equipment and scientific research organisations in the communications industry) with the title “Development of an innovative railway communications system based on the 4G/5G technology” with the following concept: “Potential participants in the new subtopic: railway companies from concerned countries (with the involvement, if necessary, of developers and manufacturers of telecommunications equipment and scientific research organisations in the communications industry)”.

Within the framework of the new subtopic it is proposed to:

- achieve an understanding of the situation among partners regarding possible frequency ranges, incl. for the 4G/5G technologies, taking into account national and regional conditions and requirements;
- exchange the results of research and development works;
- develop technical and functional requirements for interconnection within end-to-end transport corridors;
- develop and standardise interfaces and protocols for interaction between on-board equipment, signalling and communications systems, information and control systems, traffic control systems;
- taking into account the complexity of the subject under consideration and the high cost of the technical solutions being developed, which require serious investment and intellectual resources, in the conditions of different levels of innovative and technological development of railway companies, identify leading duty holder on the following issues:
  - development of equipment and functional applications for wireless railway communications of a new generation;
  - development of prototypes of components of infrastructure and on-board equipment;
  - elaboration of specialised applications and services: groups of voice services for railway radio communications and dispatch communications (train radio communications, station radio communications, repair and operational radio communications, operational technological radio communications, dispatch communications, park public address communications, shunting radio communications), incl. dynamic, emergency and other types of calls, a group of traffic control services, a group of monitoring and infrastructure management services, including the Internet of Things;
  - drafting of an information and functional security system, a new generation wireless railway communications control system;
  - compatibility with existing communications networks and telecommunications systems;
- organise and coordinate testing of new

generation wireless railway communication equipment from various manufacturers at industrial testing sites of the railways of the countries concerned;

- organise and coordinate the practical application (testing) of the developed new railway communications standard based on the 4G/5G technology in terms of organising and implementing international freight and passenger transportation (including multimodal).

In the framework of cooperation with the Intergovernmental Organisation for International Carriage by Rail, during the final meeting of the Commission, OTIF representative Dragan Nešić presented to the meeting participants the activities of the Organisation in 2023 and the work within the Committee of Technical Experts (CTE), as well as the priorities and powers of the Department of Technical Compatibility on next period.

The issue of the possibility of creating a Database of Railway Service Facilities of OSJD member countries (RSF DB) was also raised, a presentation on which was made by PWG CI specialist Mario Matta. In particular, he noted that currently there is no single database of service facilities for all OSJD member countries, since in 2019 the UIC informed about the closure of the ENEE database: from mid-2019, the Central Reference Database of RailNet Europe (Central Reference File Database – CRD) performs the corresponding functions of a database of railway service objects, being regional only for EU member countries.

The purpose of creating a database of OSJD service objects would be to create a unified information space within the OSJD to improve the efficiency of work in international transport. Due to the fact that a large number of documents (agreements, treaties, leaflets) are in force within the OSJD framework, and changes to these documents are made at different times, the differences and discrepancies arise that could be eliminated using a unified information base, and contracts, agreements, and leaflets could contain references to this database.

During the discussion of this issue, the majority of the meeting participants supported the possibility of creating an RSF database, however, the final decision on its elaboration shall be made by all OSJD participants. ■