Scientific Student Conference Interoperability of Railway Transport IRICoN 2016

May 4, 2016 Prague, Czech Republic

ORGANISED BY: Faculty of Transportation Sciences Czech Technical University in Prague

SPONSORED BY: Internal Grant Agency CTU SVK 46/16/F6

GUEST EDITORS: Jitka Jírová (Faculty of Transportation Sciences, Czech Technical University in Prague) Jitka Řezníčková (Faculty of Transportation Sciences, Czech Technical University in Prague)

LOCAL ORGANIZING COMITTEE: Vít Fábera Tomáš Brandejský Jitka Jírová Dušan Kamenický Petr Koutecký Jitka Řezníčková Jan Zelenka

SCIENTIFIC COMITTEE:

Tomáš Brandejský (Faculty of Transportation Sciences, Czech Technical University in Prague) Pavel Hrubeš (Faculty of Transportation Sciences, Czech Technical University in Prague) Josef Jíra (Faculty of Transportation Sciences, Czech Technical University in Prague) Zdeněk Kaufmann (TP IŽI — Technology Platform, Interoperability of Railway Infrastructure) Martin Leso (Faculty of Transportation Sciences, Czech Technical University in Prague) Jiří Masopust (Faculty of Transportation Sciences, Czech Technical University in Prague) Jiří Masopust (Faculty of Electrical Engineering, University of West Bohemia) Petr Nachtigall (Jan Perner Transport Faculty, University of Pardubice) Otto Plášek (Faculty of Civil Engineering, Brno University of Technology) Jindřich Sadil (Faculty of Transportation Sciences, Czech Technical University in Prague) Richard Svoboda (Brno University of Technology, Faculty of Civil Engineering) Jaroslav Vašátko (Railway Research Institute, j.s.c., Prague) Martina Vitteková (Faculty of Transportation Sciences, Czech Technical University in Prague)



Book title: Scientific Student Conference INTEROPERABILITY OF RAILWAY TRANSPORT — IRICON 2016. Series title: ACTA POLYTECHNICA CTU PROCEEDINGS. Volume: 5. Date of issue: October 15, 2016. Published by: Czech Technical University in Prague, Zikova 4, 166 36 Praha 6 – Dejvice, Czech Republic. IČ: 68407700. Editorial Office: CTU — Central Library, Technická 6, 160 80 Praha 6, Czech Republic. acta@cvut.cz. Head of the Editorial Board: ZBYNĚK ŠKVOR (CTU in Prague, Czech Republic). Editor-in-chief: IVA ADLEROVÁ (CTU in Prague, Czech Republic). **Editorial Board:** ROBIN ARTHUR HEALEY (Rectorate of CTU in Prague, Dept. of External Affairs, CTU in Prague, Czech Republic), TAŤÁNA JAROŠÍKOVÁ (Faculty of Biomedical Engineering, Dept. of Natural Sciences, CTU in Prague, Czech Republic). MILAN JIRÁSEK (Faculty of Civil Engineering, Dept. of Mechanics, CTU in Prague, Czech Republic), JITKA JÍROVÁ (Faculty of Transportation Sciences, Dept. of Mechanics and Materials, CTU in Prague, Czech Republic), PETR JIZBA (Faculty of Nuclear Sciences and Physical Engineering, Dept. of Physics, CTU in Prague, Czech Republic), PAVEL KALINA (Faculty of Architecture, Dept. of Theory and History of Architecture, CTU in Prague, Czech Republic). ZUZANA MASÁKOVÁ (Faculty of Nuclear Sciences and Physical Engineering, Dept. of Mathematics, CTU in Prague, Czech Republic), JAN PÍCHAL (Faculty of Electrical Engineering, Dept. of Physics, CTU in Prague, Czech Republic), MIROSLAV SÝKORA (Klokner Institute, Dept. of Structural Reliability, CTU in Prague, Czech Republic), RADEK ŠULC (Faculty of Mechanical Engineering, Dept. of Process Engineering, CTU in Prague, Czech Republic). Graphic design and typesetting: TOMÁŠ HEJDA (Faculty of Chemical Engineering, Dept. of Mathematics, University of Chemistry and Technology Prague), JAN REZNÍČEK (Faculty of Information Technology, CTU in Prague, Czech Republic), J. JÍLEK (CTU in Prague, Czech Republic). Available on-line at http://ojs.cvut.cz/ojs/index.php/APP Each article is assigned a digital object identifier doi:10.14311/APP.2016.5. (4-digit article page number) ISSN 2336-5382 ISBN 978-80-01-06022-3 (1st edition) © Czech Technical University in Prague, 2016. Reprinting is allowed only with the agreement of the Editorial Office and with citation of source.

Preface



The papers of the Scientific Student Conference Interoperability of Railway Transport – IRICoN 2016 are concerning new results coming from the project Interoperability of Railway Infrastructure Competence Network (IRICoN) which was coordinated by Technical University in Brno in collaboration with the Technological platform "Interoperability of Railway Infrastructure" and was closed in 2015. The project was supported by the operational programme of the Ministry of Education, Youth and Sports – Education for Competitiveness under the priority axis – Tertiary Education, Research and Development. The aim of the project was to improve the quality of human resources for research and development and improve training of target groups, consist of students and young professionals in the field of interoperability of railway infrastructure. Necessity of the project was supported by the research interests of students and academic staff of technical universities and research institutes.

The project enables to involve young experts in advisory groups for members of the governing organs of the European network interoperability, which was established for the preparation and implementation of the interoperability of the European rail system.

The project has set up expert groups called the Mirror Groups, which reflect the activities of the trans-European rail networks in the areas of: (i) Infrastructure, (ii) Management and Safety, (iii) International Railway Research Board, (iv) Energy, (v) System Solutions and (vi) Research.

Preparing members of the target groups took the form of: (i) traineeships for young researchers at foreign universities or at European institutes aimed in railway interoperability (ii) organizing workshops and training sessions with the participation of domestic and foreign experts, (iii) participation in international conferences on railway transport, (iv) fellowships at leading foreign railway sites, (v) workshops aimed at exchanging the latest information about news in railway transport and (vi) additional training focused on project management in the field of railway research. Besides the aforementioned activities there was created portfolio of complementary activities for the target groups aimed at transfer of technology and improving knowledge in the field of control and legislation in the field of research and development and for evaluation of scientific results.

The aim of our conference is to exchange knowledge and connections of scientific and technical potential of universities, research and design institutes together with professional potential of construction and manufacturing companies to promote innovation in rail services in accordance with the requirements of Technical Specifications for Interoperability trans-European rail system in subsystems of infrastructure, energy and management and safety. An important aim of the conference is also to contribute to higher education and professional qualifications of future graduates master and doctoral studies, which will enable them to participate on the management, coordination and other activities in the area of interoperability of the European rail system.

Otto Plášek for the scientific comittee