

prof. Ing. Jaroslav Smutný, Ph.D. – Ing. Vladimír Tomandl, Ph.D. – prof. Ing. Luboš Pazdera, CSc. – Ing. Petra Lazarová – Ing. Daniela Vukušičová

Akustická analýza kolejových absorbérů na pevné jízdni dráze (Acoustic Analysis of Track Noise Absorbers Applied on Slab Tracks)

This paper deals with an analysis of noise transmission from railway transport to the surrounding environment. A classical track skeleton placed in the ballast bedding with the B91 S/1 transverse monoblock concrete sleepers and the Vossloh W 14 fastening system is compared with the RHEDA 2000 slab track structure with the high resilient rail fastening system “300”. The slab track was evaluated with various BRENS® ABSORBER track noise absorbing systems as well as without them.

Ing. Dobromil Nenutil – Ing. Tomáš Svoboda

Architektura komplexního palubního systému ve vlacích vybavených vlakovou komunikační sítí Ethernet (Architecture of a Comprehensive Onboard System in Trains Equipped with the Ethernet Train Communication Network)

Besides electronic systems inevitable for the actual operation, a modern train contains also numerous systems which support train operation and maintenance and which strive to increase passengers' comfort and security. Many of these systems are integrated into the train information and monitoring systems of the train operator and infrastructure manager. To ensure smooth mutual communication between on-board systems it is necessary to equip rail vehicles with the communication infrastructure that fulfils all their demands on data transmission in terms of both capacity and timeliness. The train communication network based on IP technology and Ethernet and specified by the IEC 61375 standard series (TCN – Train Communication Network) is such a communication infrastructure. The article describes the high-level architecture of an on-board electronic “ecosystem” and the architecture of the TCN that corresponds to it. Next, the TCN characteristic is presented and some of its properties specific for the train environment are described at a detailed level. Furthermore, the article deals with the issues of cybersecurity, the importance of which for on-board systems has increased with the use of IP technologies and Ethernet. This part is dealt with in a more general way and its goal is to provide the reader with basic orientation in the issues of cybersecurity in the railway sector. In its conclusion, the article mentions the innovation topics aimed at the train communication network which are being dealt with in the current projects of the Shift2Rail initiative.

PhDr. Matúš Šucha, Ph.D. – Ing. Ivo Hruban, Ph.D. – doc. Ing. Pavel Drdla, Ph.D. – doc. Ing. Josef Bulíček, Ph.D. – doc. PhDr. Zdeněk Vtípil, CSc.

Dopravně-psychologické posouzení psychické zátěže výpravčích a traťových dispečerů (Transport-psychological Assessment of Mental Strain of Line and Station Train Dispatchers)

Results of the “Psychological Assessment of Mental Strain of Line and Station Train Dispatchers” elaborated for the Railway Infrastructure Administration (SŽDC) are summarised in the paper. The aim is to point out the diversity of work in these jobs (line and station train dispatchers). This diversity arises especially depending on the category of the particular interlocking system applied.

There are mentioned potentially risk aspects as well as potentially protective aspects of mental strain, which were considered as important in the railway stations included in this paper. The level of mental strain is generally evaluated (with some exceptions) as above-average or significant. It is necessary to create appropriate working conditions which do not increase the existing mental strain due to the perceived high responsibility associated with this work.

Ing. Jiří Pohl

Elektrická vozba na železnici a obnovitelné zdroje energie (Electric Traction Vehicles and Renewable Energy Resources)

Transport is a significant consumer of energy, especially of fossil fuels. In the decarbonisation process, mobility is an important tool of the development of rail transport in the field of electric vehicles. It is worth noting that modern electric traction vehicles with regenerative brakes use the principles of renewable resources for train transport. In the case of gradient braking, similar to hydroelectric power plants, they transform potential energy of the mass into electricity. When braking to stop, they convert, like wind turbines, kinetic energy of mass into electricity. An important secondary source of energy is given by its savings. These are obviously achieved on the railways both intramodally, especially when replacing diesel vehicles by electric vehicles, as well as extramodally, when transferring traffic from roads to railways.

Jan Eisenreich

Kolejový absorbér hluku s funkcí retence vody – Ostravská premiéra světové novinky (Track Noise Absorber with a Function of Water Retention – Ostrava Premiere of the World News)

Concerning urban lands, land transport infrastructure construction projects (roads, track systems and other hard-surface areas) represent a significant built-up surface, which determines, in many areas, the nature of the urban climate and therefore the quality of the environment as well. These transport infrastructures together with other urban constructions (buildings, halls etc.) are an important factor of microclimatic changes and arising of heat islands (so-called urban heat islands – UHI). Only the rail transport, i.e. railway or tram transport systems, can provide its built-up surface back

to the life cycle of Earth. By using a new technology of noise and vibration attenuation in the area of the railway construction with added value of rainwater retention and enabling its evaporation, with a possibility of vegetation growth, it is possible to achieve improvement of the environment and microclimate of the urbanised landscape. The article is focused on the implemented application of the BRENS STERED rail noise absorbers with water retention functions on the operated open railway superstructure of a tram line in Ostrava. The paper includes a description of the technical design, method of assembly and maintenance of the railway line and conclusions summarising acoustic efficiency through the measurements carried out. The conclusion of the article provides for technical designs of the projects under preparation for some cities in Europe and North America, as well as possibilities of applications on nation-wide and regional railways in the Czech Republic with tracks featuring a rigid carriageway or conventional ballast bedding.

doc. Dr. Ing. Roman Štěrba

Konkurenční pozice železniční osobní dopravy na přepravním trhu (Competitive Position of Railway Passenger Transport on the Transport Market)

The article compares various parameters of key carriage services on main routes of both domestic and cross-border bus and train passenger transport between Prague as the capital city of the Czech Republic, regional capitals and capital cities of neighbouring states. In addition, it reviews the goals and tools of both the transport and energy policies and offers a view on improvement of the attractiveness and competitiveness of the environment-friendly railway transport on the passenger transport market.

Ing. Petr Nachtigall, Ph.D. – Ing. Erik Tischer

Možnosti zavedení automatického provozu pražského metra B (Possibilities of Introduction of Automated Operation on the Prague Metro Line B)

This article focuses on automated metro operation systems, their basic requirements and functions. There is also a definition of various degrees of automation and a description of differences in functions of individual types. This article gives also a basic overview of functions which are necessary for an automated metro operation system. In the second part, the article provides for an analysis of automated metro systems in the world. The last part deals with various types of interlocking systems for the automated metro operation system, including their basic functions.

doc. Ing. Lukáš Týfa, Ph.D. – Ing. Pavel Purkart

Německý pohled na regionální a městské kolejové systémy jako inspirace pro českou regionální a příměstskou dopravu (A German View of Regional and Urban Rail Systems as an Inspiration for Czech Regional and Suburban Transport)

The article presents interesting German solutions in regional, suburban and urban rail transport systems which may be very inspirational for future development in the Czech Republic. Firstly, the article focuses on light rail systems, especially on mixed operation and dual-system vehicles. It shows an example of a well-developed light rail system in the city of Karlsruhe and its neighbourhood. Secondly, the article deals with issues of the regional rail system in Bavaria and it describes an example of the Viechtach – Gotteszell regional railway line where regular operation has been resumed.

Ing. Miroslav Šídlo

Proces nezávislého posuzování technických změn na železničních subsystémech ve vztahu k procesu řízení rizik (Process of Independent Assessment of Technical Changes in Railway Subsystems in Relation to the Risk Management Process)

The article explains, in a brief, simple and easily comprehensible way, basic procedures applied by the Safety Assessment Entity (“SPB”) in its investigation whose aim is to decide, on the basis of available evidence, whether a system meets safety requirements imposed on railway equipment or not.

Ing. Petr Jindra, Ph.D.

Projekt Inteligentní vůz v prostředí společnosti ČD Cargo, a.s. (Intelligent Wagon Project in Conditions of ČD Cargo, a.s.)

The article summarises the first experience learnt from the pilot testing of technologies used by the project known as “Intelligent Wagon in Conditions of ČD Cargo, a.s.”

Ing. Mgr. Robert Číhal, CSc.

Uplatnění metodik RailTopoModel a BIM při prostorovém popisu železniční sítě (Application of RailTopoModel and BIM Methodologies at Spatial Description of the Railway Network)

The paper describes basic concepts and relationships of the issues referred to in the title and their development. Attention is also paid to comparisons of properties of relevant projects falling into the IS of the Railway Infrastructure Administration from the viewpoint of possibilities of their adapting to the use of the railML® format and accepting the outputs of projects processed with the use of the BIM technology.

*Ing. Vladimír Tomandl, Ph.D. – Ing. Petr Felgr – doc. Mgr. Tomáš Apeltauer, Ph.D. –
Ing. Josef Remeš – Ing. Petr Beneš, CSc.*

**Výstavba a rekonstrukce výpravních budov s ohledem na interoperabilitu
a bezpečnost (Construction and Renovation of Station Buildings with Regard
to Interoperability and Safety)**

The paper reviews main technical requirements imposed on renovations or on newly constructed station buildings, especially the requirements concerning interoperability and safety in the context of protection of soft targets. The design proposed should also take into account practical experience and needs of passengers, including people with reduced mobility. The article mentions also various benefits of the Building Information Modelling process known as BIM.

prof. JUDr. Karel Marek, CSc.

Zadávání veřejných zakázek (Awarding of Public Contracts)

Awarding of public contracts enables suppliers to implement large-scale deliveries. Public contracts account for spending a large part of socially available resources. Public contracts contribute to the arising of relatively stable business relationships with secured financing, and the risk of not obtaining the consideration agreed upon is minimised for contractors who are awarded public contracts. New EU directives and related domestic legal regulations are also intended to contribute to the assurance of transparency and non-discrimination approach in the public procurement process.

Ing. David Vodák

**Zhodnocení variant úprav traťového úseku Veselí nad Lužnicí – Jindřichův
Hradec (Evaluation of Variants for Improvement of the Veselí nad Lužnicí -
Jindřichův Hradec Railway Line)**

The subject matter of the article is to summarise the most interesting conclusions of the diploma thesis “Evaluation of Variants for Improvement of the Veselí nad Lužnicí - Jindřichův Hradec Railway Line”. This thesis tried to find the best possible way of improvement of the railway line section between Veselí nad Lužnicí and Jindřichův Hradec. Two basic variants of upgrade works with appropriate operational concepts were suggested on the basis of the analytical introduction. Particular proposals for upgrade works on the infrastructure were drawn up with regard to them. The proposed operational concepts were applied to the upgraded infrastructure in the conclusion of the dissertation.

doc. Ing. Lukáš Týfa, Ph.D. – Ing. David Vodák

Zkušenosti z přípravy projektu vysokorychlostní trati „High Speed Two“ pro Českou republiku (Experience from Preparation of the High Speed Railway Line Project Known as “High Speed Two” for the Czech Republic)

Preparation of new high speed railway line projects has finally become a reality also in the Czech Republic. High speed railway is one of the few possibilities of how to further improve our railway system, which has reached, after modernisation of the existing railway lines, its quantitative as well as qualitative limits. In this context, it can be really useful to draw inspiration from fresh experience learnt from the High Speed Two (HS2) railway project. The HS2 project should connect London with the north and west of England. Initial parts of the paper are mainly about the railway system in Great Britain and the existing railway line ensuring connection in that route, which is followed by selected particular knowledge implying from the studies searching for the optimum route of the new high speed railway line. At the end the experience gained is commented in such a way that it can be used also for preparation of high speed railway projects in the Czech Republic.

Ing. Josef Zbořil, Ph.D.

Zvyšování životnosti součástí výhybek a výhybkových konstrukcí v trendu Průmyslu 4.0 (Increase in Lifetime of Parts of Points and Point Structures in the Industry 4.0 Trend)

The paper brings a general introduction into the issues of increasing service lifetime of points and point structures in the current trend known as Industry 4.0. It describes examples of foreign good practices and examples of approaches of the Railway Infrastructure Administration, state- organisation, and of DT – Výhybkárna a strojírna, a.s. (DT- Pointworks and Engineering) in the Czech Republic, with its individual parts which are already used. The article describes the reasons and causes of procurement and introduction of the use of modern 2D and 3D scanners in the field of railway infrastructure, with a possibility of conceptual database storage of the data (not limited to the data created by these scanners) for requirements of effective maintenance, reliable, safe and economic operation. The paper informs about the developed system of service books of point structures, as an analogy of Swiss software for point management, known as Rail Cloud, with its links to requirements of Industry 4.0, BIM (Building Information Model), LCC (Life Cycle Costs), PLM (Product Lifecycle Management) and RAMS (Reliability, Availability, Maintainability and Safety) methods.

Tisková zpráva, České dráhy, a.s.

Před 60 lety zahájila Vindobona pravidelný provoz (Vindobona Started Its Operation 60 Years Ago)