CONSOLIDATION OF TECHNICAL, SAFETY AND HUMAN RESOURCES IN EURASIAN RAILWAY TRANSPORT CORRIDORS

Monograph
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The investigation described in this monograph was conducted within the framework of the FP7 project NEAR$^2$ – Network of European-Asian Rail Research Capacities – from 2012 to 2014. One of the main tasks of the NEAR$^2$ project was the creation of 10 concept documents that would map the current situation along the Eurasian Railway land bridge in specific fields of expertise (based on the 10 poles of the European Rail Research Network of Excellence or EURNEX) and define future research needs based on identified gaps in technology and knowledge.

The monograph has been developed within the activities of three NEAR$^2$ working groups (WG): WG6 “Safety and Security”, WG8 “Infrastructure and Signalling,” and WG10 “Training and Education”. So, the content of the monograph is based on the above-mentioned concept documents of the NEAR$^2$ project. The project had multiple aims:

1. To define topics related to railway safety and security that affect the achievement of interoperability and rolling stock operation of the European-Asian railway corridors
2. To identify the problems, needs, gaps, and barriers that exist and degrade the regular rail movement of goods between Europe and Asia
3. To identify future research needs and priorities that will support the formulation of a research agenda for the Eurasian land bridge

The monograph is based on the outcomes of the discussions that took place within the ambit of the NEAR$^2$ project. The monograph serves to bridge the gaps in knowledge and technology in order to improve technical interoperability, traffic safety regulations and risk assessment, and rolling stock maintenance system. It also seeks to analyse railway infrastructure more efficiently and to identify interoperability problems, staff training and educational issues in the railways of the Eurasian countries.

The national rail networks of various Eurasian countries evolved heterogeneously over the past century, and relevant national technical interoperability, safety regulations, and environment protection regulations were put in place, even before relevant international coordination existed.
OVERALL SUMMARY

Three railway systems (geographical regions) were considered in this research work: the first, the railways of the countries in the European Union; the second, the Russian, Ukrainian, and Belarusian railways; and the third, the railways of Asian countries.

The monograph comprises seven chapters dealing with the particularities of rail safety regulation in different countries, technical aspects of safety and interoperability, infrastructure and signaling, rolling stock maintenance problems, locomotive slip and slide control, and training and education in Eurasian Railways.

Scope of the monograph

The present monograph aims at identifying and presenting a framework of actions that will allow the formulation of an appropriate scientific background and partnership that will, in turn, support the creation of a competitive Eurasian railway connection. Thus, the monograph focuses on the following:

1. Network application field, background and problem definition, objectives and study methodology, revealing of integrity of railway safety and interoperability; mapping of the current situation of infrastructure, and signaling; and staff training in Eurasian railways (Chapter 1).
2. Analysis and description of Eurasian railway infrastructure constituents and components: maximum axle load, maximum train length, track gauge, static and dynamic clearance, maximum speed both of passenger and freight trains, variety of traction and signaling systems, particularities of track maintenance (Chapter 2).
3. Comparison analysis of rail safety and security systems in European and Asian countries; problems of traffic safety risk assessment; compatibility of rail safety policies in different Eurasian countries, and harmonization progress of safety policy (Chapter 3).
4. Description of rail safety certification stages and processes in European Union countries; certification time and cost; characterization of certification procedure; single rail vehicle certificate; description of certificate to access railway infrastructure; the authorization of rail rolling stock (Chapter 4).
5. Explanation of technical aspects of railway safety in the Trans-Eurasian landbridge: progress of applying global intelligent systems; rolling stock devices in connection with the trackside system; rolling stock active and passive safety requirements and assessment; rolling stock maintenance quality impact on rail safety; research on locomotive driving wheel slip and slide control systems; modeling of inter-failures of renewed rail vehicle fleet and improvement of locomotive maintenance system (Chapter 5).
6. Railway human resources, training and education issues; verifying the necessity to create the integrated/ harmonized rail education and training system in the
Eurasian space based on international experiences; the rail educational standards, knowledge management tools and principles, e-learing practices (Chapter 6).

7. Overall concluding remarks: identification of future research needs and priorities that will support the formulation of a relevant research agenda for the Eurasian land bridge; identification of common future research projects related to the main topics of the monograph, as well as to the combination of the interests of the Eurasian rail industry and undertakings (Chapter 7).

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