



Safety in Railway Companies

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ABSTRACT

Widely understood safety belongs to important scientific issues and railway safety constitutes a transport development key factor in economy. Provisions of the law, regulations and community law detail the working of railway companies in many areas, also concerning safety. All aspects of safety affect proper functioning of railway companies, infrastructure development, and they also stimulate socio-economic development. The article presents various aspects of safety in railway companies depending on the environment, entities operating in railway environment, interaction between these entities and impact on creating safety postulate.

KEYWORDS: safety, railway companies, human resources management, property management

1. Introduction

Widely understood railway safety belongs to important scientific issues and constitutes a transport development key factor in economy. Ensuring an appropriate level of safety in railway transport makes, that buyers are more likely to use it. Increased demand for rail transport services affects the development of railway infrastructure and stimulates socio-economic development. The article presents various aspects of safety in railway companies depending on the environment, entities operating in railway environment, interaction between these entities and impact on creating safety postulate. The author of the article will try to analyze, what safety in railway transport is and how it is understood and perceived. Determine what and who stakes out the level of safety on the railway and whether employees of railway companies are able to identify safety at their workplace.

Fig. 1 shows what safety in the home, at work and in the surrounding reality can potentially be associated with. Conceptualizations contained in Fig. 1 are comprehensively included in the essence of railway transport safety.

The literature on the subject has many definitions of railway transport safety, which are transferred to the basics of the theory of transport. According to the classic definition cited in dictionaries, safety is the condition of being unthreatened, peace and confidence [1]. In the general sense, safety should be understood as a state of being not in danger [2]. However, the definition that most accurately reflects the character of the issue

of safety in railway transport is used in the aviation industry. It defines safety as a condition in which the possibility of occurrence of damage, among people or property is minimized and remains at an acceptable level or below this level, thanks to a continuous process of risk identification and safety risk management [3]. The above definition indicates that safety in railway transport is multidimensional.

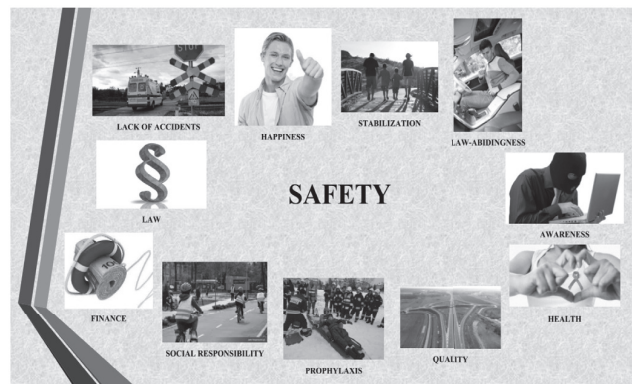


Fig. 1. The essence of safety [own study]

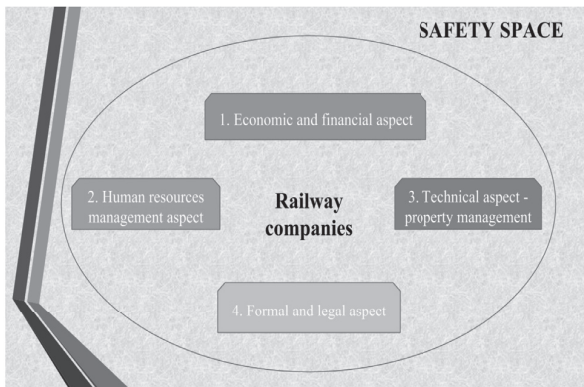


Fig. 2. Safety aspects in railway transport [own study]

2. Formal and legal aspect

Creating the railway transport safety policy in formal and legal terms should be considered from the level of the European Union, which through regulatory instruments sets out the basic directions of actions in the field of systemic solutions regarding railway transport safety. The established EU legal frameworks allow for the creation of structures at each country level, the aim of which is to implement and supervise safety standards.

The entities operating in the surrounding of railway transport include:

- The European Parliament draws up directives and regulations that set the rules for the functioning of safety in railway transport throughout the European Union.
- The European Commission, based on the acts of the European Parliament and the Council of the European Union, specifies the conditions of functioning of the railway by decisions, regulations, recommendations and directives.
- The European Railway Agency (ERA) supports the technical implementation of the Community law aimed at developing a consistent approach to safety in the European railway system guaranteeing high level of safety [4].
- The Ministry of Infrastructure [5] aims to improve the safety of the railway system in the areas of hard activities, including the modernization and revitalization of railway lines, implementation of the European Train Control System (ETCS), soft actions areas related to changes and the development of law acts related to railway safety [6]; the ministry also undertakes initiatives related to the strengthening the role of the Office of Rail Transport and the reconstruction of vocational education; as part of its activities, the ministry has an independent State Railway Accidents Investigation Commission (investigation body), which on the basis of accidents analysis formulates recommendation for the railway market by setting safety standards.
- The Office of Rail Transport acts a regulatory, control and supervisory role in relation to companies operating on the railway market.

Safety Management System (SMS), as defined in [7] directive 2004/49/EC of the European Parliament of 29 April 2004 on

safety on the Community's railways, means the organization and measures adopted by the infrastructure manager or rail carrier to ensure the safe management of the activity conducted by the given entity.

In accordance with the guidelines, the Safety Management System covers all principles developed and implemented for the needs of a given entity (incl. internal regulations, internal procedures, job instructions), which regulate the operation of a given entity in the area of safety (incl. the division of responsibilities - including management responsibility, ensuring the competence for specific tasks, resource management) and enable to organize secure relationships with other entities, including infrastructure managers, carriers and subcontractors [8].

Systematisation of basic EU and internal legal acts regulating safety issues can be presented as follows:

- The European Union acts: directive 2004/49/WE, Commission Regulation (EU) No. 1169/2010, 1158/2010, 1078/2012, 1077/2012, 402/2013
- Internal acts: Transport Act, regulations on SMS in railway transport, on common safety indicators (CSI), on the conditions and procedures for issuing, extending, changing and withdrawing safety authorizations and safety certifications.

The above indicates that the formal and legal aspect constitutes a strong tool in structuring safety in railway transport at the European and national level or all entities functioning in the "railway safety area".

3. Human resource management aspect

Safety in railway transport is closely related to the competences of employees hired in the railway company. Contemporary safety requirements pressure railway entrepreneurs to constantly perfect their staff by cooperating with schools and universities, and by improving their professional qualifications and obtaining appropriate qualifications by employees. This also applies to staff at every organizational level. In SMS structures, there are procedures strictly related to human resources in railway companies. In accordance with the provisions of Directive 2004/49 /EC and the requirements of the relevant regulations (Commission Regulation (EU) No 1158/2010 and Commission Regulation (EU) No 1169/2010), these include:

- Procedures for dividing responsibilities and ensuring control by management at various levels;
- Procedures of employee competence management system [8].

Strong and effective management ensures that objectives related to safety are defined and prioritized (Planning), appropriate practices providing the achievement of safety objectives are implemented (Implementation), the effectiveness of the system is constantly monitored (Testing) and corrective or preventive measures are taken (Modification)[9].

Active involvement of the management, starting from the highest level of the organization, as part of the procedure is carried out by:

- implementation of effective communication system "down" and "up" of the organization,
- creation of effective management structures,

- incorporation of safety management into business decisions.

In the context of the employee competence management system procedures, systemic solutions have a whole lot practical applications. The most important of them are [10]:

- Enriching job descriptions by including a profile of desired competences;
- Improving the recruitment and selection process;
- Assessment of employee potential;
- Assessment of needs from practical point of view;
- Research on the effectiveness of training;
- Building career plans.

Elaborating the specification of the process of hiring, training, preparation and improvement of employees at railway occupations in railway companies is included in the regulation of the Minister of Infrastructure and Economic Development [11]. Under the current provisions, the condition for admitting an employee to work independently on a railway position is to undergo professional training. To undergo such training, a person should meet the following conditions:

- diploma or certificate confirming the required education,
- documents confirming work experience at other railway position,
- an opinion stating the physical and psychological ability to work in a given position, issued by an authorized doctor.

Professional training includes:

- theoretical training,
- job probation,
- practical training,
- trials.

The next stage is passing the practical and theoretical exam, after which the employee obtains the right to practice the profession. Nevertheless, it is the employee's responsibility to obtain authorization, which confirms the practical checking of knowledge and skills required on a given position. The presented above process is really a short version of the whole course of professional preparation at railway occupations. It includes, in accordance with the regulation, the following positions:

- train dispatcher,
- signalman,
- manager of a passenger and goods train (business and working),
- setter,
- maneuver,
- rolling stock auditor,
- automation specialist,
- trackmaster,
- lineman,
- railroad engineer,
- railroad engineer assistant.

In the railway sector, employment is also determined by the health, physical and mental conditions the employees are obligated to fulfill and people hired to work at railway positions. Unfortunately, railway companies admit that there are problems with hiring new people for work - mainly because the candidates do not meet the health requirements. "If there are 120 volunteers for the interview, only 12 get a medical permit to work. These are usually young people. Health problems and related difficulties

in maintaining the staff in good physical condition are the main problems faced by the companies" [12]. An additional factor hindering the preparation of qualified employees is an inadequate, to the expectation of the railway market, educational system in this area. Unfortunately, over the last years, schools and universities with railway profiles have systematically disappeared from the list of educational institutions.

The current activities of the Ministry of Infrastructure and Economic Development are focused on tasks related to the reconstruction of vocational education with a railway profile. The soft activities of the Ministry of Infrastructure also include the development of training competences of Polish State Railways and PKP Intercity by purchasing simulators for the training of employees, e.g. railroad engineers.

Managing human capital in railway companies requires lifelong learning at every level of the organizations. It means an attitude of permanently acquiring and updating knowledge for the purpose of continuous personal, social and professional development [13]. In the era of knowledge-based economy, lifelong learning creates a person characterized by creative and dynamic attitude to life and culture, a person, who can change living conditions to improve them to for the common good [14]. Managing human capital in modern railway companies based on safety, should adapt people to modern procedures, the functioning of modern railway in the maze of ever-changing regulations, meeting formal safety requirements controlled by the Office of Rail Transport and creating a broadly understood safety culture.

4. Technical aspect - property management

In accordance with the legislation, the railway infrastructure is created by the following elements, provide that they form part of a railway line, railway siding or other railway track, or are intended to manage them, transport people or goods, or maintain [15]:

- railway tracks, including interchanges and crossings of rails and rails included in them;
- turntables and traversers;
- roadbed, in particular embankments and dikes;
- engineering objects;
- interlocks, railway traffic control devices, including safety, signaling, and communication devices on the route;
- platforms with infrastructure enabling passengers to reach them;
- freight ramps, including freight terminals, along with lines of supply for public roads;
- technological roads and pathways along the tracks;
- railroad crossings and pathways along tracks;
- lighting systems for railway traffics and safety purposes;
- electrical energy conversion and distribution devices for traction power supply purposes;
- lands marked as cadastral parcels, on which there are elements listed in above points.

In terms of the length of tracks in EU railway statistics, Poland is one of the leaders. Relatively large rail network results from the

fact of a large area of the country, its central location in Europe and very good topographical conditions for the construction of railway lines. However, in terms of quality, infrastructure in Poland is not among the leaders of Europe. In the 20th century, the quality of railway infrastructure in Poland underwent systematic degradation. Only Poland's entry into the European Union has resulted in launching EU funds for the modernization of rail networks in Poland. Nowadays, the role of rail transport in integrated transport system of the country is a strategic task. To that end, it is necessary to make a move that will increase competitiveness of the railway in relation to other types of transport, measured by travel time, travel comfort and safety level. This task will be pursued by investments, organizational and technological improvements and changes in the professional activity of railwaymen. In January 2013 the Council of Ministers adopted a resolution "Strategy for the development of transport up to 2020" (with a prospect until 2030). The document sets out the most important directions of activity in context of increasing territorial accessibility, improving the safety of road users and transport efficiency by creating a coherent, sustainable and user-friendly transport system in the national and European dimension. For passengers, travel comfort is also important - modern and comfortable rolling stock, renovated stations and technical condition of railway infrastructure, which has an impact on an important element of competitiveness - punctuality [16].

The PKP SA Group, the largest player on the Polish railway market for the modernization of railway stations, railway lines and rolling stocks, in accordance with the National Rail Program in 2014-2023 assumes total expenditures in the amount of PLN 67.5 billion, including in 2016 PLN 7.1 billion, in 2017 PLN 6.2 billion, and in 2018 PLN 9.6 billion. PKP PLK - the largest railway lines manager - provides for modernization of 3000 railroad switches and almost 1200 railroad crossings [17].

An important element in property management is also the adaptation of the railway infrastructure for freight transport. For example, in 2014, the commercial speed (the ratio of distance traveled by train between two points of the road to the total times of rides and stops) for rail freight services in Poland was 23 km/h. For comparison, in Germany the average speed is 50 km/h. Disappointing condition of railway infrastructure and "bottlenecks" for Polish freight carriers is a problem which hinders not only the arranging of train schedules, but also prompt delivery of cargo to the customer. Examples of "bottlenecks" include single-track sections of lines or lines with a high level of mixed traffic, i.e. passenger and freight traffic. Some restrictions are also controversial, such as limitation related to length of freight trains and reduction of axle loads due to poor infrastructure condition [18].

When analyzing the area of property management, it is also important to refer to the SMS. The procedures force on the railway companies to carry out appropriate infrastructure and rolling stock analyzes. The analyzes must cover, i.a. the following issues: railway, power supply, steerage and rolling stock [19].

5. Economic and financial aspect

The following groups of entities (in various range) are involved in ensuring safety in railway transport:

- Railroad carriers,
- Infrastructure managers,
- Siding users,
- Entities in charge of maintenance,
- Rolling stock manufacturers,
- Maintenance workshops.

They are obligated to apply safety-related procedures and to carry out risk assessments related to the process they perform for rail transport [20].

The effect of the above is to bear the cost in the following areas:

- railway traffic control (railway traffic operation) - this is the task of ensuring the safety of moving vehicles on the railway network and ensuring the required efficiency of these vehicles in a technically and economically justified manner [21];
- ongoing maintenance, renovation, modernization and investment in railway infrastructure, i.e. permanent way, railway traffic control devices, engineering structures, buildings, contact system, communication and lightning;
- ongoing maintenance, renovation, modernization and investment in rolling stock;
- utilities supply;
- material logistics.

The implementation of tasks in the above mentioned areas constitute the highest level of costs for railway companies in the total costs of company. Due to above, railway companies have the possibility, based on appropriate regulations, to raise funds and subsidies for the implementation of the tasks mentioned above. It is significant that all entrepreneurs undertake many initiatives, which follow the ideas of the National Development Strategy 2020 (so-called 2nd strategic area - a competitive economy) which the basic assumptions are reflected in the Transport Development Strategy until 2020.

An important aspect of the costs incurred by railway companies is also the fact, that all equipment used to carry out maintenance and traffic tasks, in accordance with the regulations, must have "type approval certificates". The procedures for producers to obtain certain certificates, conferred by the President of the Office of Rail Transport, significantly affect the price level of all these products.

There are many other issues related to the proper functioning of railway entities, which can and should be subject to analyzes and deliberations in the economic and financial aspect. These topics relate to, i.e. the model of unit rates for the provision of railway infrastructure or the issue of exemptions of railway infrastructure from perpetual usufruct fees and real estate tax.

According to the above, there are many aspects and different conditions of safety in railway transport. The author of the article has tried to sort out the issues in the basic scope, which are presented in Fig. 3.

Each of these aspects is shaped by the functioning of various entities in micro and macro environment of the railway companies creating a "railway safety space". These entities, through their mutual

influence, determine the level of safety in railway transport, indicating potential risks, threats and areas for improvement.

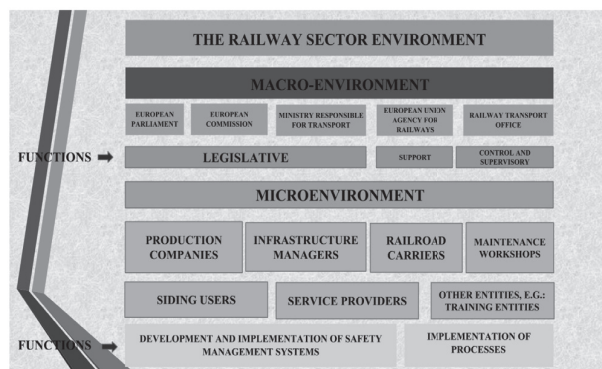


Fig. 3. Entities operating in the micro and macro environment of the railway sector environment [own study]

6. Conclusion

Safety is an important element conditioning the proper functioning of rail transport. The macro and micro entities of the railway sector's environment shape its level of security. The railway safety space is created by the following aspects: economic and financial, human capital management, technical and formal-legal.

Bibliography

- [1] ARNOLD A.: Słownik języka polskiego. Bielsko-Biała: Wydawnictwo Park Sp. z o.o., 2007),
- [2] ZIĘBA R.: Pojęcie i istota bezpieczeństwa państwa w stosunkach międzynarodowych. Sprawy Międzynarodowe, nr10, 1989
- [3] http://cl.pwszchelm.pl/index.php?option=com_content&view=article&id=117&Itemid=87 [date of access 20.04.2018]
- [4] REGULATION (EC) No 881/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 establishing a European Railway Agency (Agency Regulation)
- [5] Regulation of the Council of Ministers of January 23, 2018 on the creation of the Ministry of Infrastructure, Minister of Infrastructure heads the departments of government administration in the field of communication and transport.
- [6] <http://mi.gov.pl/2-Bezpieczenstwonakolei.htm> [date of access 20.04.2018]
- [7] The Rail Transport Act, consolidated text based on: Dz. U. of 2017 item 2117, 2361, from 2018, item 650
- [8] <https://www.utk.gov.pl/pl/bezpieczenstwo-systemy/zarzadzanie-bezpieczen/system-zarzadzania-bezpieczenstwem.html> [date of access 20.04.2018]
- [9] European Railway Agency (2010), A Guide to the Development and Implementation of a Safety Management System for Railway Undertakings and Infrastructure Managers for the Implementation of a Safety Management System in Accordance with Art. 9 of Directive 2004/49 / EC and its Annex III, France: European Railway Agency.
- [10] <http://forfuture.eu/x.php/1,22/System-Zarzadzania-Kompetencjami.html> [date of access 20.04.2018]
- [11] Regulation of the Minister of Infrastructure and Development of 30 December 2014 on employees employed in positions directly related to the conduct and safety of railway traffic and the operation of specific types of railway vehicles pursuant to art. 22d ust. 3 of the Act of 28 March 2003 on railway transport (Journal of Laws of 2013, item 1594, as amended)
- [12] <https://kurierkolejowy.eu/aktualnosci/30731/pkp-cargo-brakuje-nam-rak-do-pracy.html> [date of access 20.04.2018].
- [13] SUCHODOLSKI B.: Edukacja permanentna. Rozdroża i nadzieje. Warszawa: Wydawnictwo Towarzystwa Wolnej Wszechnicy Polskiej, 2003
- [14] BEDNARCZYK H.: Wokół problemów kształcenia ustawicznego. Warszawa-Radom: Wydawnictwo Instytutu Technologii Eksploatacji, 1999
- [15] <https://www.utk.gov.pl/pl/dostep-do-infrastruktur/dostep-do-infrastruktury/zarzadzanie-infrastruktury/11622,Zarzadzanie-infrastruktura-kolejowa.html> [date of access 20.04.2018]
- [16] http://www.kolejnictwo-polskie.pl/default_014.html [date of access 20.04.2018]
- [17] <https://www.bankier.pl/wiadomosc/Prezes-PKP-PLK-Wydatki-inwestycyjne-w-17-wyniosa-ok-5-7-mln-zl-3618248.html> [date of access 20.04.2018]
- [18] http://www.kolejnictwo-polskie.pl/default_014.html [date of access 20.04.2018]
- [19] PAWLIK M.: Systemy zarządzania bezpieczeństwem zarządców infrastruktury i przewoźników kolejowych. Technika Transportu Szynowego, 11/2007
- [20] SITARZ M., CHRUZIK K., WACHNIK A.: Zintegrowany system zarządzania bezpieczeństwem w transporcie kolejowym. Integracja systemów zarządzania. Technika Transportu Szynowego, 1-2/2012
- [21] DĄBROWA-BAJON M.: Podstawy sterowania ruchem kolejowym. Warszawa: Oficyna Wydawnicza Politechniki Warszawskiej, 2002