



# The efficient management of railway sidings in terms of a safety criterion – selected aspects

**A. JABŁOŃSKI**

OTTIMA PLUS SP. Z O.O., Południowy Klaster kolejowy, 40-594 Katowice, ul. Gallusa 12  
EMAIL: adam.jablonski@ottima-plus.com.pl

## **ABSTRACT**

The dynamics of the changes in the railway sector requires a system approach. Adopted management mechanisms are created by new regulations, for example a new Directive of the European Parliament and the Council 2012/34 / EU of 21 November 2012. New law presents a new categorization of railway sidings and proposes their way of functioning in terms of a safety criterion. Ensuring the supply chain with regard to safety is determined by specific operating rules on the railway sidings. At the same time this requires intensified supervision of the railway sidings, especially in the case of rail events. A railway siding is a very important component of the rail system and a railway siding user is a special case of an infrastructure manager. The aim of this article is to present the selected aspects of the efficient management of railway sidings in terms of a safety criterion. The scope of this article includes the issue of railway siding management in the context of a new division of railway infrastructure arising from changes in legislation.

**KEYWORDS:** Safety, railway siding, management

## **1. Introduction**

The dynamics of the changes in the railway sector requires a system approach. Adopted management mechanisms are created by new regulations, for example a new Directive of the European Parliament and the Council 2012/34 / EU of 21 November 2012 on establishing a single European railway area (O.J. EU L 343, 14.12.2012, p. 32). At the same time a new, the required categorization of railway sidings changes their way of functioning in terms of a safety criterion. This also requires the intensified supervision of sidings, especially in the case of possible occurrence of rail events. At the same time a new division of railway infrastructure has appeared.

A railway siding is thus railway infrastructure and a railway siding user is a special case of an infrastructure manager.

In such an approach, the business model of a railway siding and its operationalization is particularly important in organizational, operational and technical terms, taking into account safety criteria. The aim of this article is to present the selected aspects of the efficient

management of railway sidings in terms of a safety criterion. The scope of this article includes the issue of railway siding management in the context of a new division of railway infrastructure arising from changes in legislation.

## **2. Implementation of the EU Directive 2012/34 on the creation of a single railway area - amendment to the Act on rail transport**

The modern principles of rail transport operation are based on the mechanisms of risk and safety management in rail transport. Every decision is burdened with some kind of risk, hence the concept of risk begins to set a new dimension of railway undertakings management. It is important to approach risk in rail business analytics in a

systemic way, so as to make it an indispensable factor influencing the organizational behaviour of managers in railway undertakings. Then business analytics enables management supported by forecasting and planning processes, based on the mutual synthesis of cause and effect relationships [2]. In this context, the Directive of the European Parliament and the Council 2012/34 / EU of 21 November 2012 [3] on establishing a single European railway area is to standardize the provisions contained in the three directives on the development of the railway sector, the issuance of licenses and capacity allocation and charging principles, which have been significantly altered. The primary objectives of the new Directive is to increase the integration of rail transport in the European Union, to intensify rail freight and passenger services and increase the efficiency and competitiveness of railways compared to other forms of transport. The main areas regulated by the Act refer to the separation of infrastructure management from transport, financing infrastructure managers, licensing railway undertakings, the principles of charging for access to infrastructure and capacity allocation, independence and the functions of a regulatory body and access to services for railway undertakings. A new definition of railway infrastructure has appeared. In new regulations, the definition of railway infrastructure has been changed. The definition of infrastructure is uniform with the definition in the Directive 2012/34 / EU. Reference to the new Addendum I to the Act has been made, which defines the components of railway infrastructure in a more structured way than the Directive.

Railway infrastructure consists of the following components, provided that they form part of a railway line, siding or other railroad, or are designed to be managed, transport things or people, or maintained:

1. railway tracks, including turnouts and crossings and their constituent rails, grooved rails, steering wheels, rub rails, tracks, switches, crossings and other elements of turnouts, sleepers and fastenings, small parts of a railway track, ballast, including rubble and sand;
2. turntables and traversers;
3. control centres, railway traffic control devices, including security, signalling and communications devices on railway routes, in stations and in marshalling yards, devices for generating, transforming and distributing electric current for signalling and communications; buildings for such installations or devices; trackside control devices for a safe ride of trains and detecting failures in passing rolling stock; retarders; equipment for heating turnouts;
4. engineering structures: bridges, viaducts, culverts and other bridge structures, tunnels, passes over and under tracks, retaining walls and strengthening of slopes;
5. platforms including the infrastructure enabling passengers to reach them on foot or by vehicle, from a public road or a railway station;
6. freight ramps, including those in freight terminals, along with freight delivery and pick-up roads to and from public roads;
7. technological roads and walkways along tracks, enclosure walls, hedges, fences, firebreaks, and snow screens;
8. rail-road crossings and railway level crossings, including devices and systems to ensure the safety of road traffic and pedestrians;
9. lighting installations for rail traffic and safety;
10. devices for processing and distributing electricity for traction power supply: sub-stations, power supply cables between sub-stations and contact wires, overhead contact lines along with supporting structures such as catenary masts, and the third rail with supporting structures;
11. land, marked as record parcels, where the items listed in Sections 1-11 are located [8].

According to a new division, railway infrastructure is divided into a railroad, railway line, railway siding, private infrastructure and service infrastructure facilities. According to the new law, a railway siding is a railroad designated by the infrastructure manager, connected directly or indirectly with a railway line, used for loading, maintenance or parking activities, or moving railway vehicles and entering them into traffic on the rail network. It should be noted that only maneuvers are possible at the railway siding. A railway siding is railway infrastructure and its user is a special case of an infrastructure manager. A railway siding user is an infrastructure manager who manages only a railway siding and not other railroads [7]. An applicant is a new entity in the process of making railway infrastructure available. An applicant is a railway undertaking, an international grouping of economic interests, including railway undertakings or other entities interested in obtaining railway infrastructure capacity, in particular the organizer of public rail transport, freight forwarder, and the shipper or operator of combined transport.

### 3. Preparation of the railway network charter as a new duty of a service infrastructure manager

According to the new Act on railway transport, within one year of the day the Act entered into force, a manager is obliged to draw up a railway charter defining railway lines, railway sidings and other railways that he manages, as well as specifying which of them are disused or private infrastructure. The manager also includes information about railway infrastructure components belonging to the railway line, which are managed by another manager. No railway network charter means that the manager decides that the railway infrastructure managed is disused. The Act provides for a penalty if there is no charter, if the railway network is used only for its own needs. Establishing a railway line, a manager specifies railway infrastructure components included in it, the starting and end points and stations belonging to it, the sections the line is divided into, and the number of lines. A railway siding is established by defining its elements. It is made available to railway undertakings on a non-discriminatory basis under Chapter 6 of the Act. A railway siding is railway infrastructure. A railway siding user is a special case of an infrastructure manager. In many cases, access to a service infrastructure facility is at the railway siding. A new definition of railway infrastructure capacity does not associate this concept only with a train ride. Railway infrastructure capacity can be allocated to an applicant also for maneuvers or rail vehicles stops. The obligations to make infrastructure available do not apply to private infrastructure. A public railway siding includes the

railway siding that is an access road to a service infrastructure facility. The manager is obliged to make a railway siding available to each applicant under the terms set out in the Act. The manager prepares: a network charter, network rules, pricing charges for access to railway infrastructure (the principle of direct cost), a draft agreement on making railway infrastructure available, a draft agreement on the use of railway infrastructure capacity, and procedures for resolving disputes related to the allocation of capacity. Real estate included in the railway siding are exempt from real estate tax and fee for perpetual use. A railway undertaking cannot be a public railway siding manager. A manager makes a private railway siding available only to such railway undertakings that carry out transportation for the needs of the railway siding owner or manager. A manager covers the costs of transportation (he commissions transportation to railway undertakings). A manager draws up the railway network charter. Real estate included in the railway siding is not subject to tax exemptions. A railway undertaking can be a manager of a private siding. It is not allowed to operate a rail service on the disused railway siding. Real estate included in the railway siding is not subject to tax exemptions. A railway undertaking can be a manager of a disused railway siding. The following are the possible options of the functioning of a railway siding in light of the new legislation, according to the assumptions:

1. A railway siding subject to availability
2. A service infrastructure facility
3. Private infrastructure is shown in Fig.1.

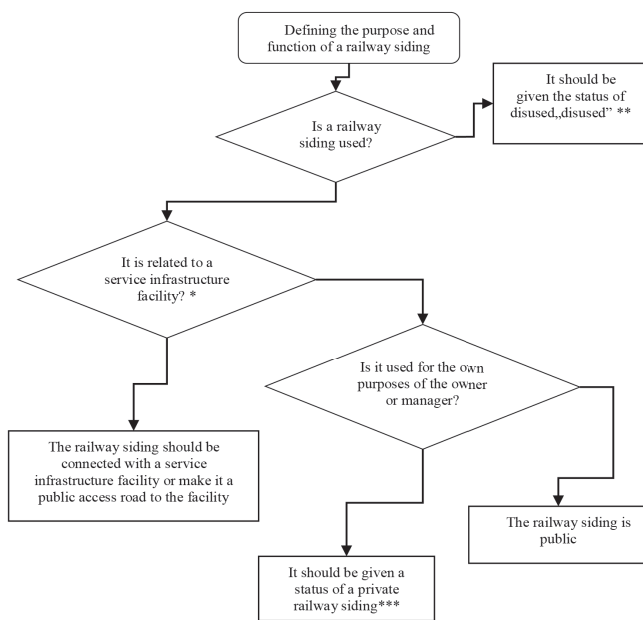


Fig. 1. Possible options of the functioning of the railway siding in light of the new legislation [own study]

In the options presented, a railway siding user develops a draft pricing list specifying, among others, the manner of determining the unit basic rate or a system of charging for access, and a network charter. The user of a service infrastructure facility develops the rules of access to the facility, referred to as “Facility regulations” and the charter of the facility. A private infrastructure user requires the extension of provisions in the Work Rules of the Railway Siding on

the status of private infrastructure and reporting changes to the President of the Rail Transport Authority (UTK).

#### 4. New requirements related to the procedure for dealing with accidents at railway sidings

The Regulation of the Minister of Infrastructure and Construction of 16 March 2016. [4] on serious accidents, accidents and incidents in rail transport (Journal of Laws 2016 Item 369) changes the conditions of safety management at the railway sidings. A key change is an obligation to report serious accidents to the State Railway Accidents Investigation Commission. It should be noted that the Regulation of the Minister of Transport of 30 April 2007 on serious accidents, accidents and incidents on railway lines (Journal of Laws 2007, No. 89 item. 593) [5], considered repealed, indicated no obligation to report serious accidents to the State Railway Accidents Investigation Commission by railway siding users. The Regulation of the Minister of Infrastructure and Construction of 16 March 2016 on serious accidents, accidents and incidents in rail transport (Journal of Laws 2016 Item 369) requires the reporting of events that took place on the user’s “railway siding tracks” (i.e. those on which in-house transport is not run). The Regulation (Journal of Laws 2016 Item 369) defines how to notify of serious accidents, accidents and incidents, appoint a railway commission chairman and conduct the proceedings and how railway commissions should work. Pursuant to the new regulation, a threat is within the meaning of Art. 3 Section 13 of Regulation No 402/2013 [6]. A threat means a condition that could lead to an accident. This event is a serious accident, an accident or incident. An incident is any occurrence other than an accident or a serious accident, associated with rail traffic and affecting its safety. According to the Regulation, an accident is an unintended sudden event or a sequence of such events involving a railway vehicle, resulting in adverse consequences for human health, property or the environment; accidents include, in particular:

- collisions,
- derailment,
- events at level crossings,
- events involving persons, caused by a rail vehicle in motion,
- railway vehicle fire.

To the Regulation, a serious accident is any accident caused by a collision, derailment or other event having an obvious impact on railway safety or safety management:

- with at least one fatality or at least five people injured, or
- causing significant damage to a railway vehicle, railway infrastructure or the environment, which can be immediately assessed by the commission investigating the accident as at least two million- euro damage [4].

A railway siding user is obliged to notify of a serious accident, accident and incident involving in-house transport vehicles to the Commission and the President of the Railway Transport Authority in a situation when:

- an event takes place on “railway siding tracks” of the user (i.e. those on which in-house transport is not run);
- an event had an impact on railway siding infrastructure or a siding employee was involved in it.

According to the Regulation, a railway commission is a person or group of persons conducting the proceedings in the case of an accident or incident, and is composed, in particular, of representatives of an infrastructure manager, a railway undertaking or a railway siding user, whose workers or railway vehicles were involved in the accident or incident, or whose infrastructure is related to them. The manager of the organizational unit of an infrastructure manager, a railway siding user or a railway undertaking involved in rail transport makes the list of persons authorized to participate in the work of the railway commission. According to the Regulation, the members of a railway commission to investigate an accident or incident are appointed by the manager of the organizational unit of an infrastructure manager, a railway siding user or a railway undertaking involved in rail transport, competent for the place and nature of the accident or incident, whose workers or railway vehicles were involved in an accident or incident, or whose infrastructure was related to them. The railway commission consists of the necessary number of members to ensure the fair and efficient conduct of the proceedings. The type and scope of activities performed by the railway commission and the conduct of proceedings are determined by the railway commission chairman on its own initiative or upon the presentation of proposals by commission members.

When making decisions, a railway commission chairman takes into account:

- the effects and circumstances of the accident or incident;
- the opinions of railway commission members;
- the need to gather the necessary evidence and make an investigation in order to reliably determine the causes of the accident or incident and the need to restore normal rail traffic as soon as possible at the site of the accident or incident.

## 5. The operationalization of a railway siding business model in terms of a safety criterion

In order to effectively manage railway sidings in terms of a safety criterion, it is necessary to determine essential activities that should be conducted, taking into account the organizational, operational and technical aspects. It also refers to the mechanisms of change management, pursuant to the Regulation 402/2013. The examples of various changes which the requirements based on the Polish experience may apply to include:

- Technical changes (the modernization of railway traffic control devices - replacing relay devices with digital ones, the modernization of rolling stock construction, reconstruction of railway lines).
- Operating changes: (change in service-repair cycles of rolling stock, changing rules of organizing railway traffic).

Organizational change (outsourcing of train dispatchers, the acquisition of railway infrastructure maintenance processes by external companies based on their original approach) [1]. This can also be interpreted for the needs of efficient railway siding management.

Table 1 below presents organizational activities at the railway siding in terms of a safety criterion.

**Table 1. Organizational activities at the railway siding in terms of a safety criterion [own study]**

No.	Activities
<b>Defining the optimum status of the rail network</b>	
1.	Showing a model of railway siding operation and maintenance, in accordance with changes in the railway law, effective since 29 December 2016. Models should contain possible layouts of the status of railroads forming sidings, including the creation of areas that meet the requirements for rail transport.
2.	Developing the complete documentation on railway siding safety, in particular the documentation including: the conditions of rail traffic operation and signalling; railroad infrastructure maintenance conditions, rail traffic control and communications devices; the rules of operating railway crossings; the rules of conduct at the railway transport of hazardous materials; the rules of conduct in the event of rail accidents and events; instructions for riding trains or railway vehicles only within the railway siding and acquiring the necessary instructions on the maintenance of traffic control devices.
3.	Developing the Work Rules of Railway Sidings with updated schematic plans of railway sidings with the development of: <ul style="list-style-type: none"> <li>• the rules of work and cooperation of railway sidings with railroads and railway infrastructure that have different status;</li> <li>• the rules of service infrastructure facilities;</li> <li>• price lists for making such infrastructure and service infrastructure facilities available;</li> </ul> • determining the Work Rules of Railway Sidings with the managers of the non-railway infrastructure connected with railway infrastructure; <ul style="list-style-type: none"> <li>• submitting all necessary applications to the competent authorities</li> <li>• support in the process of obtaining necessary administrative decisions in the course of application proceeding by the Railway Transport Authority</li> </ul>

Table 2 below presents maintenance activities at the railway siding in terms of a safety criterion.

**Table 2. Maintenance activities at the railway siding in terms of a safety criterion [own study]**

No.	Activities
1.	Conducting audits twice a year (spring/summer, autumn/winter) reviewing railway siding management. Checking the correctness of activities performed by organizations involved in the operation of a railway siding, i.e. traffic technique, vehicles, staff competencies, and infrastructure maintenance.
2.	Representing the company before the State Railway Accidents Investigation Commission by an appointed representative
3.	Introducing periodic reporting on accidents at railway sidings



4.	Acting as a railway siding coordinator on constant standby, which involves monitoring of the legal area in order to seek changes and propose making specific modification of internal rules or the work rules of the railway siding. Conducting training once a year on legal aspects related to the functioning of a railway siding. The thematic scope of training will include, first of all, accidents, legal aspects and a rail system.
5.	Cooperation with or supervision of the work of the railway commission when an event occurs.
6.	Ad hoc inspection (at least quarterly) of the functionality of railway siding operation

Poniżej w tabeli 3. zdefiniowano czynności techniczne na bocznicy kolejowej w kryterium bezpieczeństwa. Table 3 below presents technical activities at the railway siding in terms of a safety criterion.

**Table 3. Technical activities at the railway siding in terms of a safety criterion [own study]**

No,	Activities
1.	As regards railway traffic control: <ul style="list-style-type: none"> <li>• Performing necessary maintenance tasks</li> <li>• Arising from the internal regulations of PKP Polskie Linie Kolejowe S.A.</li> <li>• Systematic supervision of the efficiency of railway traffic control devices</li> <li>• Keeping maintenance- repair records</li> <li>• Performing overhauls in accordance with applicable Construction Law</li> </ul>
2.	As regards railroads: <ul style="list-style-type: none"> <li>• Performing an overhaul in accordance with Construction Law (once a year) – a track system and a level crossing</li> <li>• Inspecting turnouts and tracks (twice a month)</li> <li>• Keeping the documentation reporting the tasks performed</li> </ul>
3.	As regards manoeuvres: <ul style="list-style-type: none"> <li>• Checking the visibility of signals and indicators on the railway siding twice a year</li> </ul>
4.	General: <ul style="list-style-type: none"> <li>• on the technical condition of the railway siding</li> <li>• Reporting non-compliance</li> <li>• Representation before the Railway Transport Authority</li> </ul>
5.	24-hour emergency service: <ul style="list-style-type: none"> <li>• removing the failures of traffic control devices and railway tracks located at the railway siding</li> </ul>

The above tables present the proposal for the operationalization of an effective business model of a railway siding in terms of a safety criterion. The typology is consistent with the Regulation 402/2013 and therefore refers to the common safety methods. Such a multi-dimensional approach can ensure the ability of a railway siding to perform its basic functions while ensuring an acceptable level of railway safety.

## 6. Conclusion

The dynamics of changes in the railway sector in the legal dimension determines the development of new organizational, operational and technical solutions, which must be systemic and multidimensional. To do this, it is necessary to look at railway sidings from many perspectives. The implementation of new measures aimed at the operationalization of a railway siding business model is of particular importance here. The article presents the assumptions of the new Directive 2012/34 EU on the creation of a single railway area – an amendment to the Act on railway transport with a discussion of the key definitions. A new aspect of railway siding management aimed at meeting safety requirements has also been presented.

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