Pursuant to Article 6 paragraph 5 of the Railway Safety and Interoperability Law (ˮOfficial Gazette of the RSˮ, No 41/18),

the director of the Directorate for Railways has adopted

Rulebook on common safety indicators in railway traffic

The rulebook was published in the „Official Gazette of the RS“, No 25/2019 of 3.4.2019 and it entered into force on 11.4.2019.

Article 1

This Regulation prescribes common safety indicators based on which the railway infrastructure manager and the railway undertaking develop their annual safety report, as well as the common methods for calculating the economic consequences of accidents in railway traffic.

Article 2

Terms used in this Regulation shall have the following meanings:

1) *active level crossing*  is a level crossing where the crossing users are protected from or warned of the approaching train by devices activated when it is unsafe for the user to traverse the crossing;

2) *train kilometre* means the unit of measure representing the movement of a train over one kilometre; the distance used represents distance actually run, if available, otherwise the standard network distance between the origin and destination shall be used on the railway network of the Republic of Serbia;

3) *the value of preventing a casualty* is a value attributed to reducing the risk of deaths and serious injuries in the transport sector and which is not a basis for reimbursement of expenses between the parties involved in the accident;

4) *employees and contractor* means any person whose employment is in connection with a railway and is at work at the time of the accident, including the staff of contractors, self-employed contractors, the crew of the train and persons handling tolling stock and infrastructure installations;

5) *significant accident* means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to rolling stock, railway infrastructure or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots;

6) *a significant disruption in the rail transport* is the interruption of traffic on the main railway lines for six or more hours;

7) *significant damage* is damage to railway vehicles, infrastructure or the environment in the amount of at least EUR 150,000 in RSD equivalent;

8) *track buckle or other track misalignment* means any fault related to the continuum and the geometry of track requiring track to be placed out of service or immediate restriction of permitted speed;

9) *derailment of train* means any case in which at least one wheel of the train leaves the rails;

10) *track kilometres* means the length of the railway network of the Republic of Serbia, taking into account each track of a multiple-track railway line;

11) *level crossing user* means any person using a level crossing to cross the railway line by any means of transport or by foot;

12) *trespasser* means any person present on railway area whose presence is forbidden, with the exception of a level crossing user ;

13) *accident* means any unwanted or unplanned sudden event or a specific set of such events that has harmful consequences (collisions, derailment, level crossing accident, accidents involving persons caused by rolling stock in motion, fire, etc.);

14) *accident involving the transport of dangerous goods* means any accident or incident that is subject to reporting in accordance to the Convention on international carriage by rail (COTIF), Appendix C – Regulation on International Carriage of Dangerous Goods By Rail (hereinafter referred to as: RID) (“Official Gazette of the RS – International treaties”, No 7/17) or in accordance with the European Agreement on the International Carriage of Dangerous Goods by Road (ADR) (“Official Gazette of the RS – International treaties”, No 14/13, 2/14 and 6/17);

15) *level crossing accident* means any accident at level crossings involving at least one railway vehicle and one or more crossing road vehicles, other crossing users such as pedestrians or other objects temporarily present on or near the track if lost by a crossing road vehicle or user;

16) a*ccident to persons involving rolling stock in motion* means an accident to one or more persons hit by a railway vehicle or by any object attached to or that has become detached from the vehicle, these include persons who fall from railway vehicles, as well as persons who fall or are hit by loose object when traveling on board vehicles;

17) *dangerous goods* are substances and objects whose transport is prohibited in accordance with RID or is allowed only under certain conditions prescribed therein;

18) *a danger point* is a place on the track protected by a signal, whose unauthorized passage would endanger the traffic safety (e.g., switch, level crossing, etc.);

19) *other person at a platform* means any person at a railway platform who is not defined as "passenger", "employee or contractor", "level crossing user", "other person not at a platform" or "trespasser ";

20) *other person not at a platform* means any person not at a railway platform who is not defined as "passenger", "employee or contractor", "level crossing user", "other person at a platform" or "trespasser";

21) *passive level crossing* means a level crossing without any form of warning system and/or protection activated when it is unsafe for the user to traverse the crossing;

22) *killed person* means any person killed immediately or dying within 30 days as a result of an accident, excluding any suicide;

23) *wrong side signalling failure* means any technical failure of a signalling system (either to infrastructure or to rolling stock) resulting in signalling information less restrictive than that demanded;

24) *fire in rolling stock* means a fire or explosion that occurs in a railway vehicle (including its load) when it is running between the departure station and the destination station, including when stopped at the departure station, the destination station or intermediate stoop, as well as during marshalling operations;

25) *attempted suicide* is an act of deliberate self-injury resulting in serious injury;

26) *precursor of accident* means any incident or several incidents in traffic which have a potential to cause an accident;

27) *passage* is any other way, except for the road referred to in item 31) of this Article, which allows the passage of people, animals, vehicles or machines;

28) *signal passed at danger when passing a danger point* means any occasion when any part of a train proceeds beyond its authorized movement and travels beyond the danger point;

29) *signal passed at danger without passing a danger point* means any occasion when any part of a train proceeds beyond its authorized movement but does not travel beyond the danger point;

30) *line kilometres*  means the length of the railway network in the Republic of Serbia; for multiple-track railway lines, only the distance between origin and destination is to be counted, regardless of the number of tracks;

31) *road* means any public or private road, street or highway, including adjacent footpaths and bicycle lines;

32) *passenger* is any person traveling by train other than a member of the train crew, including a person trying to embark or disembark from a moving train;

33) *level crossing*  means any level intersection between a road or passage and a railway, as recognized by the infrastructure manager and open to public or private users; passages between platforms within stations are excluded as well as passages over tracks for the sole use of employees;

34) *passenger-km* means the unit of measure representing the transport of one passenger by rail over a distance of one kilometre; only the distance on the territory of the Republic of Serbia shall be taken into account ;

35) *suicide*  means an act to deliberately injure oneself resulting in death;

36) *train protection system* means a system that helps to enforce obedience to signals and speed restrictions;

37) *on-board systems* mean systems assisting the driver to observe line-side signalling and in cab signalling and thus providing protection of danger points and enforcement of speed limits;

38) *broken rails* means any rail which is separated in two or more pieces, or any rail from which a piece of metal become detached, causing a gap of more than 50 mm in length and more than 10 mm in depth on the running surface;

39) *broken wheel on rolling stock in service* means a break affecting the wheel and creating a risk of accident (derailment or collision);

40) *broken axle on rolling stock in service* means a break affecting the axle and creating a risk of accident (derailment or collision);

41) *collision of train with rail vehicle* means front to front, front to end or a side collision between a part of a train and a part of another train or rail vehicle, or with shunting rolling stock;

42) *collision of train with obstacle within the clearance gauge* means a collision between a part of a train and objects fixed or temporarily present on or near the track (except at level crossings if lost by a crossing vehicle or user), including collision with overhead contact lines;

43) *seriously injured person*  means any person injured who was hospitalized for more than 24 hours as a result of an accident, excluding any attempted suicide;

44) *tonne-kilometre* is a measuring unit representing the transport of one ton of goods within a distance of one kilometre, taking into account only the distance travelled in the territory of the Republic of Serbia;

45) *cost of material damage to rolling stock or infrastructure* means the cost of providing new rolling stock or infrastructure, with the same functionalities and technical parameters as that damaged beyond repair, and the cost or restoring repairable rolling stock or infrastructure to its state before the accident; both types of costs shall be estimated by railway undertakings and infrastructure managers on the basis of their experience, including also costs related to the leasing of rolling stock, as a consequence of non-availability due to damaged vehicles;

46) *cost of damage to environment* means costs that are to be met by railway undertakings and infrastructure managers, appraised on the basis of their experience, in order to restore the damaged area to its state before the railway accident.

Article 3

Common safety indicators relating to accidents are

1) total relative (to train –kilometres) number of significant accidents presented for the following types of accidents:

(1) collision of train with rail vehicles,

(2) collision of train with obstacle within the clearance gauge,

(3) derailment of train,

(4) level crossing accidents, including accidents involving pedestrians at level crossing,

(5) accident to persons involving rolling stock in motion, with the exception of suicides and attempted suicides,

(6) fires in rolling stock,

(7) other accidents;

2) total relative (to train-kilometre) number of persons seriously injured and killed by type of accident divided into the following categories:

(1) passengers(also relative to total passenger-kilometres and passenger train-kilometres),

(2) employees or personnel of the contractor,

(3) level crossing users,

(4) trespassers,

(5) other persons at a platform,

(6) other persons not at a platform.

Every significant accident is reported by the type of accident that occurred first, even if the consequences of an accident that occurred later are more serious, e.g. fire after a derailment.

Article 4

Common safety indicators relating to dangerous goods are total and relative (to train-kilometre) number of accidents involving the transport of dangerous goods by rail divided into the following categories:

1) accidents involving at least one railway vehicle transporting dangerous goods;

2) number of such accidents in which dangerous goods are released.

Article 5

Common safety indicators relating to suicides are total and relative (to train-kilometres) number of suicides and attempted suicides.

Article 6

Common safety indicators relating to precursors of accidents are total and relative (to train-kilometres) number of:

1) broken rail;

2) track buckle and other track misalignment;

3) wrong-side signalling failure;

4) signal passed at danger when passing a danger point;

5) signal passed at danger without passing a danger point;

6) broken wheels on rolling stock in service;

7) broken axles on rolling stock in service.

Unauthorised movement as referred to in paragraph 1, points 4) and 5) of this Article means to pass:

1) a trackside signal at danger or disrespect of an order to stop where a train protection system is not operational;

2) the end of safety related movement authority provided in a train protection system;

3) a point communicated by verbal or written authorisation laid down in applicable regulations;

4) stop boards (except buffer stops) or hand signals.

Any case in which a vehicle without any traction unit attached or a train that is unattended runs away pas a signal at danger, as well as any case in which, for any reason, the signal is not turned to danger in tome allow the driver to stop the train before the signal in not include in unauthorized movement.

All precursors, both those resulting in an accident and those which do not result in an accident, are presented.

Precursors resulting in a significant accident are also presented within the indicators of this Article.

Precursors which do not result in a significant accident are presented only within the indicators from this Article.

Article 7

Common safety indicators for calculation of the economic impact of accidents are:

1) number of killed and seriously injured persons multiplied by the value of preventing a casualty;

2) cost of damages to environment;

3) cost of material damages to rolling stock or infrastructure;

4) cost of delays as a consequence of accidents.

Indicators from paragraph 1 of this Article shall be expressed in dinars and shal be the total and relative (to train-kilometres) number.

The Directorate for Railways in its annual report shall present economic consequences of significant accidents.

Article 8

Common safety indicators relating to technical safety of infrastructure are:

1) percentage of tracks with train protection systems in operation and percentage of train-kilometres using on-board train protection systems where these systems provide:

(1) automatic warning to train driver,

(2) automatic warning to train driver and automatic stop when passing a signal at danger,

(3) automatic warning, automatic stop and occasional supervision of speed providing protection of danger points where the speed control is carried out at locations where speed limitation is required (e.g. at the approach of a signal),

(4) automatic warning, automatic stop and continuous supervision of speed on the railway line by continuous indication and enforcement of the maximum allowed target speed on all sections of the line (automatic train protection system);

2) number of level crossings (total, per line kilometre and track kilometre) divided in the following categories:

(1) passive level crossings,

(2) active level crossings,

– manual,

– automatic with user-side warning,

– automatic with user-side protection,

– automatic rail-side protected.

Protection by the use of physical devices includes:

1) half or full barriers;

2) gates.

Warnings by the use of fixed equipment at level crossings are given by:

1) visible devices: lights;

2) audible devices: bells, horns, klaxons, etc.

Active level crossings are classified as:

1) manual – a level crossing where user-side protection or warning is manually activated by a railway employee;

2) automatic with user-side warning – a level crossing where user-side protection is activated by the approaching train;

3) automatic with user-side protection: a level crossing where user-side protection is activated by the approaching train and automatic where user-side protection and warning is activated by the approaching train;

4) automatic with rail-side protection – where a signal or other train protection system permits a train to proceed once the level crossing is fully user-side protected and is free from incursion.

Article 9

The value of preventing a casualty is composed of:

1) willingness to pay for preventing a casualty based on the priorities established in the Republic of Serbia;

2) direct and indirect estimated costs in the Republic of Serbia:

(1) medical and rehabilitation cost,

(2) legal court cost, cost for police and accident investigation, the emergency service and cost of insurance,

(3) production losses i.e. value of goods and services that could have been produced if the accident had not occurred.

When calculating the cost of casualties, fatalities and serious injuries shall be considered separately.

The value of preventing a casualty in the Republic of Serbia is:

1) for a fatality 33.350.000,00 dinars;

2) for a serious injury 4.000.000,00 dinars;

3) for a minor injury 333.500,00 dinars.

The value of preventing casualty from paragraph 3 of this Article shall be increased or reduced each year by the rate of growth or reduction of the gross national product.

Article 10

The cost of delays as a consequence of accidents represents the monetary value of delays incurred by users of rail transport (passengers and freight customers).

The costs of delays as a consequence are calculated according to the following model:

1) value of time for a passenger of a train (per hour):

VTp = [VT of work passengers] \* [average percentage of work passengers per year] + [VT of non-work passengers] \* [average percentage of non-work passengers per year],

where:

– VTp is measured in dinars per passenger per hour,

– work passenger means a passenger travelling in connection with their professional activities excluding commuting,

– VT monetary value of travel time savings,

– VT for work passenger is 805,00 dinars per hour,

– VT for non-work passenger is 250,00 dinars per hour;

2) value of time for a freight train (an hour):

VTt = [VT of freight trains] \* [(tonne-km)/(train-km)],

where:

– VTt is measured in dinars per freight tonne per hour,

– VT is monetary value of transport time savings,

– (tonne-km)/(train-km) is average tonnes of goods transported per train in one year,

– VT for transport of 1 tonne of goods is 40,00 dinars per hour;

3) Cm = cost of 1 minute of delay of a train:

– for a passenger train:

– Cmp = K1 \* (VTp/60) \* [(passenger-km)/(train-km)]

(passenger-km)/(train-km)=average number of passengers per train per year;

– for a freight train:

Cmt = K2 \* (VTt /60)

factors К1 and К2 are between the value of time and the value of delay; factor К1 is 2,5 and factor К2 is 2,15;

4) costs of delays as a consequence of an accident are:

Cmp \* (minutes of delay of passenger trains) + Cmt \* (minutes of delay of freight trains).

The costs of delay are to be calculated for significant accidents, as follows:

1) costs of real delays on railway lines where accidents occurred as measured at terminal stations;

2) costs of real delays or, if not possible, estimated delay on other railway lines caused by accidents on the railway lines from point 19 of this paragraph.

The values of VT given in this Article shall be increased, i.e. reduced by the rate of growth, i.e. reduction of the gross national product.

Article 11

On the day of the entry into force of this rulebook the Rulebook on common safety indicators in railway traffic (“Official Gazette of the RS”, No 60/15 and 89/16) is repealed.

Article 12

This rulebook shall enter into force on the eighth day following the day of its publication in the “Official Gazette of the Republic of Serbia”.

No 340-406./2019

In Belgrade, 28 March 2019

Director,

Petar Odorović, MSc.