

NIB Network

EUROPEAN NETWORK OF RAIL ACCIDENTS NATIONAL INVESTIGATION BODIES

GUIDANCE ON THE DECISION TO INVESTIGATE ACCIDENTS AND INCIDENTS

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This document was developed by the NIB Network to support the NIBs in their work and is made publicly available for transparency purposes and as a reference for any other interested party.

Any use of it should be made in the adequate context and refer to its title, date and to the NIB Network.

NIB Network

The [European Network of Rail Accidents National Investigation Bodies](#) is an informal network created for the fulfilment of article 22.7 of Directive (EU) 2016/798 of the European Parliament and of the Council, of 11 May 2016, on railway safety, composed of representatives from the bodies in charge of the safety investigation of railway accidents of the European Union Member States plus Norway and Switzerland.

The NIB Network, with the support of the European Union Agency for Railways, undertakes an active exchange of views and experience for the purposes of the development of common investigation methods, drawing up common principles for follow up of safety recommendations and adaptation to the development of technical and scientific progress.

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2 Acronyms and definitions

2.1 Acronyms

EC	European Community
ECM	Entity in charge of maintenance
ERA	European Union Agency for Railways
EU	European Union
IM	Infrastructure Manager
NIB	National Investigation Body
NSA	National Safety Authority
RU	Railway Undertaking
TF	Task force

2.2 Definitions

1. Definitions according to Article 3 of Directive 2016/798

(1) ‘Union rail system’ means the Union rail system as defined in point (1) of Article 2 of Directive (EU) 2016/797

(11) ‘accident’ means an unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions; derailments; level crossing accidents; accidents to persons involving rolling stock in motion; fires and others;

(12) ‘serious accident’ means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety; ‘extensive damage’ means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total;

(15) ‘causes’ means actions, omissions, events or conditions, or a combination thereof, which led to an accident or incident;

2. Definitions according to Directive 2016/797

(5) ‘subsystems’ means the structural or functional parts of the Union rail system, as set out in Annex II

(7) ‘interoperability constituents’ means any elementary component, group of components, subassembly or complete assembly of equipment incorporated or intended to be incorporated into a subsystem, upon which the interoperability of the rail system depends directly or indirectly, including both tangible objects and intangible objects;

See also chapter 10 and annex 1 for definitions from the CSIs in appendix to Annex 1 of Directive 2016/798. The reference to the CSI definitions is commented in chapter 10.1.1

Please note:

Article 2 of Directive 2016/798 states the exceptions where the directive does not apply, such as metros, trams, light vehicles and infrastructure used exclusively by those vehicles etc.

Member States may decide to include the exceptions in accordance with national law.

3 Intended Users of this Guidance

Members of national investigation bodies (NIBs).

For information purposes:

- › Members of national safety authorities (NSAs) who are concerned with reports and recommendations by Investigation Bodies.
- › Members of the European Union Agency for Railway (ERA) who are concerned with reports and recommendations by Investigation Bodies.
- › Members of other bodies who are the subject of reports and recommendations by investigation bodies (e.g. entity in charge of maintenance (ECM), certification bodies, road authorities, emergency services).
- › The railway undertakings (RUs), infrastructure managers (IMs) and other actors in the railway sector who are interested in the processes of accident investigation.

4 Introduction and purpose of this guidance

Article 22(7) of Directive 2016/798 states that the investigating bodies shall conduct an active exchange of views and experience for the purposes of the development of common investigation methods. Although the NIBs have achieved a high degree of common understanding on the approach of EU railway accident and incident investigation, there is still some variety. This guidance is intended to further consolidate the common approach and to share the experience gathered from more than 10 years of EU accident investigation practice regarding the common understanding of:

- › which accidents shall be investigated;
- › which accidents and incidents may be investigated.

This guidance is intended as a reference manual for NIBs in relation to Articles 20 (1), 20 (2) and 22 (6) of Directive (EU) 2016/798 and provides examples to facilitate a common understanding about accident investigation across the European Union.

This guidance it is not to be used as a substitute for the Directive 2016/798 (EU).

The guidance is not legally binding.

The guidance will be reviewed by the NIB network, if necessary updated to reflect the progress of the European legal acts and standards, as well as to reflect the experience deriving from accident investigation over time. The reader is invited to consult the webpage designated by the NIB Network for information about the latest available edition of the guidance.

5 Principles for this guidance

To facilitate the reading of this guidance, the original text of Directive 2016/798 (EU) is stated before the corresponding item of guidance.

To differentiate the text of Directive 2016/798 (EU) from the guidance, it is presented in "*Bookman Old Style*" Italic Font, exactly as here.

6 Principles for the decision to investigate

The Railway Safety Directive creates a common framework for the management of safety on the Union's railway system. To ensure the high level of safety in the railway system, a common understanding of requirements of the Directive is important; this includes the requirements for the investigation of accidents.

Directive 2016/798 specifies when the:

- › investigation of an accident is mandatory according to article 20 (1);
- › investigation of an accident or incident is within the discretion of the investigating body according to article 20 (2);
- › investigation of accidents or incidents other than those referred to in article 20 may be subject to national legislation according to article 22 (6).

The NIBs can investigate on these two bases:

- › national legislation implementing the requirements of Directive 2016/798;
- › additional national requirements.

This may have consequences for the:

- › decision to investigate or not;
- › application of the requirements and procedures provided by the Directive 2016/798.

The flowchart below describes the decision to investigate according to Directive 2016/798.

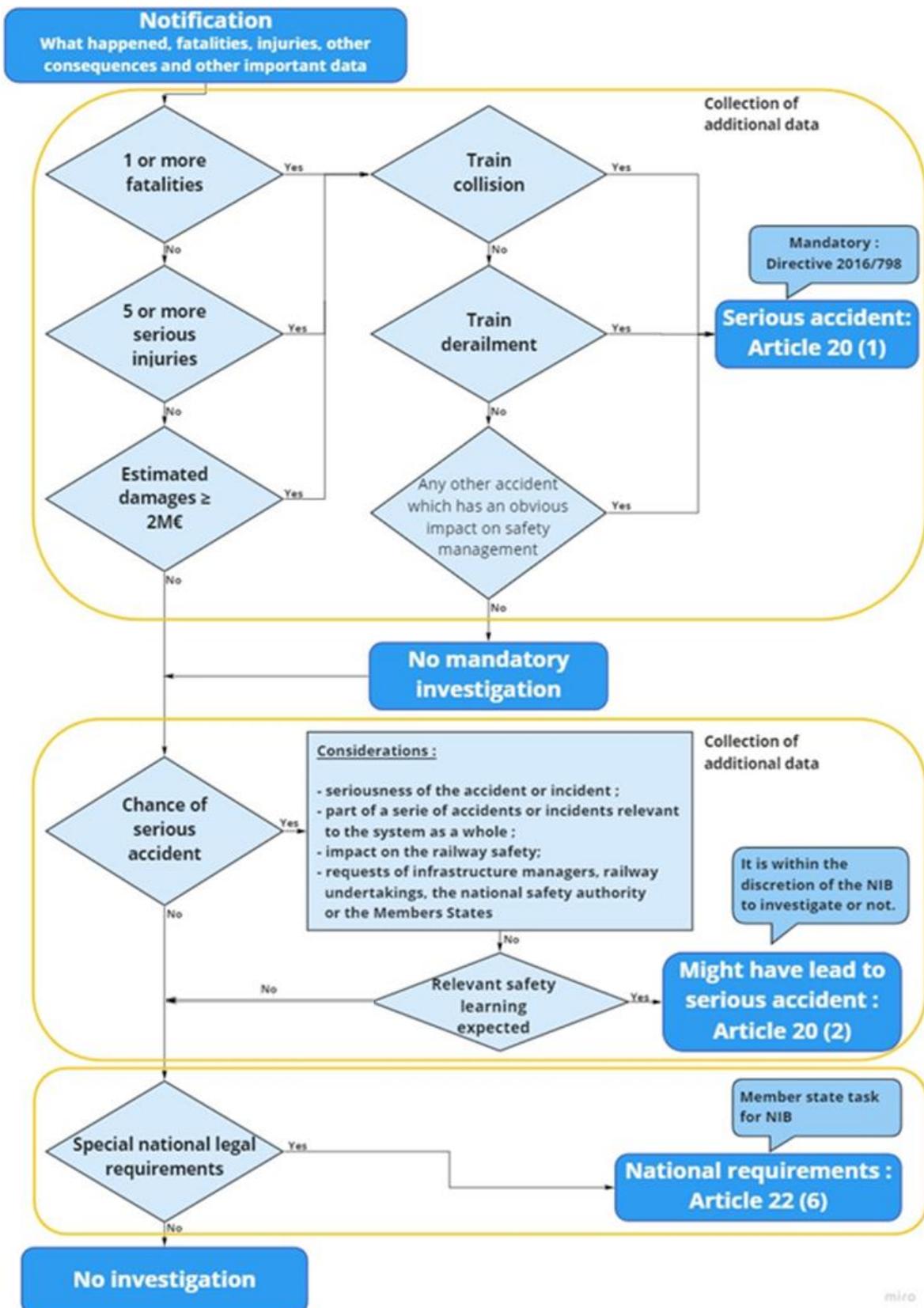


Figure 1: Flowchart for the decision to investigate or not

With regard to accidents to be investigated under article 20(1), a common understanding of the definition of “*serious accident*” is essential:

‘serious accident’ means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety; ‘extensive damage’ means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total;

Article 20 (3) of the Directive 2016/798 contains guiding principles that should be taken into account when deciding on the scope of an investigation and the procedure to be followed. These principles are formally only applicable to investigations under article 20. However, if there are no specific national requirements, it might be useful to apply it also to investigations under article 22(6) in line with the national legislation.

The decision to investigate including the motivation for the decision shall be recorded in the investigation report, see Annex to Regulation (EU) 2020/572, No. 2.1 and 2.2.

Apart from this, following general good administrative practice, also the decision not to investigate including the motivation should be documented in an appropriate form.

7 Mandatory investigation – serious accidents

Article 20 (1) of the Directive 2016/798 states the following:

Member States shall ensure that an investigation is carried out by the investigating body referred to in Article 22 after any serious accident on the Union rail system. The objective of the investigation shall be to improve, where possible, railway safety and the prevention of accidents.

7.1 The consequence of the accident

An accident resulting in one of the following consequences:

- › 1 or more fatalities.
- › 5 or more serious injured.
- › Extensive damage that can be immediately assessed to cost at least EUR 2 million in total shall always be considered a serious accident if:
 - It is a train collision or derailment, or
 - It has an obvious impact on railway safety regulation or the management of safety.

The common understanding achieved in the NIB-network is as follows:

Fatality¹ (killed person) means any person killed immediately or dying within 30 days as a result of an accident, excluding any suicide.

Serious injury (seriously injured person) means any person injured who was hospitalised for more than 24 hours as a result of an accident, excluding any attempted suicide.

With regard to the criterion “**extensive damage**”, it is not expected that investigators should calculate the exact cost. The classification depends on an initial assessment made at the accident site. Experience shows that the costs are in most cases underestimated at first.

The estimates in Annex II are provided in order to support the investigator in roughly assessing the damage, they are based on the replacement value of the technical systems. In estimating the costs, the investigator should take into account the age and condition of the damaged material.

Good Practice:

The NIB could ask dedicated experts on site or RU or IM. They know the age, the condition and can estimate the renewal cost.

7.2 The “obvious” impact of the accident

For collisions and derailment with 1 or more fatalities, 5 or more serious injuries or estimated damages in excess of EUR 2 million, Directive 2016/798 implies in principle that these accident types always have an “obvious impact on railway safety regulation or the management of safety”.

In the flowchart in Figure 1 the text “*Any other accident which has an obvious impact on safety management*” refers to Article 3 (12) of Directive 2016/798 “*...any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety...*”.

For all other types of accidents, it is necessary to consider “the impact on railway safety regulation or the management of safety”, because the causal factors or the consequences of such accidents might not always relate to railway safety management or regulation (e.g. in cases of suicide, trespassing).

¹ Definitions from the RSD Annex 1 appendix for CSI.

8 Not mandatory - NIB may decide to investigate or not

The purpose of Article 20 (2) is to enable the NIBs to investigate accidents and incidents, which do not fall under article 20 (1), at their discretion. Furthermore, article 20 (2) provides the criteria for the decision to investigate an occurrence:

“The investigating body ... may also investigate those accidents and incidents which under slightly different conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of the Union rail system.

The investigating body may decide whether or not an investigation of such an accident or incident is to be undertaken. In making its decision it shall take into account:

- (a) the seriousness of the accident or incident;*
- (b) whether it forms part of a series of accidents or incidents relevant to the system as a whole;*
- (c) its impact on railway safety; and*
- (d) requests from infrastructure managers, railway undertakings, the national safety authority or the Member States.”*

8.1 Evaluation of Event with potential risk of serious accident

Not all incidents represent the same level of risks. Some incidents need more careful and formal controls than others.

“Slightly different conditions” are not defined explicitly.

However, the wording suggests a risk-based approach:

- › “Slightly different conditions” refer to the probability.
- › “May have led to serious accidents²” refers to the consequences.

“Slightly” means to some degree but not to a very large degree. After a non-serious accident, NIBs should consider the variation of **one or very few factors**, which in the specific case might have contributed to relatively mild consequences of a performance variability, but not the **worst-case combination of factors**.

² See chapter 2.2 Definition

Good Practice:

Use of risk matrix may be one method to evaluate the potential risk. Example of a risk matrix and decision guideline from Portugal and Hungary are in annex.

The qualitative risk analysis methods have a common objective of identifying not only the dangerous events that may lead to a risky situation but also the causes and consequences of these dangerous events.

The risk-based approach (RBA) is a methodology that allows the activities of the NIB to be prioritized on the basis of prior data analysis. The underlying principle of RBA is to focus the means (your resources) where they are most needed.

Please note:

Article 20(2) mentions explicitly the investigation of “*technical failures*” of “*structural subsystems*”. However, NIBs are recommended to include other aspects as non-technical failures and the functional subsystems in their consideration to decide whether to investigate or not.

The **potential consequences of an accident** should always be a criterion in deciding to investigate an accident, which does not fall under article 20 (1). In the context of seriousness of accident, the NIB should also take into account a potential public interest when deciding to investigate or not. From the public’s point of view, an occurrence may be considered as a “serious accident” even when the criteria of article 20 (1) are not fulfilled.

The NIB should therefore take the public interest into account when deciding to investigate or not.

In addition, the NIB must also take into account the resources available at the time of the event and for carrying out the investigation.

An event is only perceived as a risk insofar as it can **have an impact on railway safety**.

In cases of (technical) failures of the (structural) subsystems or of interoperability constituents, the impact on railway safety should always be considered, if the failure bears an obvious risk potential. Again, the risk potential may arise from the probability of an occurrence as well as from the potential consequences.

When similar accidents or incidents have also occurred in other Member States, this may be another indication of “*... impact on railway safety*”.

The risk potential may arise from **the probability of an occurrence as** well as from the potential consequences.

There should be similarities between two or more accidents or incidents in order to consider an accident or incident as “part of a series”. These similarities may be, for example:

- › in the location of the occurrence;
- › in the type of rolling stock involved or the infrastructure or its specific components;

but also

- › in the behaviour of the staff, e.g. the specific way of applying an operating procedure or an incorrectly applied communications protocol;
- › in the causal, contributing or systemic factors linked with the occurrences - this may be even more difficult to detect.

The type of occurrences in question must bear an obvious risk potential for the safety of the Union railway system in its totality.

Typically, “type” of accident or incident will be used as a search indicator. When there are two or more similar accidents or incidents; they may be considered as part of a series of accidents or incidents.

However, it is not sufficient to simply compare accident or incident types. To identify similarities in occurrence, it is necessary to search for combinations of accident types and related incident types or precursors, depending on the causal factor of the accident:

Accident type	Incident/Precursor	
Train derailment	Broken wheel	A broken wheel can be a precursor for a train derailment
	Broken axle	A broken axle can be a precursor for a train derailment
	SPAD	A SPAD can lead to over speeding and hence can be a precursor of a derailment
Train collision	SPAD	A SPAD can be a precursor for a train collision

So, it can make sense to compare a “train derailment” caused by a broken axle with occurrences involving a broken axle but no derailment.

Please note:

A “series” is a sequence of similar occurrences.
 The “system” should be read as “Union railway system” as defined in article 3 (1) of Directive 2016/798.

Good practice:

To form an opinion as to whether an occurrence may be part of a series, the investigation bodies can search for similar accidents or incidents in their national accident database, the Agency’s database, the “safety information system” (SIS) and other relevant databases.

8.2 Requests from IM, RU, NSA or MS

(a) Requests from infrastructure managers or railway undertakings

RUs and IMs are obliged to investigate accidents and incidents within their safety management system (COMMISSION DELEGATED REGULATION (EU) 2018/762, Annex I and II, in particular section 7.1.). However, they may request an independent investigation by the NIB. In particular when they require an impartial examination of those parts of their Safety Management System, which might have failed and might have contributed to an occurrence or its consequences. Or their findings influence industry wide safety relevant to the system as a whole. Other reasons for requests of an independent investigation could be accidents involving several parties or accidents where the NIB has previous experience that can be useful.

(b) Requests from the national safety authority

Requests by the NSA are explicitly foreseen in article 20 (2), therefore they are permitted to ask the NIB to investigate an accident or incident. This may include also requests by NSAs of other Member States transmitted via the NSA-network.

(c) Requests of Members States

There are two cases:

- › A request by the government, the Parliament or any other constitutional or parliamentary institution of the NIB's Member State.
- › A request by the government, the Parliament or any other constitutional or parliamentary institution of another Member State transmitted through the usual protocols or procedures.

As article 20 (2) explicitly states, it is clear that these requests must be taken into account in the decision to investigate an occurrence or not.

It is within the discretion of the NIB to investigate or not.

Please note:

The limitation of Article 20 (2) to requests of infrastructure managers, railway undertakings, the national safety authority or the Member States builds a contrast to the general approach of Directive 2016/798 and might be done unintentionally. As the Agency has been assigned with tasks previously carried out by the NSAs, it would be logical, if also the Agency could ask a NIB to carry out an investigation. As they are free in their decisions to investigate, the NIBs are invited to take into account also requests of the Agency.

The requests form no mandatory obligation to investigate. The decision is always with the NIB.

Article 23 (1), last sentence states that *“This paragraph shall not preclude Member States from agreeing that the relevant bodies should carry out investigations in cooperation in other circumstances”*. An agreement between Member States (or with a third country) may have a wider scope than article 20 of the Directive 2016/798. Hence, after an accident or incident falling under such agreement, the NIB has to check whether it fulfils the criteria of 20 (2). If not, the investigation may fall under article 22 (6).

9 National legislation requires investigation

In article 22 (6) of the Directive 2016/798 it is clearly stated that it is within the power of the Member State to entrust the investigation body with investigations other than those referred to in article 20:

“Member States may entrust the investigating body with the task of carrying out investigations of railway accidents and incidents other than those referred to in Article 20.”

As this article refers to accidents not covered by article 20, there is a clear distinction in types of accidents covered by the respective legal base.

When investigations fall under article 22(6) instead of article 20, the NIBs shall respect only the relevant national legislation. This means, if the national legislation obliges the NIBs to conduct investigations not covered by Article 20 (1) or Article 20 (2), also the formal requirements of Directive 2016/798 regarding the investigation procedure (Article 23), the investigation reports (Article 24), the information to be sent to the Agency (Article 25) and Safety recommendations (Article 26) do not apply.

Please note:

In consequence, Article 22 (6) authorises Member States to entrust the NIBs with the investigation of occurrences, which do not fall under Article 20 (2). These can be only occurrences, which:

- › either do not fulfil the criterion “which under slightly different conditions might have led to serious accidents“, or
- › the NIB has decided not to investigate for other reasons, taking account the criteria listed under Article 20 (2) (a) – (d).

In such cases, national legislation may impose other rules for the investigation than Articles 23 et seq. of Directive 2016/798 and its national implementation.

10 Process to decide to open an investigation according to type of accident

This section is intended to give guidance for each single category with reference to article 3 (11) of the Directive 2016/798.

- › Collisions
- › Derailments
- › Level-crossing accidents
- › Accidents to persons caused by rolling stock in motion
- › Fires
- › Others

10.1 Train collisions

Train collisions shall always be investigated when they result in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment.

10.1.1 Definitions

The definition originates from the common definitions for the CSIs in appendix to Annex I of Directive 2016/798. The common definitions are used in relation to the CSIs and it is not indicated expressly in the Directive 2016/798 that such definitions are to be used for other purposes as well. There is no obligation for the Member States and the NIBs to apply strictly the common definitions of CSI for the definition of "serious accident". The definition of a serious accident in Directive 2016/798 refers to "train collision or derailment of trains" without any reference to the CSI's common definitions. Unless subject of specific legislation, the NIBs are however recommended to apply the CSI-definitions for a harmonised approach.

***'train'** means one or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point, including a light engine, i.e. a locomotive travelling on its own;*

***'collision of train with rail vehicle'** means a 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;*

***'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;*

Please note:

A collision that results in a derailment is counted as a collision.

Any collision involving only railway vehicles not covered by the definition of a train have to be categorised as “others” or, if applicable, as “level crossing accident”. In contrary, also maintenance vehicles such as road-rail vehicle, on-track machine, tamper, rail-mounted maintenance machine shall be considered as a train if they comply with the requirements of the definition above.

Collisions between shunting rolling stock/maintenance machines are classified as type of accident “others”.

For the purpose of this guidance, animals are counted as objects.

Collisions purposefully caused by applying safety procedures in response to an emergency are to be classified as “others”.

Non-exhaustive list of fixed objects:

- › buffer stops;
- › (part of) infrastructure (equipment) within clearance gauge.

All tear-downs of overhead contact lines by a train should be regarded as collisions with overhead contact lines.

Non exhaustive list of temporarily present objects:

- › rocks;
- › landslides;
- › trees;
- › lost parts of railway vehicles;
- › lost or displaced loads;
- › vehicles and machines or equipment for track maintenance;
- › (Road-) vehicles intruded into the structure gauge.

Any collision at a level-crossing between a railway vehicle (trains or other railway vehicles) with

- › one or more road vehicles crossing over the tracks;
- › other level crossing users, such as pedestrians;
- › or other objects present on or near the track that have fallen from vehicles or users crossing the tracks.

shall be classified as a “level crossing accident”.

10.1.2 Examples

For train collisions with the consequences mentioned in article 3 (12), an investigation is mandatory without any exception. Other train collisions, in particular those with involvement of another rail vehicle, should be seriously considered to be investigated according to article 20 (2) because of the high risk potential.

Example 1:

A train collided with a train. Two passengers were killed.

The investigation of this accident is mandatory according to article 20 (1) because of the fatal consequence and train collision.

The NIB has to investigate the accident.

Example 2:

A train collided with a derailed freight wagon of a train running in opposite direction. 10 passengers were seriously injured.

The investigation of this accident is mandatory according to article 20 (1) because of 5 or more serious injuries, train collision and train derailment.

The NIB has to investigate the accident.

Example 3:

A train collided with a landslide. Two passengers were slightly injured.

There is no obligation to investigate this accident according to article 20 (1);

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents.

The scope could among others include how the IM is dealing with the risk of landslides, issues during the evacuation, etc.

It is within the discretion of the NIB to investigate or not.

Example 4:

A train collides with a tree. Two passengers were slightly injured. At certain times of day the train is full of school children. Because of school holidays, the train was almost empty when the accident occurred.

There is no obligation to investigate this accident according to article 20 (1);

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents:

- › Was it only because of favourable conditions “School holidays” that the collision did not lead to serious consequences in terms of article 3 (12). The school holidays may be considered as a random condition in the context of the incident/accident.

The scope could among others include how the IM is dealing with the risk of trees ending up on the tracks, the potential with a train full of school children etc.

It is within the discretion of the NIB to investigate or not.

Example 5:

Two freight trains both travelling at 10 km/h collided on an open line. One locomotive driver was slightly injured. The low speed of one train was the result of a temporary speed restriction because of track work, the driver of the other locomotive had received an “urgent stop call” from the train dispatcher and had triggered the emergency brake.

There is no obligation to investigate this accident according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents. The low speed of the trains was caused by special fortunate circumstances, which actively could have contributed to the minor consequences.

The scope could among others include what barriers failed to allow the collision, how the track work affected the train traffic etc.

It is within the discretion of the NIB to investigate or not.

10.2 Derailment of trains

Derailments of trains must be investigated when they result in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment.

10.2.1 Definitions

‘train’ means one or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point, including a light engine, i.e. a locomotive travelling on its own;

‘derailment of train’ means any case in which at least one wheel of a train leaves the rails;

Please note:

Re-rail cases (if the accidents are significant) are to be included.

Derailments purposefully caused by applying safety procedures in response to an emergency are to be classified as “others”.

Derailment of shunting rolling stock/maintenance machines/vehicles are classified as “others”.

Collisions against rolling stock/obstacles followed by a derailment are not included, these events are classified as collisions.

Derailments of trains caused by a brake shoe shall be classified under “derailment”.

10.2.2 Examples

For derailments of trains with the consequences mentioned in article 3 (12), an investigation is mandatory without any exception. Other derailments of trains should be seriously considered to be investigated according to article 20 (2) because of the high risk potential.

Example 1:

Two wagons of a freight train derailed on the open line.

There were no injuries. The track was destroyed over a length of 3500 m, two points were destroyed. The estimated damage was 2.500.000 €.

The investigation of this accident is mandatory according to article 20 (1) because of the train derailment and damage consequence.

The NIB has to investigate the accident.

Example 2:

Two wagons of a freight train derailed on the open line. There were no injuries, the estimated damage was 25.000 €.

There is no obligation to investigate this accident according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents.

The scope could among others include the infrastructure conditions and maintenance routines, the wagons wheel conditions and maintenance routines etc.

It is within the discretion of the NIB to investigate or not.

Example 3:

Two wagons of a freight train derailed. The derailment had been observed by a train dispatcher, who immediately informed the train driver. No people were injured; the estimated damage was 25.000 €. The train dispatcher was only able to observe the derailment because it occurred just in front of his office. It can be assumed that otherwise the damage would have been much higher, and persons might have been injured.

There is no obligation to investigate this accident according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents. The observation of the derailment can be considered as a special, fortunate circumstance, which actively contributed to the minor consequences of the derailment.

The scope could among others include relevant factors during traffic management at the station, the infrastructure conditions and maintenance routines, the wagons wheel conditions and maintenance routines etc.

It is within the discretion of the NIB to investigate or not.

Example 4:

Eight cars of a passenger train derailed in a tunnel as a result of a broken wheel. The train, which was being operated in left-hand driving, derailed to the left-hand side and was held upright by the walls of the tunnel. A few seconds later an oncoming train passed by without colliding with any part of the derailed train. Nobody was seriously injured. Nobody was killed or seriously injured, and the damage was less than 2 million euros.

There is no obligation to investigate this accident according to article 20 (1);

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents. The direction of the derailment can be considered as a “randomly distributed” condition. The derailment would have resulted in a serious accident had this one condition been different.

The scope could among others include the wagons wheel conditions and maintenance routines, metallurgic specialist investigation of the wheel that broke etc.

It is within the discretion of the NIB to investigate or not.

Example 5:

The first bogie of a regional freight train derailed at low speed on a one-track line because of a snow conditions. The speed is normally limited to 40 km/h on this line because of track alignment. No passenger trains operate on this line.

There is no obligation to investigate this accident according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents

The scope of the investigation could include the following how the RU and the IM deal with the risk of snowfall in their safety management systems.

It is within the discretion of the NIB to investigate or not.

10.3 Level-crossing accidents

Level-crossings accidents must be investigated when:

- › they result in the death of at least one person or serious injuries to five or more persons or extensive damage **and**
- › have an obvious impact on railway safety regulation or the management of safety.

Level crossing accidents have an obvious impact on railway safety regulation or the management of safety, when:

- › the **accident** was obviously the result of deficiencies within the railway system (e.g. technical failures of infrastructure devices or rolling stock, staff not complying with the procedures, deficiencies in the safety management system etc.);
- › the **consequences** were obviously the result of deficiencies within the railway system (e.g. design issues of rolling stock, emergency plans not functioning etc.).

10.3.1 Definitions

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

‘level crossing’ means any level intersection between a road or passage and a railway, as recognised 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.

‘road’ means, for the purpose of railway accident statistics, any public or private road, street or highway, including adjacent footpaths and bicycle lanes.

‘passage’ means any route, other than a road, provided for the passage of people, animals, vehicles or machinery.

Please note:

Collisions with objects on level crossings are classified as collisions, not as level crossing accidents, except when the obstacle has been lost by a crossing user or has fallen from a non-railway vehicle using the crossing.

Collisions with animals under supervision at a level crossing should be included. Collision with wild animals and animals not under supervision occurring on a level crossing should be included under train collisions or other accidents (depending on the rail vehicle involved).

Crossing users include all persons in or on vehicles, motorized or not, and pedestrians.

10.3.2 Examples

Please note:

An accident on a level crossing with heavy motor vehicles always has the potential to lead to a serious accident. This may be a reason to perform an investigation.

Non-permitted entry onto a level-crossing is a widely spread issue; therefore, these cases of obvious “violation” are often not investigated. However, NIBs should not exclude such cases by default from investigation because they might miss the chance to significantly contribute to improve level-crossing safety. Even in the case of an obvious violation of safety rules, the causal or contributing factors may originate from the railway system.

In cases where the behaviour of the level crossing user cannot be explained rationally it is recommended to start a preliminary examination³. Often poor visibility conditions, poor signposting or poor design of the level-crossing influences the level crossing user’s behaviour.

Level-crossing accidents and incidents may be suitable cases for studying a series of accidents. Incidents should be included in this consideration.

Findings of investigations of level-crossing accidents may also lead to safety recommendations addressed to “other authorities and bodies” in terms of article 26 (2) aiming on improvements on the roadside.

Good practice:

Following an accident at a level crossing, which led to death or serious injury of the users of the crossing, there should be a preliminary examination to identify whether the railway systems were working correctly (both level crossing and train). In cases where there are injuries or fatalities of persons in the train, this preliminary examination should include consideration of whether the passive protection system of the train worked correctly.

If the railway subsystems functioned correctly, and the users of the level crossing (e.g. vehicle drivers etc.) were responsible for putting themselves in danger (e.g. by deliberately ignoring the warning lights and zigzagging around a half-barrier), then an investigation might however be appropriate, if it would lead to an improvement in railway safety.

Because level-crossing also include a different mode of transport (road) it is advisable to include or cooperate with personnel with specialised expertise (road, vehicle, driver, etc.) to get a better understanding of the road perspective and issues. Multimodal NIBs like Sweden and Norway are reporting good experience from cooperating with the road competence within the authority on level-crossing accidents.

³ *This preliminary examination may not necessarily be performed by the NIB*

Example 1:

A train collided with a car on a level crossing secured by half-barriers. Two people in the car were killed, the train driver was slightly injured. There was evidence of a malfunction of the barriers as they did not close.

The investigation of this accident is mandatory according to article 20 (1) because of the fatal consequence and indication of obvious impact on railway safety.

The NIB has to investigate the accident.

Example 2:

A train collided with a car on a level crossing without technical protection. Two people in the car were killed. The inspection showed that all technical standards were observed, and the train staff acted in accordance with the rules.

This accident does not have to be investigated according to article 20 (1).

This accident should not be classified as an accident according to article 20 (2) unless there are particular reasons why the car driver tried to pass by the level crossing.

It is within the discretion of the NIB to investigate or not.

Example 3:

A train collided with a car on a level crossing secured by half-barriers. Two people in the car were killed; the train driver and 7 passengers were seriously injured. There was no malfunction of the barriers or other rail-side safety devices. According to witness accounts, the car driver tried to pass by the barriers.

This accident does not have to be investigated according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to the consequences to passengers and employees. This accident indicates that there are lessons to be learned either for safety management or safety regulation or both.

The scope of the investigation could among others include:

- › Why were the consequences so serious within the train?
- › Whether the risks for the train driver and passengers for these relatively frequent occurrences were assessed and measures implemented?

It is within the discretion of the NIB to investigate or not.

Example 4:

A train collided with a woman on a level-crossing for pedestrians. The woman was seriously injured. It was clear that the woman had ignored the acoustic signals warning of the approach of the train.

This is an example of an accident that not necessary falls under article 20 (2).

This accident should not be classified as an accident according to article 20 (2) unless there are particular reasons, such as expected relevant safety learning or special national rules 20 (6) requirements.

It is within the discretion of the NIB to investigate or not.

10.4 Accidents to persons involving rolling stock in motion (excluding suicides)

Accidents to persons involving rolling stock in motion must be investigated when:

- › they result in the death of at least one person or serious injuries to five or more persons or extensive damage
- and**
- › have an obvious impact on railway safety regulation or the management of safety.

Accidents to persons involving rolling stock in motion have an obvious impact on railway-safety regulation or the management of safety, when the accident was the result of deficiencies within the railway system (e.g. technical failures of infrastructure devices or rolling stock, staff not complying with the procedures, poor planning of maintenance work, etc.).

10.4.1 Definition

‘accident to persons involving rolling stock in motion’ means accidents to one or more persons who are either hit by a railway vehicle or by an object attached to, or that has become detached from, the vehicle, this includes persons who fall from railway vehicles as well as persons who fall or are hit by loose objects when travelling on board vehicles;

Please note:

The following non exhaustive list of events is included:

- › persons using passages between platforms and struck by a train;
- › persons falling from trains;
- › passengers hit or stuck by a train;
- › employees or contractors hit or stuck by a train.

Persons travelling on trains that are seriously injured or killed not in connection with the train movement are excluded. E.g.: a passenger falling inside a train after a slip or a passenger burnt by a hot beverage on board of a train.

10.4.2 Examples

Please note:

The accident type “involving rolling stock in motion” includes solo running wagons, shunting movements, etc.; it includes between platforms within stations, as well as passages over tracks for the sole use of employees.

Non-permitted access to railway infrastructure – known as “trespassing” - is a widely spread issue; these cases of obvious “violation” are often not investigated. However, NIBs should not exclude such cases by default from investigation because they might miss the chance to significantly contribute to improve railway safety. Even in the case of an obvious violation of safety rules, the causal or contributing factors may originate from the railway system (e.g. deficiencies in risk assessment).

The NIBs should start a preliminary examination at least of those accidents with damage to persons, who were hit during an activity that has a close connection to the intended use of railway. A close connection with the intended use can be assumed, if people were hit:

- › in railway stations (incl. passages between platforms);
- › in marshalling yards (incl. passages for crossing the tracks for the sole use of employers);
- › during construction or maintenance work on railway infrastructure.

Often poor visibility conditions, poor signposting or poor design of the procedures influences the behaviour of people.

Good practice

Following an accident to persons involving rolling stock in motion, which led to the death or serious injury of any person, there should be a preliminary examination to identify whether there is evidence or a strong indication of suicide. If this is not the case, the examination should establish whether the railway subsystems were working correctly both on the train and on potential track-side protection installations.

In cases of accidents with injuries or fatalities in the context of maintenance or construction work on the railway system the preliminary examination should include checks whether the safety measures were sufficient and performed correctly.

If all railway subsystems were working correctly, and the person who was hit (e.g. the trespasser) was responsible for putting him/herself in a position of danger (e.g. by passing over the tracks when there was a safe passage within a reasonable distance) and **his/her behaviour was obviously not influenced by factors within the railway system**, then an investigation would not to be appropriate unless it would clearly lead to an improvement in railway safety.

Although the case may not fall under the criteria for an article 20(1) investigation, the NIB may at its discretion investigate the accident under article 20(2), e.g. in cases of high public interest, or if national law requires so (article 22 (6)).

Example 1:

A train hit a group of people on a double-track line. Two people were killed, two others were seriously injured. Evidence was given that the people were visitors of the IM, who wanted to examine a special installation close to the track. They were within the track area with permission of the dispatcher and under the supervision of IM's safety staff.

The investigation of this accident is mandatory according to article 20 (1) because of the fatal consequence and indication of obvious impact on railway safety.

The description indicates a communication problem within the railway system and there could be lessons to be learned for safety management.

The NIB has to investigate the accident.

Example 2:

In a station two people were killed. While crossing the tracks at the station, they were hit by a passing train. Evidence was given that they were "stressed" by the short time to change platform and wanted to reach a commuter train, which was to depart from a different platform than usual. The closest safe possibility to cross the tracks was 300 metres away.

This accident does not have to be investigated according to article 20 (1).

However, the description indicates the decision of the dispatcher to change platform shortly before departure might have contributed to the accident and there are significant lessons to be learned for the safety management system.

It is within the discretion of the NIB to investigate or not.

Example 3:

The NIB was informed about a woman killed by a moving train in a station. It appeared to be a case of trespass. Therefore, the NIB had decided not to investigate. However, from press reports and witness statements, the NIB became aware that there may have been circumstances in the railway system, which had caused the accident. The NIB revised its decision and started an investigation. The investigation showed that the woman, acting on ambiguous information, had caught the wrong train. When the train started moving in the wrong direction, she opened the doors (despite technical devices to prevent the doors being opened) and fell out of the train. Subsequently, lying injured on the track, she was hit by another train.

Initially, this accident might have been classified as accident according to article 20 (2). After more information became available (obvious impact to railway regulation of management of safety e.g. with the door locking system) this accident should have been classified as an accident according to article 20 (1).

The scope of the investigation could among other include the persons behaviour and what barriers are in place (or not) to prevent this type of accidents.

This accident has to be investigated according to article 20 (1).

Example 4:

A train hit a group of people on a double-track line. Two people were killed, two others were seriously injured. Evidence was given that the people wanted to take a shortcut on the way to a restaurant.

This accident does not have to be investigated according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful, in particular if there is indication the use of this shortcut is established practise.

The scope of the investigation could among other include the persons behaviour and what barriers are in place (or not) to prevent this type of accidents.

It is within the discretion of the NIB to investigate or not.

Example 5:

A child's pushchair was pulled onto the tracks from a platform besides a two-track line, by the air draft from a passing freight train. By chance the pushchair was empty, as the father had just taken the child up into his arms.

This accident does not have to be investigated according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents.

The scope of the investigation could among other include what barriers are in place (or not) to prevent this type of accidents.

It is within the discretion of the NIB to investigate or not.

10.5 Fire in rolling stock

A **fire in rolling stock** has to be investigated when:

- › it results in the death of at least one person or serious injuries to five or more persons or extensive damage **and**
- › have an obvious impact on railway safety regulation or the management of safety.

Fire in rolling stock has an obvious impact on railway safety regulation or the management of safety, when:

- › the fire was the result of deficiencies within the railway system (e.g. technical failures of rolling stock, poor or neglected maintenance of rolling stock, technical failure in infrastructure devices which led to a fire in rolling stock) **or**
- › the consequences were a result of deficiencies within the railway system (e.g. if passengers could not escape because of locked doors).

10.5.1 Definition

‘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, including when stopped at the departure station, the destination or intermediate stops, as well as during re-marshalling operations.

Please note:

Fires that started when a rail vehicle was not in motion are included.

Re-marshalling operations are operations carried out between the departure station and the destination.

Smoke, heat or blast resulting from fire or explosions leading to an accident could also be included.

10.5.2 Examples

Please note:

Fires arising from rolling stock always have the potential for catastrophic consequences, e.g. if they occur in tunnels.

In general, fires in passenger trains should be investigated.

Good practice:

Following a fire in the rolling stock which led to death or serious injury of a person, there should be an examination to identify whether there is evidence or a strong indication of factors increasing the fire (fire rising). If this is not the case, the examination should establish whether the railway subsystems were working correctly (with reference to both the location where the fire arose, and the protection and safety installations).

In case of fire rising, an investigation might be necessary, e.g. when there is strong indication that the material used for seats and other interior installations might have contributed to the fire’s consequences (feeding the fire or development of poisonous gases).

If the case does not fall under the criteria for an article 20 (1) investigation, the NIB may at its discretion investigate the accident under article 20 (2), e.g. chance of serious accident etc., or in cases of national legal requirements under article 22 (6).

Example 1:

A fire occurred in a carriage of a passenger train. Following this accident one passenger was killed, and two passengers seriously injured. It was evident that the fire began on the upper deck. The passenger, who died of smoke poisoning, were found in the upper level; and had tried to escape through the windows labelled as the emergency exit.

The investigation of this accident is mandatory according to article 20 (1) because of the fatal consequence and indication of obvious impact on railway safety.

The NIB has to investigate the accident.

Example 2:

A fire occurred in a carriage of a passenger train. Following this accident two passengers were slightly injured. It was evident that the fire was caused by an electrical shortcut in the ventilation system. It is also possible that the construction of the carriage contributed to the consequences to the passengers.

This accident does not have to be investigated according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to serious accidents. An electrical shortcut in the ventilation system may have an impact on railway safety at a Community level, as it is a standard equipment of passenger trains.

The scope could among other include to verify if the construction of the carriage contributed to the consequences to the passengers and may impact safety on other carriages as well.

It is within the discretion of the NIB to investigate or not.

10.6 Other accidents

An “**other accident**” has to be investigated when

- › it results in the death of at least one person or serious injuries to five or more persons or extensive damage
- and**
- › have an obvious impact on railway safety regulation or the management of safety.

An **accident classified as “other accident”** has an obvious impact on railway safety regulation or the management of safety, when:

- › the occurrence was the result of deficiencies within the railway system (e.g. technical failures of rolling stock, technical failure in infrastructure),

- › the consequences were a result of deficiencies within the railway system (e.g. if a protection measure failed),
- › the consequences occurred to passengers or staff (numbers of each group should be added together).

10.6.1 Definition

‘Other (accident)’ means any accident other than a collision of train with rail vehicle, collision of train with obstacle within the clearance gauge, derailment of train, level crossing accident, an accident to person involving rolling stock in motion or a fire in rolling stock.

10.6.2 Examples

This list is not exhaustive, and only some examples belonging to the type of “**other accidents**”:

- › collisions and derailments of shunting rolling stock/maintenance machines, including those on tracks closed for maintenance operations;
- › collisions and derailments purposefully caused by applying safety procedures in response to an emergency (e.g. application of a deraileur in an emergency case);
- › dangerous goods released during transport;
- › objects projected by trains, like ballast, ice, etc.;
- › electrocution related to rolling stock in motion.

Please note

In cases of doubt it might be useful to contact another NIB or the Agency to discuss whether the case should be investigated or not. The final decision has to be taken by the investigating body.

10.7 Other incidents

It is within the discretion of the NIB to investigate other incidents or not.⁴ When considering opening an investigation the following could be considered:

- (a) the seriousness of the incident;
- (b) whether it forms part of a series of incidents relevant to the system as a whole;
- (c) its impact on railway safety; and
- (d) requests from infrastructure managers, railway undertakings, the national safety authority or the member States.”

In chapter 11 Annex, a number of precursors from the common definitions for the CSIs in appendix to Annex 1 of Directive 2016/798 are listed. These precursors can also be used as examples of other incidents within the discretion of the NIB to investigate or not.

10.7.1 Definition

‘Other (incidents)’ means any occurrence, other than an accident or serious accident, affecting the safety of railway operations.

10.7.2 Examples

Example 1:

When a passenger train passed at the foot of the signal, the signal was displaying a Green signal, while the freight train occupied the last track circuit of the section. In normal situation, the occupation of the last track circuit in the section result in the display of a Red signal (at danger) for the signal.

This accident does not have to be investigated according to article 20 (1).

However, it should be checked whether an investigation according to article 20 (2) may be useful due to a high risk potential to lead to collision and a serious accident in a carriage of a passenger train.

The scope could among other include to verify the signalisation and may impact safety on other signals as well.

It is within the discretion of the NIB to investigate or not.

Please note:

In cases of doubt it might be useful to contact another NIB or the Agency to discuss whether the case should be investigated or not. The final decision has to be taken by the investigating body.

⁴ See also chapter 8 Not mandatory - NIB may decide to investigate or not

11 Annex

Annex I Definitions

Definitions of precursors according to the implementation guidance for CSIs.

“broken rail”

means any rail which is separated in two or more pieces, or any rail from which a piece of metal becomes detached, causing a gap of more than 50 mm in length and more than 10 mm in depth on the running surface.

Fracture of a rail, failure of a weld and failure of a fish-plate assembly are included.

Track rails, rails in switch panels (switch and stock rails), rails in closure panels, rail in crossing panels and rail in expansion joints are included.

Failures at fishplates are also included.

“track buckles and other track misalignment”

means any fault related to the continuum and the geometry of track, requiring track obstruction or immediate reduction of permitted speed.

‘wrong side signalling failure’

means any failure of a signalling system (either to infrastructure or to rolling stock), resulting in signalling information less restrictive than that demanded.

Wrong side signalling failure refers to signalling system technical failures. It describes a failure condition in a piece of railway signalling equipment that results in an unsafe state.

The following events of this non-exhaustive list is to be included according to the implementation guidance for CSIs (if related to the technical failure of a signalling system):

- › a green light aspect presented instead of an indication at danger, signal warning to slow down, caution signal announcing a stop signal or a speed restriction signal;
- › any signal less restrictive than a stop signal that is presented instead of a stop signal;
- › the presentation failure of a distant signal announcing a stop signal or a speed restriction signal;
- › incorrect detection of points;
- › Less restrictive information transmitted to driver cab via train-protection-system.

The following events are to be excluded:

- › malfunctions of the interlocking which do not lead to information less restrictive than a stop; e.g. automatic release of route locking before the train has left the section concerned;
- › malfunctions related to degraded modes.

Please note:

Events excluded according to the implementation guidance for CSIs is still within the discretion of the NIB to investigate or not. For example, track circuits not operating can be a serious incident because it can prevent a stop signal being presented to an approaching train when the block is occupied by another train.

“Signal Passed at Danger (SPAD)”

means any occasion when any part of a train proceeds beyond its authorised movement and travels beyond the danger point

Danger point is a point at which the train will be in a danger of an accident (collision, level-crossing accident, accident to person caused by rolling stock in motion or derailment). It is usually defined in the specifications of the Train Protection System.

A failure to stop a train at a station where prescribed in the timetable does not itself qualify for a SPAD, since it does not constitute an obstacle for an authorized movement of a train.

“...proceeds beyond its authorised movements...” as referred to above means to pass:

- › a trackside colour light signal or semaphore at danger, or an order to STOP where a Train Protection system (TPS) is not operational;
- › the end of a safety related movement authority provided in a TPS;
- › a point communicated by verbal or written authorisation laid down in regulations;
- › stop boards (buffer stops are not included) or hand signals.

Any case in which a vehicle without any traction unit attached or a train that is unattended runs away past a signal at danger is not included. Any case in which, for any reason, the signal is not turned to danger in time to allow the driver to stop the train before the signal is not included.

Stop markers only indicating where to stop within the boundaries of authorized movement, typically introduced for the convenience of passengers, should not be considered as stop boards.

‘broken wheel on rolling stock in service’

means a break affecting the wheel and creating a risk of accident (derailment or collision).

“Broken wheels” should include:

- › defects - fractures (complete separation of the material) having caused an accident;
- › defects - fractures or cracks identified during pre-departure checks or in operation of a severity to exclude the rolling stock from running.

Defects - Fractures or cracks detected in workshops during planned maintenance operations should be excluded.

‘broken axle on rolling stock in service’

means a break affecting the axle and creating a risk of accident (derailment or collision).

“Broken axle” should include:

- › defects - fractures (complete separation of the material) having caused an accident;
- › defects - fractures or cracks identified during pre-departure checks or in operation of a severity to exclude the rolling stock from running.

Defects - Fractures or cracks detected in workshops during planned maintenance operations should be excluded.

Annex II Estimation

The estimates are provided in order to support the investigator in roughly assessing the damage; they are based on the replacement value of the technical systems. In estimating the costs, the investigator should take into account the age and condition of the damaged material.

	Unit	Replacement value in €
freight train/passenger train locomotive	1	4 million
Shunting locomotive	1	2 million
locomotive/motor-section of high-speed train	1	8 million
passenger coach	1	2 million
coach of high-speed train	1	3 million
freight wagon	1	20.000 – 200.000
track renewal	metre	1.000
catenary renewal	metre	1.000
switch, small ($r = 190 \text{ m} \leq 300 \text{ m}$)	1	150.000
switch, medium ($r = 500 \leq 760 \text{ m}$)	1	200.000
switch, large ($r \geq 1200 \text{ m}$)	1	400.000
signal, small	1	50.000
signal, large	1	200.000

Table for the estimation of costs

Annex III Examples of Decision guideline

Good practice: Decision guideline Hungary

Accidents and incidents

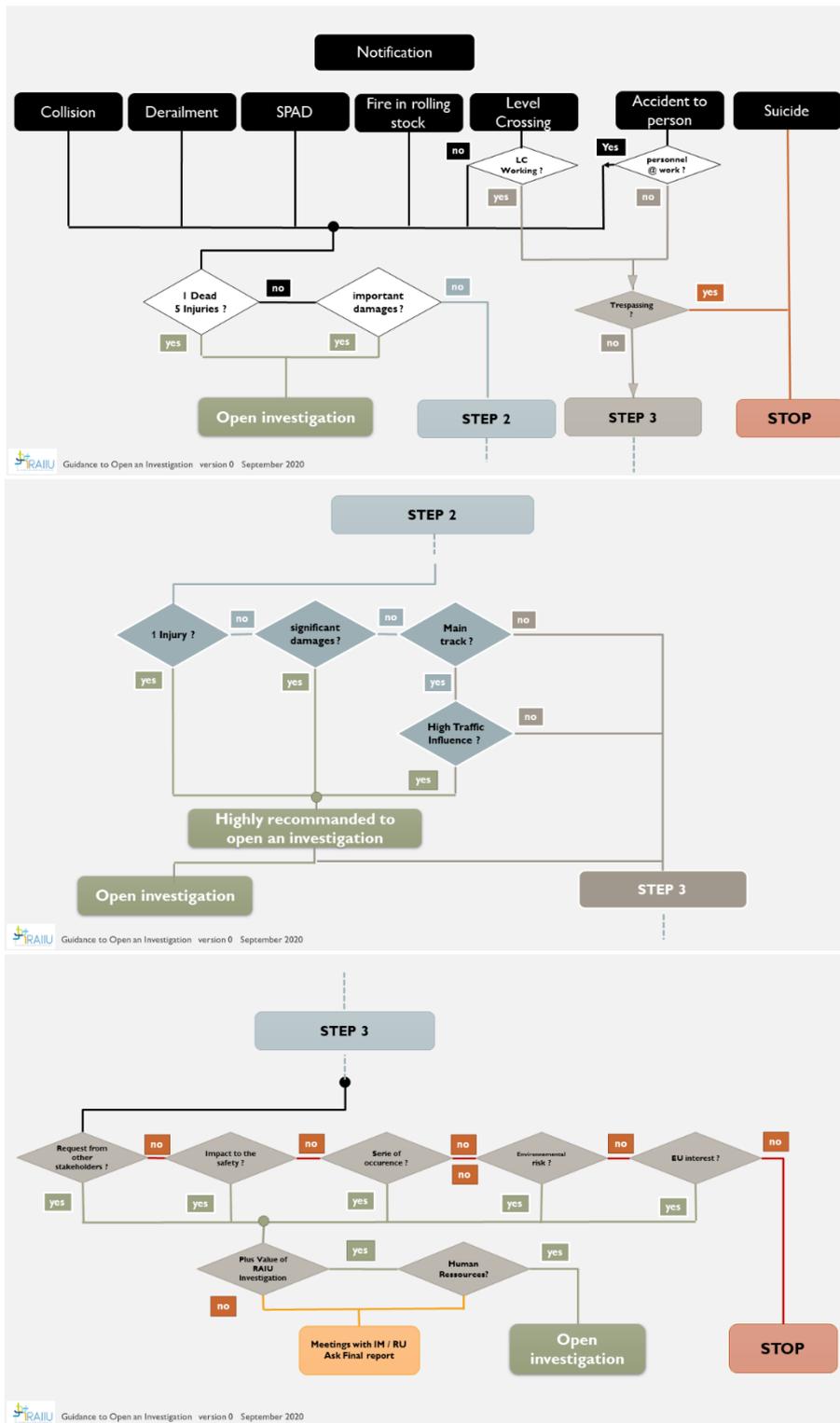
The table is only a guide, other decisions may be made based on circumstances and facts

Not for public use!

Occurrence			Consequence in persons								* remark	
			None	1	2	3	4	5	6	7		
Accident	Collision	train to train; train to shunting	● *	●	●	●	●	●	●	●	train without passengers→ OI	
		shunting to shunting	1*	○	○	●	●	●	●	●	High amount of damage→ may be	
		obstacle (except LO)	from rail system	1*	○	○	●	●	●	●	●	
			non rail system, animal	1	1	○	●	●	●	●	●	
	Derailment	train	railway, tramway and metro network	●	●	●	●	●	●	●	●	
			on other network	○	○	○	●	●	●	●	●	
		shunting	1	○	○	●	●	●	●	●	●	
	Level Crossing	consequence: derailment, fire on rail vehicle, injured person		●	●	●	●	●	●	●	●	
		dangerous good uncontrolled		●	●	●	●	●	●	●	●	
		failed rail system		●	●	●	●	●	●	●	●	
		"only" collision	pedestrian, bicycle	1	1	○	○	●	●	●	●	
			motorcycle	1	1	○	○	●	●	●	●	Questions: signaling system; visibility (angle, speed?)
	gépkocsi		○	○	○	●	●	●	●	●		
	Tram collision to road vehicle		1	1	1	○	○	●	●	●		
	ASP/CRSM	hit or collision from side		1	1	○	○	●	●	●	●	
		falling out	automatic closing door	○	○	○	●	●	●	●	●	
			non-automatic door	1	1	○	○	●	●	●	●	
		in vehicle	in general	1	1	1	○	○	●	●	●	
			object in clearance gauge	1	○	○	○	○	●	●	●	
	railway stuff		1	○	○	○	○	●	●	●		
Fire	DMU, EMU, passenger car		○	○	○	○	○	○	○	○		
	other		○	○	○	○	○	○	○	○		
Other		1	1	○	○	○	○	○	○			
			None	Finished point	Risk of collision	Disrupted track, moving metro from line	How to fix weather train					
Incident	SPAD	railway and metro network	●	●	●	●	●	●	●			
		tramway	1	1	○	○	○					
	Runaway		1	1	●	●	●					
	Face to face moving on same track		●									
	Track, signaling system, failure		1									
	Pantograph and over-line failure		1									
	Weather		1									
Suicide		> ...caused by moving...										
Security occurrence			1									

● Investigation by NIB ○ Investigation by operator ○ Detailed data collection 1 Database (one-sheet)

Good practice: Decision guideline Belgium



Annex IV Example of Risk Matrix from Portugal

ASSESSMENT OF THE CRITICALITY OF THE OCCURRENCE

Severity	<p>In case of Incident: Classify considering the most probable consequence if the occurrence had escalated to accident.</p>					
	<p>Critical Accident (when its consequences would result with high probability in a serious accident)</p>					
	<p>Dangerous Accident / Incident (when its consequences could result in a serious accident)</p>					
	<p>Moderate Accident / Incident No fatalities, but injured people and/or material damages</p>					
	<p>Minor Accident / Incident a) No victims nor important damages b) Deaths or injuries intentionally caused by the affected person or others.</p>					
	<p>Negligible Incident No victims nor damages</p>					
Classify the occurrence in severity and frequency		<p>Very rare At least once every 10 years</p>	<p>Rare At least once every 5 years</p>	<p>Occasional At least once a year</p>	<p>Frequent At least once every 6 months</p>	<p>Very frequent Several times a month</p>
		Frequency				
Justification of severity classification:						
Justification of frequency classification: (indicate if you consider local average or national network average)						

Possible increasing or reduction of the severity classification:

Were there any remaining safety barriers that prevented the accident/incident to escalate to a serious accident?

	There weren't any remaining safety barriers	Increase severity classification by one level
	It was not a serious accident only by chance or external circumstances (weather conditions, exceptional or no trained human actions or behaviours...)	Keep severity classification
	There were only one or two remaining safety barriers, but they depended upon an adequate human action or behaviour ("soft" barrier, such as regulations or procedures...)	Reduce severity classification by one level
	There was at least one technical safety barrier ("active" barrier, such as ATP, physical barrier...)	Reduce severity classification by two levels

Comments:

ASSESSMENT OF THE CRITICALITY OF THE OCCURRENCE

HIGH	Formal investigation
AVERAGE	Assess the realization of a summary investigation / formal investigation / safety study, considering the expected benefits and the availability of the NIB resources
LOW	Archive – Register in database

12 References

N°	Description	Reference	Version
/1/	Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railway and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying for the of railway infrastructure and safety certification (Railway Safety Directive)	Directive 2004/49	Corrigendum as amended by Directive 2008/57/EC, Directive 2008/110/EC Directive 2009/149/EC.
/2/	Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004	Regulation (EU) 2016/798	
/3/	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety	Directive 2016/798	
/4/	Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union	Directive 2016/797	
/5/	Commission Implementing Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation	Regulation 2020/572	