Assessment of achievement of safety targets – 2023

Main figures based on CSI data (up to 2021)

March 2023

EUROPEAN
UNION
AGENCY
FOR RAILWAYS

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2.   Reference documents

N°	Description	Reference
[1]	Commission Decision of 5 June 2009 on the adoption of a common safety method for assessment of achievement of safety targets, as referred to in Article 6 of Directive 2004/49/EC of the European Parliament and of the Council	2009/460/EC (CSM CST)
[2]	Commission Decision of 23 April 2012 on the second set of common safety targets as regards the rail system	2012/226/EU
[3]	Commission implementing decision of 11 December 2013 amending Decision 2012/226/EU on the second set of common safety targets for the rail system	2013/753/EU
[4]	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (recast of the Railway Safety Directive)	(EU) 2016/798

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3.   List of terms and abbreviations

Term / Abbreviation	Definition
Agency	European Union Agency for Railways (formerly European Railway Agency, ERA)
CSI	Common Safety Indicator
CSM	Common Safety Method
CST	Common Safety Target
EC	European Commission
Eurobase	Eurostat dissemination database
EU	European Union
MS	Member State
MWA	Moving Weighted Average
NSA	National Safety Authority
NRV	National Reference Value
OBS	Annual observation

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4. Executive summary

This report presents the fourteenth assessment of achievement of safety targets carried out by the Agency in accordance with the Common Safety Method (CSM) as defined in Commission Decision 2009/460/EC [1]. It is the twelfth assessment using the second set of Common Safety Targets (CSTs) and National Reference Values (NRVs) [2][3]. The assessment uses Common Safety Indicator (CSI) data for the years 2017-2021[1] for the 25 EU Member States that have a railway system plus Norway.

The results of the assessment indicate a possible deterioration of safety performance in the following Member States (by risk category):

› Czechia (Others);
› Germany (Others);
› Portugal (Others);
› Slovakia (Staff and Others).

The assessment shows that railway safety performance remains acceptable at the EU level for all categories of railway users.

In accordance with Article 5 of the Method [1], the Member States for which there is a 'possible deterioration of safety performance' in any category of railway user shall send to the Commission a report explaining the likely causes of the results obtained.

The Agency refers the readers of this report to the ex-post evaluation[2] of the Method [1] to better interpret the results. One important point is that the reference values were set using Eurostat data while the current calculations are performed using CSI data only. The way in which accidents are allocated to different risk categories differs between these two sources, which influences some results, notably for the risk category 'Others'.

Second, the NRVs were set using 2004-2009 data. Railway safety has improved considerably since then. A consequence is that countries that strongly improved their safety levels since 2009, but in recent years show a deterioration, are not flagged as such. A revision of the NRVs is thus strongly recommended so that reference values of greater relevance and accuracy are used.

The Agency also emphasizes that the CSM CST is limited as a method to address safety deteriorations swiftly and proactively, largely due to the lag in time between reporting and assessment. A fast implementation of the common safety methods for assessing safety level and safety performance (CSM ASLP), with the associated systematic and comprehensive EU-wide safety incidents reporting scheme, would provide an additional angle to assess and improve how safety is managed across Europe. Moreover, the CSM ASLP will determine safety levels and safety performance on both the operator and Member State level. These insights will enable more targeted actions.

Finally, a new iteration of the "priority country programme" could be beneficial for the countries that show a safety performance significantly below the EU average.

Taken together these measures would contribute to further improving railway safety across Europe.

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[1] Therefore, the tragic train collision which occurred in Tempi, central Greece, on the 28 February 2023 is not considered in this year's assessment.

[2] https://www.era.europa.eu/system/files/2022-10/Report%20-%20Common%20Safety%20Method%20for%20Assessment%20of%20Achievement%20of%20Safety%20Targets.pdf

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5. Introduction

Common safety targets ('CSTs') and CSMs have been gradually introduced to ensure that safety is maintained at a high level and, when and where necessary and reasonably practicable, improved. They should provide tools for the assessment of the safety and performance of operators at Union level as well as in the Member States. Common safety indicators ('CSIs') have been established in order to assess whether systems comply with the CSTs and to facilitate the monitoring of railway safety performance.[3]

This report presents the results of the annual assessment of achievement of NRVs and CSTs as set out in Article 7 of the Railway Safety Directive [4] and in accordance with the CSM defined in Decision 2009/460/EC (hereafter referred to as the Method)[1].

The current assessment is the twelfth carried out by the Agency using the second set of NRVs/CSTs [2][3].

6. Method for assessing achievement of safety targets

6.1. Data

According to point 3.1.4 of the Annex to the Method [1], the assessment shall be carried out annually by the Agency taking into consideration the most recent five preceding reported years. Therefore, the current assessment uses CSI data for the years 2017-2021.

Until 2015, the CSI data was compared to the Eurostat data derived from Eurostat's Common Questionnaire, and the latter would have precedence. Since 2016 Eurostat extracts rail safety data directly from the CSI dataset, meaning that there is one single data source.

The NRVs were set using Eurostat data. It is noted that the numbers for the categories 'level crossing users', 'unauthorised persons' and 'others' were inferred[4], as they were not directly available in Eurobase[5]. The ex-post evaluation of the CSM CST that can be found on the ERA website, reflects on how the results of this assessment should be interpreted in light of such data limitations.

6.2. Definitions

The following definitions are used in the assessment:

› **'fatalities and weighted serious injuries (FWSIs)'** means a measurement of the consequences of significant accidents combining fatalities and serious injuries, where 1 serious injury is considered statistically equivalent to 0.1 fatalities;

› **'passengers'** means all persons, excluding members of the train crew, who make a trip by rail, including passengers trying to embark onto or disembark from a moving train for accident statistics only;

› **'staff including employees or contractors'** means any persons whose employment is in connection with a railway and is at work at the moment of the accident; it includes the crew of the train and persons handling rolling stock and infrastructure installations;

› **'level crossing users'** means all persons using a level crossing to cross the railway line by any means of transportation or by foot;

› **'others'** means all persons not defined as 'passengers', 'staff including employees or contractors', 'level crossing users' or 'trespassers';

› **'trespassers'** means any persons present on railway premises where such presence is forbidden, with the exception of level crossing users; and

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[3] (EU) 2016/798 Recital 11 [2]

[4] As described in the Annex of the "Report on the development of the second set of CSTs"

[5] In Eurobase only the following 3 categories of victims were available: passengers, employees and others.

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› **'*societal* risks'** means the collective risk to all categories of persons listed in Article 7(1)(a) of Directive (EU) 2016/798 [4].

6.3.   Four-step assessment procedure

The four-step assessment procedure described in chapter 3 of the Annex to the Method [1] was applied to each of the six risk categories[6]:

› Passengers (1.1 and 1.2);
› Staff including employees or contractors (2);
› Level crossing users (3.1)[7];
› Others (4)[8];
› Trespassers (5);
› Societal risk (6).

The four steps of the assessment procedure are described in the flowchart in Figure 1, adapted from Appendix 2 of the Annex to the Method [1]. The positive decisional arrows correspond to a passed result and the negative decisional arrows correspond to a failed result of the different assessment steps.

The first step and first part of the second step are performed autonomously by the Agency using CSI data. In the second part of the second step, the Agency contacts the national safety authority of the concerned Member States to retrieve information on the single highest-consequence accident in the five most recently reported years and asks whether that accident was more severe than the most severe single accident included in the data used for setting the NRVs/CSTs (period 2004-2009). If so, that recent single event shall be excluded from the calculations.

The third and fourth steps are carried out autonomously by the Agency with CSI data and the outcomes of previous assessments. A detailed description of the content of each step is available in section 3.2 of the Annex to the Method [1].

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[6] *This report uses the risk categories' names defined in (EU) 2016/798. Annex 2 provides the correspondence of risk categories' names across the applicable legislation.*

[7] *The NRVs and CSTs for the risk category 3.2 were not established in the second set of NRVs/CSTs due to the lack of reliable data.*

[8] *This includes the CSIs 'other person at a platform' and 'other person not at a platform'.*
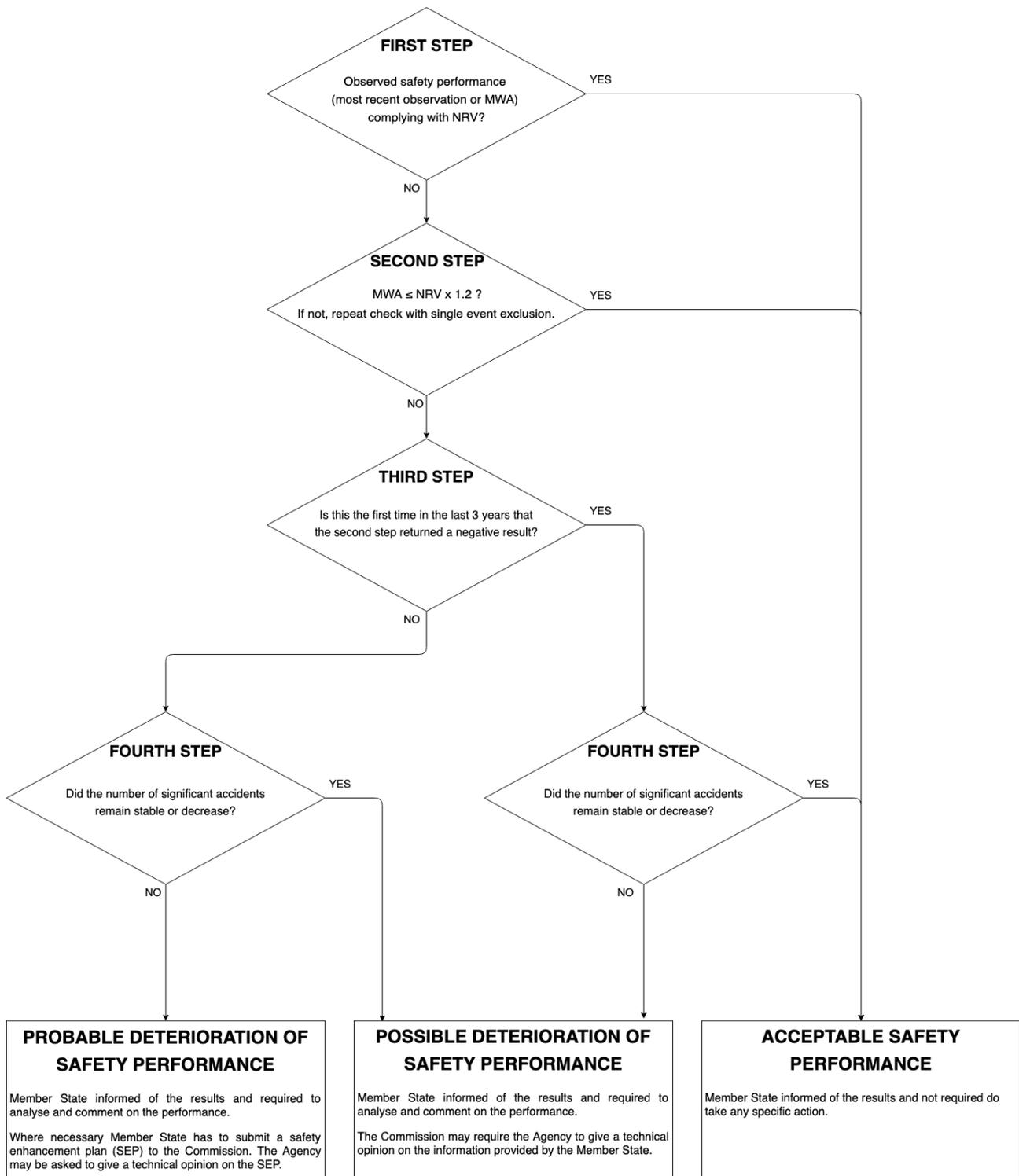
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FIRST STEP

Observed safety performance
(most recent observation or MWA)
complying with NRV?

YES

NO

SECOND STEP

MWA ≤ NRV x 1.2 ?
If not, repeat check with single event exclusion.

YES

NO

THIRD STEP

Is this the first time in the last 3 years that
the second step returned a negative result?

YES

NO

FOURTH STEP

Did the number of significant accidents
remain stable or decrease?

YES

NO

FOURTH STEP

Did the number of significant accidents
remain stable or decrease?

YES

NO

**PROBABLE DETERIORATION OF
SAFETY PERFORMANCE**

Member State informed of the results and required to
analyse and comment on the performance.

Where necessary Member State has to submit a safety
enhancement plan (SEP) to the Commission. The Agency
may be asked to give a technical opinion on the SEP.

**POSSIBLE DETERIORATION OF
SAFETY PERFORMANCE**

Member State informed of the results and required to
analyse and comment on the performance.

The Commission may require the Agency to give a technical
opinion on the information provided by the Member State.

**ACCEPTABLE SAFETY
PERFORMANCE**

Member State informed of the results and not required do
take any specific action.

Figure 1 : Decision flowchart for assessing achievement of NRVs and CSTs. (adapted from Appendix 2 of the Annex to the Method [1])

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7. Results of the assessment

7.1. First and second steps of the assessment procedure

The majority of Member States achieved a 'passed' result at either the first or second steps of the assessment for all the risk categories, indicating acceptable safety performance. As shown in Table 1, three Member States had a 'failed' result in one risk category while one Member State 'failed' in two risk categories.

Table 1 : Intermediate results of the assessment: Member States failing after the first part of the second step (i.e. after applying the 20% tolerance)

Risk category						
Passengers		*Staff including employees or contractors*	*Level crossing users*	*Others*	*Trespassers*	*Societal risk*
1.1	*1.2*	*2*	*3.1*	*4*	*5*	*6*
-	-	Slovakia	-	Czechia Germany Portugal Slovakia	-	-

According to point 3.2.3 of the Annex to the Method [1], if the 20 % tolerance is not met, the Agency shall ask the national safety authority (NSA) of the Member State concerned to provide the specifics of the single highest-consequence accident (in terms of FWSIs) in the assessed period, here the period 2017-2021. This accident shall be excluded if it is more severe, in terms of consequences, than the most severe single accident included in the data used for setting the NRVs/CSTs (period 2004-2009).

The concerned NSAs were contacted. None of them indicated that any of the relevant accidents in the 2017-2021 period was more severe than those that occurred between 2004 and 2009. As such, there were no intermediate changes because of the exclusion of an accident.

The detailed results of the second step of the assessment are summarized in Annex 3.

Annex 4 provides a historical overview of the Member States that had a negative result after the second step

7.2. Third and fourth steps of the assessment procedure

The application of the third step established that for all cases, it was either the second or third time that a negative result was obtained for the specific risk category in the last three years.

In the fourth step of the assessment the number of significant accidents was evaluated.

In Finland a statistically significant increase in the number of accidents was noted in the 'level-crossing' and 'all' accidents categories, but no negative assessment occurred in step 2 or 3. In the category 'accidents to persons' a significant increase was noted in Czechia and Luxembourg. These countries did not show a negative assessment in step 2 or 3.

The final results of the assessment are summarised in 2.

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Table 2 : Result of the assessment after applying all four steps of the assessment method – showing countries with a 'Possible deterioration of safety performance'

Risk category						
Passengers		Staff including employees or contractors	Level crossing users	Others	Trespassers	Societal risk
1.1	1.2	2	3.1	4	5	6
-	-	Slovakia	-	Czechia Germany Portugal Slovakia	-	-

This completes the assessment of achievement of safety targets.

Annex 5 provides an overview of the Member States that had a negative result after the final step in the past years.

7.3.   Analysis of the results

This annual assessment of achievements of safety targets identified the acceptable safety performance in the categories 'Passengers', 'Level crossing users', 'Trespassers' and 'Societal risks' in all Member States.

A "possible deterioration of safety performance" was identified in one Member States for the category 'Staff including employees or contractors' and in four Member States for the category 'Others'.

The assessment also shows that railway safety performance remains acceptable at the EU level for all categories of railway users.

7.3.1.   Data limitations

The second set of NRVs was established using 2004-2009 safety data. The accuracy of data from that period is lower than that of more recent years. Notably, for years 2004 and 2005 the safety data in some categories were not fully harmonised and there have been cases of underreporting in the category 'Others'.

It is also noted that railway safety data available in Eurobase was used in the assessments for the years until 2015. CSI data is used exclusively since 2016. Whilst the differences in data from these sources are generally small, an effect on the results has been observed, notably on the number of deteriorations under the category 'Others'. More information on this limitation can be found in the Agency evaluation report on the CSM CST.

7.3.2.   Method limitations

The 2023 assessment confirms that negative results are more likely to be obtained when the FWSI has a low value (e.g. in the category of 'staff' or 'others'). This points to a particular limitation of the method, which would become more pertinent if a new set of NRVs (using more recent and generally lower FWSI values) were to be used.

Another limitation relates to the time between reporting and assessment, which is quite large. The common safety method for assessing the safety level and safety performance of railway operators (CSM ASLP) would

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substantially improve the level of detail and timeliness of the assessments, thanks to the systematic and comprehensive EU-wide safety incidents reporting scheme. The CSM ASLP would focus on operators but gives the possibility to aggregate results on a Member State level.

Finally, a new iteration of the "priority country programme" could be beneficial for those countries that show a safety performance significantly below the EU average in order to identify the issues involved and put forward relevant actions for improvement. This exercise would build on the first round of this programme and would contribute towards convergence and improvement in safety performance across the EU Member States.

8. Conclusions

This assessment of the achievement of safety targets identified a "possible deterioration of safety performance" in four EU Member States for two categories of railway users. In not a single EU Member State a "probable deterioration of safety performance" was observed.

It was found that railway safety in the EU remains acceptable for all categories of users. The Agency emphasizes nevertheless the enduring need to improve railway safety across the EU.

In accordance with Article 5 of the Method, the Member States with a possible deterioration of safety performance shall send to the Commission a report explaining the likely causes of the results obtained.

The Agency refers the readers of this report to the ex-post evaluation of the CSM CST to better interpret the results and to find several recommendations to improve the Method. The Agency iterates its advice to revise the NRVs.

In addition, the Agency highlights that the CSM ASLP would provide a powerful system for operators and Member States to assess safety levels and safety performance. Together with a new iteration of the 'priority country programme' real steps could be made to further improve railway safety across Europe.

Annex 1 Overview of annual assessments

This is the fourteenth assessment of achievement of CSTs carried out by the Agency. The table below provides an overview of the specificities of all previous assessments made by the Agency.

CST report	Publication year	CSTs/NRVs set	MWA period	OBS year
1	2010	1st set of CSTs/NRVs (2004–2008)	MWA (4 years) 2005–2008	OBS 2008
2	2011	1st set of CSTs/NRVs (2004–2008)	MWA (4 years) 2006–2009	OBS 2009
3	2012	2nd set of CSTs/NRVs (2004–2008)	MWA (5 years) 2006–2010	OBS 2010
4	2013	2nd set of CSTs/NRVs (2004–2008)	MWA (5 years) 2007–2011	OBS 2011
5	2014	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2008–2012	OBS 2012
6	2015	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2009–2013	OBS 2013
7	2016	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2010–2014	OBS 2014
8	2017	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2011–2015	OBS 2015
9	2018	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2012–2016	OBS 2016
10	2019	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2013–2017	OBS 2017
11	2020	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2014–2018	OBS 2018
12	2021	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2015–2019	OBS 2019
13	2022	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2016–2020	OBS 2020
14	2023	2nd set of CSTs/NRVs (amended) (2004–2008)	MWA (5 years) 2017–2021	OBS 2021

Annex 2   Names of risk categories across the relevant legislation

Risk Category	2009/460/EC		2012/226/EU	2013/753/EU	(EU)2016/798
	Art. 3	Appendix 1 of the Annex	Annex	Annex	Art. 7
1.1	Passengers				
1.2					
2	'Staff' or 'employees including the staff of contractors'	Employees			Staff including employees or contractors
3.1	Level crossing users				
4	Others (third parties)	Others	Persons classified as "others"	Persons classified as "others"	Others
5	Unauthorised persons on railway premises				Trespassers
6	Risk to the society as a whole	Whole society	Societal risks		

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Annex 3 Results after the 2nd step of the assessment.

Member State	Risk category 1.1 – 'Passengers'				
	NRV (*10⁻⁹) [2004-2009]	OBS (*10⁻⁹) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA (*10⁻⁹) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	37.26	0.00	Yes	0.90	Yes
Bulgaria (BG)	207.00	9.43	Yes	24.42	Yes
Czechia (CZ)	46.49	19.81	Yes	12.49	Yes
Denmark (DK)	9.03	1.68	Yes	8.76	Yes
Germany (DE)	8.13	0.48	Yes	2.69	Yes
Estonia (EE)	78.18	0.00	Yes	6.92	Yes
Ireland (IE)	2.74	0.00	Yes	0.00	Yes
Greece (EL)	54.67	0.00	Yes	35.37	Yes
Spain (ES)	29.19	8.79	Yes	8.99	Yes
France (FR)	22.53	1.04	Yes	3.68	Yes
Croatia (HR)	176.90	0.00	Yes	4.82	Yes
Italy (IT)	38.10	4.31	Yes	6.82	Yes
Latvia (LV)	78.18	0.00	Yes	15.00	Yes
Lithuania (LT)	97.16	0.00	Yes	0.00	Yes
Luxembourg (LU)	23.81	13.56	Yes	0.80	Yes
Hungary (HU)	170.18	7.12	Yes	26.68	Yes
Netherlands (NL)	7.43	0.00	Yes	0.20	Yes
Austria (AT)	26.25	3.54	Yes	5.84	Yes
Poland (PL)	116.13	6.24	Yes	7.72	Yes
Portugal (PT)	41.82	3.41	Yes	4.51	Yes
Romania (RO)	57.40	1.81	Yes	10.49	Yes
Slovenia (SI)	25.27	0.00	Yes	24.49	Yes
Slovakia (SK)	62.05	0.00	Yes	31.38	Yes
Finland (FI)	9.03	3.05	Yes	2.02	Yes
Sweden (SE)	3.54	0.00	Yes	0.05	Yes
Norway (NO)	2.83	0.00	Yes	1.47	Yes
Scaling basis – Passenger train-km per year.					

Member State	Risk category 1.2 – 'Passengers'				
	NRV (*10^{-9}) [2004-2009]	OBS (*10^{-9}) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA (*10^{-9}) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	0.32	0.00	Yes	0.01	Yes
Bulgaria (BG)	1.91	0.17	Yes	0.38	Yes
Czechia (CZ)	0.82	0.40	Yes	0.21	Yes
Denmark (DK)	0.11	0.03	Yes	0.11	Yes
Germany (DE)	0.08	0.01	Yes	0.03	Yes
Estonia (EE)	0.67	0.00	Yes	0.08	Yes
Ireland (IE)	0.03	0.00	Yes	0.00	Yes
Greece (EL)	0.50	0.00	Yes	0.30	Yes
Spain (ES)	0.27	0.08	Yes	0.06	Yes
France (FR)	0.11	0.01	Yes	0.02	Yes
Croatia (HR)	1.14	0.00	Yes	0.00	Yes
Italy (IT)	0.26	0.05	Yes	0.05	Yes
Latvia (LV)	0.67	0.00	Yes	0.14	Yes
Lithuania (LT)	0.76	0.00	Yes	0.00	Yes
Luxembourg (LU)	0.18	0.33	No	0.02	Yes
Hungary (HU)	1.65	0.11	Yes	0.34	Yes
Netherlands (NL)	0.09	0.00	Yes	0.00	Yes
Austria (AT)	0.29	0.05	Yes	0.06	Yes
Poland (PL)	0.85	0.07	Yes	0.07	Yes
Portugal (PT)	0.31	0.03	Yes	0.04	Yes
Romania (RO)	0.61	0.02	Yes	0.12	Yes
Slovenia (SI)	0.36	0.00	Yes	0.36	Yes
Slovakia (SK)	0.88	0.00	Yes	0.30	Yes
Finland (FI)	0.11	0.03	Yes	0.02	Yes
Sweden (SE)	0.03	0.00	Yes	0.00	Yes
Norway (NO)	0.03	0.00	Yes	0.02	Yes
Scaling basis – Passenger-km per year.					

Member State	Risk category 2 - 'Staff including employees or contractors'				
	NRV ($*10^{-9}$) [2004-2009]	OBS ($*10^{-9}$) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA ($*10^{-9}$) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	24.63	10.03	Yes	9.24	Yes
Bulgaria (BG)	20.40	6.38	Yes	10.60	Yes
Czechia (CZ)	16.45	29.90	No	12.56	Yes
Denmark (DK)	9.10	0.00	Yes	1.51	Yes
Germany (DE)	12.56	7.87	Yes	7.19	Yes
Estonia (EE)	64.83	0.00	Yes	2.45	Yes
Ireland (IE)	5.22	11.24	No	2.67	Yes
Greece (EL)	77.87	0.00	Yes	22.06	Yes
Spain (ES)	8.81	1.22	Yes	4.82	Yes
France (FR)	6.06	2.77	Yes	4.06	Yes
Croatia (HR)	73.65	52.61	Yes	7.28	Yes
Italy (IT)	18.85	6.31	Yes	6.93	Yes
Latvia (LV)	64.83	0.00	Yes	3.84	Yes
Lithuania (LT)	41.01	0.00	Yes	32.64	Yes
Luxembourg (LU)	11.99	12.23	No	11.18	Yes
Hungary (HU)	9.31	13.94	No	4.85	Yes
Netherlands (NL)	5.97	0.00	Yes	1.04	Yes
Austria (AT)	20.29	0.62	Yes	1.72	Yes
Poland (PL)	17.18	0.38	Yes	11.32	Yes
Portugal (PT)	53.09	27.97	Yes	29.53	Yes
Romania (RO)	22.30	40.07	No	23.87	Yes
Slovenia (SI)	40.88	5.05	Yes	13.99	Yes
Slovakia (SK)	2.71	43.21	No	19.78	No
Finland (FI)	9.21	0.00	Yes	0.37	Yes
Sweden (SE)	2.86	0.00	Yes	9.32	No
Norway (NO)	2.82	0.00	Yes	1.27	Yes
Scaling basis - Train-km per year.					

Member State	Risk category 3.1 - 'Level crossing users'				
	NRV (*10⁻⁹) [2004-2009]	OBS (*10⁻⁹) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA (*10⁻⁹) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	138.00	95.29	Yes	92.35	Yes
Bulgaria (BG)	141.60	143.48	No	162.67	Yes
Czechia (CZ)	237.76	110.41	Yes	136.16	Yes
Denmark (DK)	65.43	17.60	Yes	16.91	Yes
Germany (DE)	67.76	24.78	Yes	33.15	Yes
Estonia (EE)	399.88	191.78	Yes	298.58	Yes
Ireland (IE)	23.57	0.00	Yes	0.00E+00	Yes
Greece (EL)	710.26	584.27	Yes	400.74	Yes
Spain (ES)	108.72	26.84	Yes	30.86	Yes
France (FR)	78.72	51.90	Yes	50.38	Yes
Croatia (HR)	611.30	320.42	Yes	312.35	Yes
Italy (IT)	42.87	11.52	Yes	13.15	Yes
Latvia (LV)	239.16	90.09	Yes	269.15	Yes
Lithuania (LT)	521.65	0.00	Yes	71.63	Yes
Luxembourg (LU)	95.90	122.32	No	55.77	Yes
Hungary (HU)	274.20	205.39	Yes	202.87	Yes
Netherlands (NL)	126.54	58.78	Yes	54.50	Yes
Austria (AT)	160.16	55.69	Yes	62.60	Yes
Poland (PL)	277.30	189.58	Yes	201.67	Yes
Portugal (PT)	460.58	207.00	Yes	207.40	Yes
Romania (RO)	542.00	222.31	Yes	241.29	Yes
Slovenia (SI)	364.15	131.29	Yes	133.61	Yes
Slovakia (SK)	309.00	261.22	Yes	203.95	Yes
Finland (FI)	163.75	184.32	No	102.51	Yes
Sweden (SE)	63.98	58.57	Yes	28.90	Yes
Norway (NO)	21.61	0.00	Yes	16.85	Yes
Scaling basis - Train-km per year.					

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Member State	Risk category 4 - 'Others'				
	NRV ($*10^{-9}$) [2004-2009]	OBS ($*10^{-9}$) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA ($*10^{-9}$) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	2.86	1.00	Yes	4.39	No
Bulgaria (BG)	35.47	31.88	Yes	33.54	Yes
Czechia (CZ)	2.41	6.90	No	13.17	No
Denmark (DK)	14.15	0.00	Yes	1.51	Yes
Germany (DE)	3.05	6.24	No	6.89	No
Estonia (EE)	11.64	0.00	Yes	0.00	Yes
Ireland (IE)	7.00	0.00	Yes	0.00	Yes
Greece (EL)	4.51	0.00	Yes	0.00	Yes
Spain (ES)	5.54	2.44	Yes	15.43	No
France (FR)	7.71	8.30	No	7.53	Yes
Croatia (HR)	7.28	0.00	Yes	0.00	Yes
Italy (IT)	6.70	0.00	Yes	0.08	Yes
Latvia (LV)	11.64	0.00	Yes	11.27	Yes
Lithuania (LT)	11.64	0.00	Yes	0.00	Yes
Luxembourg (LU)	5.46	0.00	Yes	0.00	Yes
Hungary (HU)	4.51	0.93	Yes	3.50	Yes
Netherlands (NL)	4.70	0.00	Yes	6.67	No
Austria (AT)	11.09	0.00	Yes	0.58	Yes
Poland (PL)	11.64	0.38	Yes	1.21	Yes
Portugal (PT)	5.54	30.77	No	29.83	No
Romania (RO)	2.83	0.00	Yes	0.00	Yes
Slovenia (SI)	14.48	0.00	Yes	0.00	Yes
Slovakia (SK)	2.41	39.28	No	18.95	No
Finland (FI)	14.15	0.00	Yes	0.00	Yes
Sweden (SE)	14.15	0.64	Yes	0.57	Yes
Norway (NO)	14.15	0.00	Yes	0.00	Yes
Scaling basis - Train-km per year.					

Member State	Risk category 5 - 'Trespassers'				
	NRV ($*10^{-9}$) [2004-2009]	OBS ($*10^{-9}$) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA ($*10^{-9}$) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	72.64	50.15	Yes	49.30	Yes
Bulgaria (BG)	900.20	373.04	Yes	392.82	Yes
Czechia (CZ)	301.26	79.36	Yes	47.91	Yes
Denmark (DK)	116.24	51.20	Yes	69.90	Yes
Germany (DE)	113.08	61.40	Yes	85.07	Yes
Estonia (EE)	1547.95	13.70	Yes	190.92	Yes
Ireland (IE)	85.23	56.18	Yes	65.32	Yes
Greece (EL)	722.94	157.30	Yes	571.03	Yes
Spain (ES)	167.83	65.26	Yes	53.31	Yes
France (FR)	67.16	54.90	Yes	73.17	Yes
Croatia (HR)	676.30	153.04	Yes	359.88	Yes
Italy (IT)	119.25	120.13	No	120.75	Yes
Latvia (LV)	1314.28	495.50	Yes	452.60	Yes
Lithuania (LT)	2045.34	560.81	Yes	503.33	Yes
Luxembourg (LU)	79.92	122.32	No	11.39	Yes
Hungary (HU)	588.06	256.51	Yes	498.55	Yes
Netherlands (NL)	15.93	13.13	Yes	12.86	Yes
Austria (AT)	119.03	42.70	Yes	43.84	Yes
Poland (PL)	1213.09	387.17	Yes	443.48	Yes
Portugal (PT)	834.33	257.35	Yes	378.74	Yes
Romania (RO)	1388.20	700.52	Yes	679.89	Yes
Slovenia (SI)	236.44	0.00	Yes	6.18	Yes
Slovakia (SK)	1758.00	310.33	Yes	369.50	Yes
Finland (FI)	248.74	42.37	Yes	29.52	Yes
Sweden (SE)	94.83	27.68	Yes	34.09	Yes
Norway (NO)	91.81	2.08	Yes	19.69	Yes
Scaling basis - Train-km per year.					

Member State	Risk category 6 – 'Societal risks'				
	NRV ($*10^{-9}$) [2004-2009]	OBS ($*10^{-9}$) [2021]	OBS $\leqq$ NRV (Yes/No)	MWA ($*10^{-9}$) [2017-2021]	MWA $\leqq$ NRV*1.2 (Yes/No)
Belgium (BE)	275.05	156.47	Yes	157.02	Yes
Bulgaria (BG)	1440.00	561.15	Yes	637.91	Yes
Czechia (CZ)	591.22	242.09	Yes	226.24	Yes
Denmark (DK)	217.92	70.40	Yes	107.83	Yes
Germany (DE)	203.16	100.64	Yes	133.94	Yes
Estonia (EE)	2107.86	205.48	Yes	507.84	Yes
Ireland (IE)	114.43	67.42	Yes	68.86	Yes
Greece (EL)	1535.77	741.57	Yes	1147.99	Yes
Spain (ES)	322.57	103.08	Yes	110.15	Yes
France (FR)	179.94	118.80	Yes	138.71	Yes
Croatia (HR)	1467.00	526.06	Yes	676.70	Yes
Italy (IT)	230.95	141.52	Yes	152.13	Yes
Latvia (LV)	1658.79	585.59	Yes	760.43	Yes
Lithuania (LT)	2587.94	560.81	Yes	605.82	Yes
Luxembourg (LU)	209.70	269.11	No	123.73	Yes
Hungary (HU)	1020.00	482.34	Yes	749.18	Yes
Netherlands (NL)	148.17	71.91	Yes	74.47	Yes
Austria (AT)	329.01	101.49	Yes	119.47	Yes
Poland (PL)	1590.22	581.71	Yes	668.35	Yes
Portugal (PT)	1361.81	525.88	Yes	639.23	Yes
Romania (RO)	1704.36	964.19	Yes	954.24	Yes
Slovenia (SI)	697.89	136.34	Yes	186.69	Yes
Slovakia (SK)	1131.08	654.04	Yes	646.22	Yes
Finland (FI)	416.98	228.81	Yes	134.64	Yes
Sweden (SE)	169.19	86.89	Yes	78.77	Yes
Norway (NO)	50.87	2.08	Yes	43.38	Yes
Scaling basis - Train-km per year.					

Annex 4   Overview of 'fail' results after the 2nd step of past assessments (2010 – 2022)

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1[9]	1.2[10]	2	3.1	4	5	6
2010 Assessment 2008 Data	Greece Slovakia	Greece Slovakia	Lithuania Romania	Romania	n.a.	Romania Slovakia	Romania Slovakia
2011 Assessment 2009 Data	Slovakia Slovenia	Slovakia Slovenia	Belgium Finland Lithuania Romania	Estonia Romania Slovenia	n.a.	Romania Slovakia	Romania Slovakia
2012 Assessment 2010 Data	Belgium Greece Spain Slovakia	Belgium Greece Slovakia	Bulgaria Estonia Romania Slovakia	Ireland Romania	n.a.	Romania Slovakia Sweden	Ireland Romania Slovakia
2013 Assessment 2011 Data	Slovakia	Slovakia	Bulgaria Finland Romania Slovakia		Romania	Romania Slovakia Sweden	[Norway] Romania
2014 Assessment 2012 Data			Bulgaria Lithuania Romania Slovakia Slovenia Sweden	Bulgaria	Croatia Netherlands Romania	Italy	[Norway] Slovakia

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[9] Scaling base: passenger train-km per year.

[10] Scaling base: passenger-km per year.

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1[11]	1.2[12]	2	3.1	4	5	6
2015 Assessment 2013 Data	Spain	Spain	Romania Slovakia	Bulgaria [Norway]	Belgium	Croatia France Italy [Norway]	[Norway] Slovakia
2016 Assessment 2014 Data			Hungary Romania Slovakia Sweden	[Norway] Bulgaria	Hungary	France Italy [Norway]	Slovakia
2017 Assessment 2015 Data			Austria Bulgaria Slovakia Sweden	[Norway]		Italy [Norway]	[Norway] Slovakia
2018 Assessment 2016 Data			Bulgaria Hungary Slovakia	Bulgaria	Hungary	Italy	
2019 Assessment 2017 Data			Slovakia	[Norway]	Czechia Latvia Portugal	France	

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[11] Scaling base: passenger train-km per year.
[12] Scaling base: passenger-km per year.

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1[13]	1.2[14]	2	3.1	4	5	6
2020 Assessment 2018 Data			Bulgaria Slovakia Sweden		Belgium Czechia Germany Latvia Hungary Netherlands Portugal	France	
2021 Assessment 2019 Data			Sweden	Latvia	Belgium Czechia Germany Spain Netherlands Portugal	France	
2022 Assessment 2020 Data			Sweden Slovakia	Bulgaria	Czechia Germany Spain Netherlands Portugal Slovakia	France	

Notes: [ ] refer to the fact that Norway is not a MS.

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[13] Scaling base: passenger train-km per year.
[14] Scaling base: passenger-km per year.

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Annex 5   Overview of final results of past assessments (2010 – 2022)

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1[15]	1.2[16]	2	3.1	4	5	6
2010 Assessment 2008 CSI Data			(Romania)	(Romania)	n.a.	(Romania)	(Romania)
2011 Assessment 2009 CSI Data	Slovakia	Slovakia	Lithuania **Romania**	Romania	n.a.	Romania Slovakia	**Romania** Slovakia
2012 Assessment 2010 CSI Data					n.a.	Sweden	
2013 Assessment 2011 CSI Data	Slovakia	Slovakia	**Bulgaria** Romania Slovakia		Romania	Romania Slovakia Sweden	Romania
2014 Assessment 2012 CSI Data			Bulgaria Romania Slovakia Sweden	Bulgaria	(Croatia[17]) (Romania)		[Norway]
2015 Assessment 2013 CSI Data			Romania Slovakia	Bulgaria		Italy [Norway]	Slovakia [Norway]
2016 Assessment 2014 CSI Data			Hungary Romania **Slovakia** Sweden	Bulgaria [Norway]	Hungary	France Italy [Norway]	**Slovakia**

[15] Scaling base: passenger train-km per year.
[16] Scaling base: passenger-km per year.
[17] Assessment carried out retrospectively for 2010 and 2011.

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Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1	1.2	2	3.1	4	5	6
2017 Assessment 2015 CSI Data			Bulgaria Slovakia Sweden	[Norway]		Italy [Norway]	Slovakia [Norway]
2018 Assessment 2016 CSI Data			Bulgaria Hungary Slovakia	Bulgaria	Hungary	Italy	
2019 Assessment 2017 CSI Data			Slovakia	[Norway]		France	
2020 Assessment 2018 CSI Data			Bulgaria Slovakia		Czechia Latvia Hungary Portugal	France	
2021 Assessment 2019 CSI Data			Sweden		Belgium Czechia Germany Netherlands **Portugal**	France	
2022 Assessment 2020 CSI Data			Sweden Slovakia		Czechia Germany Spain Netherlands Portugal	France	

Notes: *[ ] refers to the fact that Norway is not a MS. () means that the result cannot be fully relied upon due to data quality issues.* For countries in **bold** "probable deterioration of safety performance" and for the other cases "possible deterioration of safety performance". The assessment result for countries excluded from the table was "acceptable safety performance".

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