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# Report

## *Assessment of achievement of safety targets – 2020*

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## 2. Reference documents

<i>N°</i>	<i>Description</i>	<i>Reference</i>	<i>Version</i>
[1]	Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways 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 of charges for the use of railway infrastructure and safety certification (Railway Safety Directive). (In force until 16 June 2020)	2004/49/EC	Amended by Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community and by Directive 2008/110/EC of the European Parliament and of the Council of 23 December 2008 amending the Railway Safety Directive and by Commission Directive 2009/149/EC of 27 November 2009 amending Directive 2004/49/EC of the European Parliament and of the Council as regards Common Safety Indicators and common methods to calculate accident costs.
[2]	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	11 May 2016
[3]	Commission Decision 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)	OJ L 150/11, 5 June 2009
[4]	Commission implementing decision of 22 July 2011 on a mandate to the European Railway Agency on the revision of common safety targets and related common safety method for period 2011-2015	C(2011) 5158	22 July 2011
[5]	Commission Decision on the second set of common safety targets as regards the rail system	2012/226/EU	23 April 2012
[6]	Commission implementing decision of 11 December amending Decision 2012/226/EU on the second set of common safety targets for the rail system	2013/753/EU	11 December 2013

### 3. List of terms and abbreviations

<i>Term / Abbreviation</i>	<i>Definition</i>
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
ERAIL	European Railway Accident Information Links (Agency safety database)
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

## 4. Executive summary

This report presents the eleventh assessment of achievement of safety targets carried out by the Agency in accordance with the Common Safety Method (CSM) defined in the Commission Decision 2009/460/EC [3]. It is the ninth assessment using the second set of Common Safety Targets (CSTs) and National Reference Values (NRVs) (see the overview of annual assessments in Annex 1). The assessment concerns the 26 EU Member States<sup>1</sup> that have a railway system plus Norway and is based on Eurostat and Agency data for the years 2014-2018.

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

- › Bulgaria (Staff including employees or contractors);
- › Czechia (Others);
- › France (Trespassers);
- › Hungary (Others);
- › Latvia (Others);
- › Portugal (Others), and
- › Slovakia (Staff including employees or contractors)

At the same time, the assessment indicates that at the EU level railway safety performance remains acceptable for all categories of railway users.

In accordance with Article 5 of the Method [3], the Member States, for which there is a possible deterioration in 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 considers that the results of this assessment, while valid and as with any statistical analysis, should be used with caution. In particular, the Agency recognises:

- › The limitations of the 2004-2009 data used for establishment of NRVs/CSTs;
- › The difficulty of using the Method in relation to categories involving small numbers of fatalities, and
- › The latency in the availability of results

Based on the data and method limitations as described in this report, a call for revision is made for the NRVs and, to some extent, the method.

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<sup>1</sup> The assessment covers the period 2014-2018 during which the UK was an EU Member State  
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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 necessary and where 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.<sup>2</sup>

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 (EU) 2016/798 [2] and in accordance with the CSM defined in Decision 2009/460/EC [3] (hereafter referred to as the Method).

The current assessment is the ninth carried out by the Agency using the second set of NRVs/CSTs published as Commission Decision 2012/226/EU [5] and amended through the Commission Implementing Decision 2013/753/EU [6].

## 6. Method for assessing achievement of safety targets

### 6.1. Data

According to point 3.1.4 of the Annex of the Method [3], 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 Eurostat and CSI data for the years 2014-2018.

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

In assessments prior to 2016, the Eurostat data for carrying out the assessment for the categories level crossing users, unauthorised persons and others were inferred as described in the Annex of the "Report on the development of the second set of CSTs", as they were not directly available in Eurobase<sup>3</sup>.

Finally, Annex 3 of this report highlights the instances where, the exposure data were not available in Eurobase and CSI traffic data had to be used instead.

### 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';

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<sup>2</sup> (EU) 2016/798 Recital 11 [2]

<sup>3</sup> In Eurobase only the following 3 categories of victims were available: passengers, employees and others.

- › **'trespassers'** means any persons present on railway premises where such presence is forbidden, with the exception of level crossing users, and
- › **'societal risks'** means the collective risk to all categories of persons listed in Article 7(4)(a) of Directive 2004/49/EC [1] and Article 7 (1)(a) of Directive (EU) 2016/798 [2].

### 6.3. Four-step assessment procedure

The four-step assessment procedure described in chapter 3 of the Annex of the Method [3] was applied to each of the six risk categories<sup>4</sup>:

- › Passengers (1.1 and 1.2);
- › Staff including employees or contractors (2);
- › Level crossing users (3.1)<sup>5</sup>;
- › Others (4)<sup>6</sup>;
- › Trespassers (5);
- › Societal risk (6).

The four steps of the assessment procedure are described in the flowchart in Figure 1, adapted from Appendix 2 to the Method [3]. 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 the Eurostat/CSI data. In the second part of the second step, the Agency has to request the input of the safety authority of the Member States concerned for the specifics of the single highest-consequence accident in the most recent five preceding reported years, excluding the years used to set the NRVs.

The third and fourth steps are carried out by the Agency autonomously with Eurostat/CSI data and the outcomes of previous assessments. A detailed description of the content of each step is available in chapter 3.2 of the Annex to the Method [3].

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<sup>4</sup> 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.

<sup>5</sup> 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.

<sup>6</sup> This includes the CSIs 'other person at a platform' and 'other person not at a platform'.

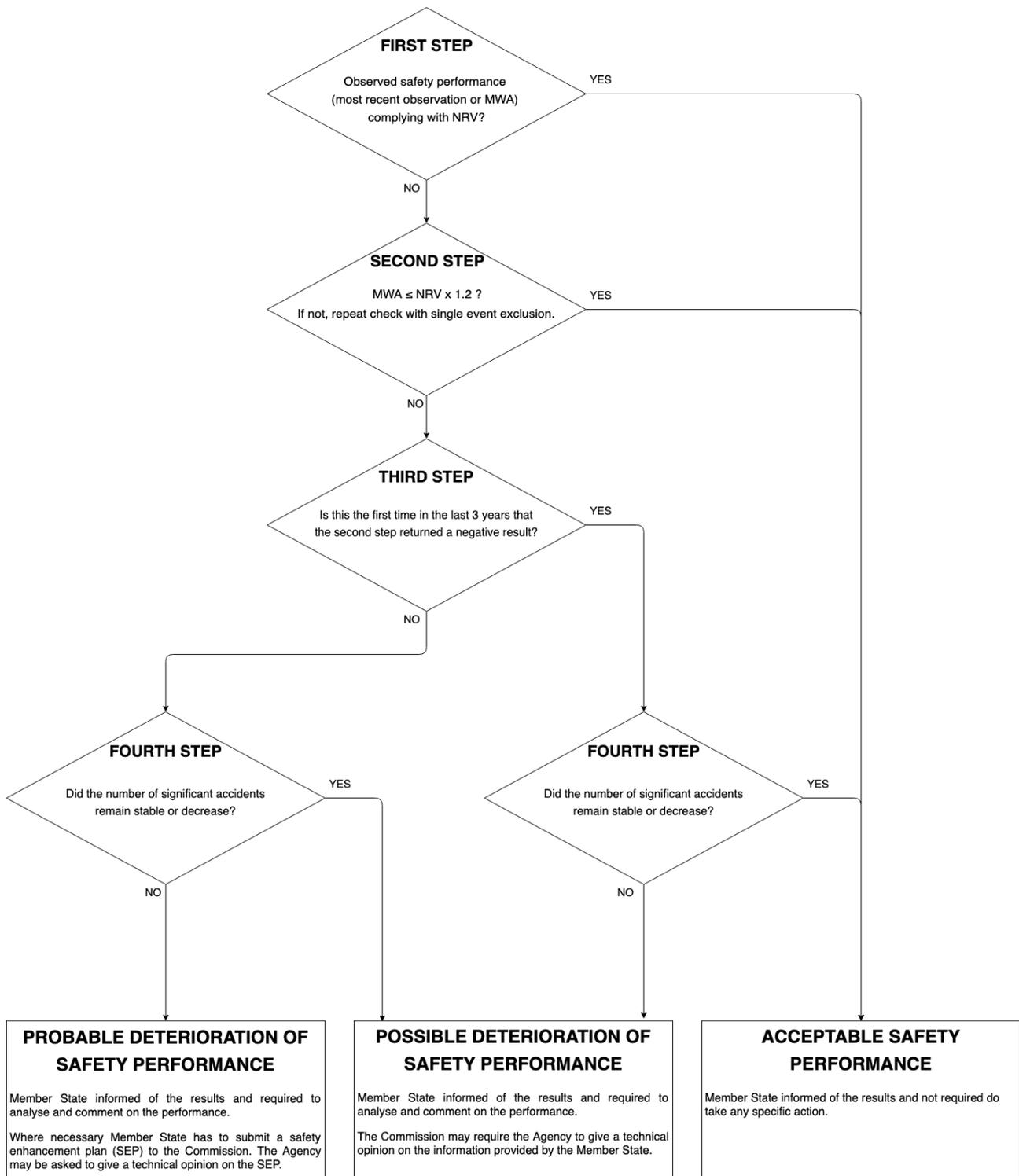


Figure 1 : Decision flowchart for assessing achievement of NRVs and CSTs. (adapted from Appendix 2 to the Method [3])

## 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 risk categories considered, indicating acceptable safety performance. For eleven Member States there was a ‘failed’ result in one specific risk category in the first part of the second step, as show in in Table 1.

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

<i>Risk category</i>						
<i>Passengers</i>		<i>Staff including employees or contractors</i>	<i>Level crossing users</i>	<i>Others</i>	<i>Trespassers</i>	<i>Societal risk</i>
<i>1.1</i>	<i>1.2</i>	<i>2</i>	<i>3.1</i>	<i>4</i>	<i>5</i>	<i>6</i>
-	-	Bulgaria Slovakia Sweden	-	Belgium Czechia Germany Latvia Hungary Netherlands Portugal	France	-

According to the Annex of the Method [3], if the 20 % tolerance is not met, the Agency shall ask the safety authority of the Member State concerned to provide the specifics of the single highest-consequence accident (in terms of FWSIs) in the five most recent years of observation, here the period 2014-2018. This accident shall only 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 overview of the single highest-consequence accidents identified in cooperation with national safety authorities (NSA) is provided in Table 2.

*Table 2 : Single highest-consequence accidents during the period 2014 - 2018 for Member States failing after first part of the second step.*

<i>MS</i>	<i>Risk category</i>	<i>Accident specifics (relevant highest-consequence accident)</i>	<i>Excluded</i>
BG	2	12/07/2014 – Kaloyanovets train station – Derailment causing 1 staff fatality and 1 serious injury.	Yes
CZ	4	22/07/2015 – Studénka – Train hits road vehicle causing 2 fatalities and 4 persons with serious injuries.	No
FR	5	15/12/2017– Bifurcation Lion d’Or – Train fatally hits 2 persons and causes 1 serious injury.	No
HU	4	26/12/2015 – Line between Csorna és Szil-Sopronnémeti stations – Train fatally hits 2 persons.	No

*Table 2: Single highest-consequence accidents during the period 2014 - 2018 for Member States failing after first part of the second step. (continued)*

PT	4	16/01/2017 – Carvalheira-Maceda train station– Train fatally hits 1 person. 27/09/2016 – Alfarelos train station – Train fatally hits 1 person. 11/11/2016 – Santarém train station – Train fatally hits 1 person. 17/07/2015 – Almourol train station – Train fatally hits 1 person.	No
SK	2	16/09/2016 – Level crossing accident at Velký Meder – Train hits road vehicle causing 1 staff fatality, and 1 staff with serious injuries.	No

The MWA were recalculated for the Member States where the single highest-consequence accident was excluded from the dataset. There were no intermediate changes because of the exclusion of an accident, as shown in Table 3.

*Table 3 : Intermediate results of the assessment: Member States failing at the second step after the exclusion of the single highest-consequence accident*

<i>Risk category</i>						
<i>Passengers</i>		<i>Staff including employees or contractors</i>	<i>Level crossing users</i>	<i>Others</i>	<i>Trespassers</i>	<i>Societal risk</i>
<i>1.1</i>	<i>1.2</i>	<i>2</i>	<i>3.1</i>	<i>4</i>	<i>5</i>	<i>6</i>
-	-	Bulgaria Slovakia Sweden	-	Belgium Czechia Germany Latvia Hungary Netherlands Portugal	France	-

The detailed results of the second step of the assessment are summarized in the Annex 4. Annex 5 provides an overview of Member States failing after two steps of the assessment method after the exclusion of the single highest-consequence accident in the assessments performed to date.

## **7.2. Third and fourth steps of the assessment procedure**

The application of the third and fourth assessment steps to the above cases led to ‘acceptable safety performance’ for the majority, except the ones summarized in Table 4. Since in some cases it was not the first time in the last three years that the second step returned a negative result, the final result of the assessment is either ‘possible deterioration of safety performance’ if the number of significant accidents remained stable or decreased or ‘probable deterioration of safety performance’ if it did not.

*Table 4 : Result of the assessment after applying all four steps of the assessment method – ‘Possible deterioration of safety performance’*

<i>Risk category</i>						
<i>Passengers</i>		<i>Staff including employees or contractors</i>	<i>Level crossing users</i>	<i>Others</i>	<i>Trespassers</i>	<i>Societal risk</i>
<i>1.1</i>	<i>1.2</i>	<i>2</i>	<i>3.1</i>	<i>4</i>	<i>5</i>	<i>6</i>
-	-	Bulgaria Slovakia	-	Czechia Latvia Hungary Portugal	France	-

For **Bulgaria**, it was the second time in the past three years that the second step returned a negative results in the category of staff including employees or contractors (2). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of staff including employees or contractors (2)**.

For **Slovakia**, it was the third time in the past three years that the second step returned a negative result in the category of staff including employees or contractors (2). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of staff including employees or contractors (2)**.

For **Czechia**, it was the second time in the past three years that the second step returned a negative results in the category of others (4). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of others (4)**.

For **Latvia**, it was the second time in the past three years that the second step returned a negative results in the category of others (4). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of others (4)**.

For **Hungary**, it was the second time in the past three years that the second step returned a negative results in the category of others (4). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of others (4)**.

For **Portugal**, it was the second time in the past three years that the second step returned a negative results in the category of others (4). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of others (4)**.

For **France**, it was the second time in the past three years that the second step returned negative result in the category of trespassers (5). According to the methodology, since the number of relevant significant accidents remained either stable or decreased, the result of the assessment is **possible deterioration of safety performance in the category of trespassers (5)**.

Annex 6 provides an overview of the possible and probable deteriorations of railway safety performance broken down by the various categories for the assessments performed to date. This completes the ninth assessment of achievement of safety targets using the second set of NRVs/CSTs.

### 7.3. Analysis of the results

The eleventh annual assessment of achievements of safety targets led to acceptable safety performance in the categories of passengers (1.1 and 1.2), level crossing users (3.1) and societal risks (6) in all Member States. For the category of level crossing users it was the first time since the 2013 assessment that no country showed a possible deterioration. Possible deterioration of safety performance was identified in two cases for the categories of staff including employees or contractors (2), four cases in others (4) and one case in the category trespassers (5).

Staff including employees or contractors and trespassers are the two categories in which unacceptable safety performance has been identified most frequently across all annual assessments (see Annex 6).

#### 7.3.1. Trend in significant accidents

Although not required by the legislation, the Agency uses the assessment to give information to the Member States on possible trends in the number of significant accidents.

The third and fourth steps of the assessment procedure were applied to examine the data for a trend in the number of significant accidents, which might suggest that safety performance should be looked at more closely in the future. The Agency applied these steps to the data for those Member States and risk categories, which had achieved a 'passed' result either for the first or the second steps. The results indicated a 'failed' outcome in the following Member States and risk categories (Table 5).

*Table 5 : Member States in which there was a statistically significant increase in accident risk in 2018.*

<i>All significant accidents</i>	<i>Accidents involving level crossing users</i>	<i>Accidents to persons caused by rolling stock in motion</i>
-	Estonia	Slovenia

#### 7.3.2. Data limitations

The second set of NRVs, used in this assessment, was established using 2004-2009 safety data. Concerns exist that the reliability of the data from that period is lower than that of more recent years. Notably, the safety data for certain categories reported for years 2004 and 2005 were not fully harmonized (see section 6.1) and there have been cases of underreporting in the category 'others' in the past.

It is also noted that up to and including 2015, railway safety data available in Eurobase were used in the assessments; the CSI data available in ERAIL was used since 2016. Whilst the differences in data from these sources are generally small, an effect on the results has been observed in some instances. As the annual assessment of achievement of safety targets looks back five years (i.e. MWA estimates), complete harmonisation in terms of data sources would normally be achieved when reviewing the period 2016-2020.

In accordance with provisions set in Article 7(5) of the Railway Safety Directive [1] and based on the aforementioned concerns, there is a case to revise the NRVs/CSTs. Annex 7 shows the results on the second step of the 2020 assessment using a hypothetical 3<sup>rd</sup> set of NRVs/CSTs based on CSI data of the years 2013 till 2017. While indicative, the results showcase the impact that a revision of the NRVs could have on the results of the assessment. Several NSAs that commented on the findings of this report are favourable towards such improvements.

### 7.3.3. Method limitations

Although observed already in previous assessments, it appears even clearer in the 2020 assessment that negative results are more likely to be obtained where the FWSI is small (e.g. in the category of staff or others). This points to a limitation of the method, sometimes signalling deteriorating performance in cases where no deterioration would be established with other methods. The limitation becomes more pertinent if a new set of NRVs were to be used that is based on more recent (and generally lower) FWSI values.

## 8. Conclusions

Acknowledging the constraints of using the current set of NRVs as set out in the Method, this assessment of achievements of safety targets identified “possible deterioration of safety performance” in three categories of railway users in seven EU Member States.

At the same time it was found that railway safety in the EU remains acceptable (below the relevant EU reference value) in all categories of users. Nevertheless, the Agency emphasizes the enduring need to improve safety performance across the EU.

In accordance with Article 5 of the Method [3], the Member States that achieved a negative result in this assessment, with a “possible deterioration of railway safety” in one or more categories, “*shall send to the Commission the likely causes of the results obtained*”.

The Commission may consider specifying the deadline and format of the report, since these are not provided in the Article 5 of the Method [3], as well as underlining the requirements on the content of the report.

Because of the described data and method limitations, it remains troublesome to draw further conclusions on trends in safety performance in all individual Member States in the framework of safety targets. This is especially the case for categories involving small number of fatalities (e.g. Staff including employees or contractors and Others). A call is therefore made for revision of NRVs and, to some extent, the method.

Annex 1 Overview of annual assessments

This is the eleventh 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.

CSTs Assessment	Publication year	Year															
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
First	2010	1st set of CSTs/NRVs				MWA (4 years)				OBS							
Second	2011	1st set of CSTs/NRVs				MWA (4 years)				OBS							
Third	2012	2nd set of CSTs/NRVs				MWA (5 years)				OBS							
Fourth	2013	2nd set of CSTs/NRVs				MWA (5 years)				OBS							
Fifth	2014	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Sixth	2015	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Seventh	2016	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Eighth	2017	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Ninth	2018	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Tenth	2019	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							
Eleventh	2020	2nd set of CSTs/NRVs (amended)				MWA (5 years)				OBS							

## Annex 2 Names of risk categories across the relevant legislation

<i>Risk Category</i>	<i>2004/49/EC</i>	<i>2009/460/EC</i>		<i>2012/226/EU</i>	<i>2013/753/EU</i>	<i>(EU)2016/798</i>
	<i>Art.7</i>	<i>Art. 3</i>	<i>Appendix 1</i>	<i>Annex</i>	<i>Annex</i>	<i>Art. 7</i>
1.1	Passengers					
1.2						
2	Staff including the staff of contractors	'Staff' or 'employees including the staff of contractors'	Employees			Staff including employees or contractors
3	Level crossing users					
4	Others	Others (third parties)	Others	Persons classified as "others"	Persons classified as "others"	Others
5	Unauthorised persons on railway premises					Trespassers
6	Societal risks	Risk to society as a whole	Whole society	Societal risk		

## Annex 3 Input data overview

The table below shows the instances where, in assessments prior to 2016, CSI data was used in place of Eurostat data, as they were not available in Eurobase. Only data used in the current assessment are included.

<i>Data category</i>	<i>Country and year</i>	<i>Remark (Eurostat)</i>
Train movement for all trains Train-Km (rail_tf_trainmv)	BE (2014, 2015) DE (2015) DK (2014, 2015) FR (2014, 2015) HU (2015) NL (2014, 2015)	Not published due to quality issues.
Train movement for passenger trains Passenger train-Km (rail_tf_trainmv)	BE (2014, 2015) DE (2015) DK (2014, 2015) FR (2014, 2015) HU (2015) NL (2014, 2015)	Not published due to quality issues.
Passenger transport by rail Passenger-Km (rail_pa_quartal)	BE (2014, 2015) AT (2014, 2015)	Data are confidential.

Annex 4 Results after the 2<sup>nd</sup> step of the assessment.

<i>Member State</i>	<i>Risk category 1.1 – ‘Passengers’</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	37.26	0.00	Yes		
Bulgaria (BG)	207.00	42.96	Yes		
Czechia (CZ)	46.49	3.70	Yes		
Denmark (DK)	9.03	0.00	Yes		
Germany (DE)	8.13	0.28	Yes		
Estonia (EE)	78.18	117.65	<b>No</b>	6.92	Yes
Ireland (IE)	2.74	0.00	Yes		
Greece (EL)	54.67	0.00	Yes		
Spain (ES)	29.19	3.51	Yes		
France (FR)	22.53	1.58	Yes		
Croatia (HR)	176.90	0.00	Yes		
Italy (IT)	38.10	2.90	Yes		
Latvia (LV)	78.18	16.50	Yes		
Lithuania (LT)	97.16	0.00	Yes		
Luxembourg (LU)	23.81	0.00	Yes		
Hungary (HU)	170.18	39.34	Yes		
Netherlands (NL)	7.43	0.66	Yes		
Austria (AT)	26.25	14.90	Yes		
Poland (PL)	116.13	16.99	Yes		
Portugal (PT)	41.82	3.42	Yes		
Romania (RO)	57.40	6.33	Yes		
Slovenia (SI)	25.27	100.14	<b>No</b>	8.94	Yes
Slovakia (SK)	62.05	46.89	Yes		
Finland (FI)	9.03	0.00	Yes		
Sweden (SE)	3.54	0.00	Yes		
United Kingdom (UK)	2.73	2.43	Yes		
Norway (NO)	2.83	24.94	<b>No</b>	2.30	Yes
Scaling basis – Passenger train-km per year.					

<i>Member State</i>	<i>Risk category 1.2 – ‘Passengers’</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	0.318	0.000	Yes		
Bulgaria (BG)	1.911	0.608	Yes		
Czechia (CZ)	0.817	0.049	Yes		
Denmark (DK)	0.110	0.000	Yes		
Germany (DE)	0.081	0.002	Yes		
Estonia (EE)	0.665	1.376	<b>No</b>	0.081	Yes
Ireland (IE)	0.028	0.000	Yes		
Greece (EL)	0.503	0.000	Yes		
Spain (ES)	0.270	0.022	Yes		
France (FR)	0.110	0.007	Yes		
Croatia (HR)	1.135	0.000	Yes		
Italy (IT)	0.257	0.019	Yes		
Latvia (LV)	0.665	0.160	Yes		
Lithuania (LT)	0.757	0.000	Yes		
Luxembourg (LU)	0.176	0.000	Yes		
Hungary (HU)	1.650	0.042	Yes		
Netherlands (NL)	0.089	0.001	Yes		
Austria (AT)	0.292	0.128	Yes		
Poland (PL)	0.849	0.133	Yes		
Portugal (PT)	0.309	0.022	Yes		
Romania (RO)	0.607	0.074	Yes		
Slovenia (SI)	0.362	1.525	<b>No</b>	0.143	Yes
Slovakia (SK)	0.883	0.434	Yes		
Finland (FI)	0.110	0.000	Yes		
Sweden (SE)	0.033	0.000	Yes		
United Kingdom (UK)	0.028	0.019	Yes		
Norway (NO)	0.033	0.268	<b>No</b>	0.025	Yes
Scaling basis – Passenger-km per year.					

Member State	Risk category 2 - 'Staff including employees or contractors'				
	NRV (*10 <sup>-9</sup> ) [2004-2009]	OBS (*10 <sup>-9</sup> ) [2018]	OBS ≤ NRV (Yes/No)	MWA (*10 <sup>-9</sup> ) [2014-2018]	MWA ≤ NRV*1.2 (Yes/No)
Belgium (BE)	24.63	1.97	Yes		
Bulgaria (BG)	20.40	114.27	No	27.71	No
Czechia (CZ)	16.45	2.87	Yes		
Denmark (DK)	9.10	1.68	Yes		
Germany (DE)	12.56	3.60	Yes		
Estonia (EE)	64.83	41.67	Yes		
Ireland (IE)	5.22	5.38	No	0.32	Yes
Greece (EL)	77.87	9.08	Yes		
Spain (ES)	8.81	5.50	Yes		
France (FR)	6.06	9.93	No	4.45	Yes
Croatia (HR)	73.65	0.00	Yes		
Italy (IT)	18.85	10.34	Yes		
Latvia (LV)	64.83	0.00	Yes		
Lithuania (LT)	41.01	129.92	No	36.16	Yes
Luxembourg (LU)	11.99	0.00	Yes		
Hungary (HU)	9.31	9.49	No	9.75	Yes
Netherlands (NL)	5.97	0.61	Yes		
Austria (AT)	20.29	2.43	Yes		
Poland (PL)	17.18	17.07	Yes		
Portugal (PT)	53.09	30.24	Yes		
Romania (RO)	22.30	0.00	Yes		
Slovenia (SI)	40.88	50.04	No	4.36	Yes
Slovakia (SK)	2.71	5.68	No	21.92	No
Finland (FI)	9.21	0.00	Yes		
Sweden (SE)	2.86	13.12	No	6.63	No
United Kingdom (UK)	5.17	2.29	Yes		
Norway (NO)	2.82	0.00	Yes		
Scaling basis - Train-km per year.					

<i>Member State</i>	<i>Risk category 3.1 - 'Level crossing users'</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	138.00	91.58	Yes		
Bulgaria (BG)	141.60	154.60	<b>No</b>	154.56	Yes
Czechia (CZ)	237.76	137.23	Yes		
Denmark (DK)	65.43	52.22	Yes		
Germany (DE)	67.76	35.13	Yes		
Estonia (EE)	399.88	319.44	Yes		
Ireland (IE)	23.57	0.00	Yes		
Greece (EL)	710.26	417.84	Yes		
Spain (ES)	108.72	38.01	Yes		
France (FR)	78.72	38.15	Yes		
Croatia (HR)	611.30	348.33	Yes		
Italy (IT)	42.87	7.76	Yes		
Latvia (LV)	239.16	319.85	<b>No</b>	251.04	Yes
Lithuania (LT)	521.65	201.38	Yes		
Luxembourg (LU)	95.90	229.91	<b>No</b>	16.64	Yes
Hungary (HU)	274.20	185.50	Yes		
Netherlands (NL)	126.54	81.72	Yes		
Austria (AT)	160.16	53.43	Yes		
Poland (PL)	277.30	200.98	Yes		
Portugal (PT)	460.58	115.46	Yes		
Romania (RO)	542.00	239.32	Yes		
Slovenia (SI)	364.15	95.07	Yes		
Slovakia (SK)	309.00	308.69	Yes		
Finland (FI)	163.75	87.30	Yes		
Sweden (SE)	63.98	14.37	Yes		
United Kingdom (UK)	23.45	7.21	Yes		
Norway (NO)	21.61	21.18	Yes		
Scaling basis - Train-km per year.					

<i>Member State</i>	<i>Risk category 4 - 'Others'</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	2.86	4.92	No	4.41	No
Bulgaria (BG)	35.47	36.97	No	36.21	Yes
Czechia (CZ)	2.41	6.32	No	8.27	No
Denmark (DK)	14.15	1.68	Yes		
Germany (DE)	3.05	6.08	No	4.88	No
Estonia (EE)	11.64	0.00	Yes		
Ireland (IE)	7.00	0.00	Yes		
Greece (EL)	4.51	0.00	Yes		
Spain (ES)	5.54	5.00	Yes		
France (FR)	7.71	4.06	Yes		
Croatia (HR)	7.28	0.00	Yes		
Italy (IT)	6.70	0.26	Yes		
Latvia (LV)	11.64	59.23	No	66.93	No
Lithuania (LT)	11.64	0.00	Yes		
Luxembourg (LU)	5.46	0.00	Yes		
Hungary (HU)	4.51	11.22	No	5.94	No
Netherlands (NL)	4.70	12.29	No	6.33	No
Austria (AT)	11.09	0.00	Yes		
Poland (PL)	11.64	0.39	Yes		
Portugal (PT)	5.54	27.49	No	23.74	No
Romania (RO)	2.83	0.00	Yes		
Slovenia (SI)	14.48	0.00	Yes		
Slovakia (SK)	2.41	0.00	Yes		
Finland (FI)	14.15	0.00	Yes		
Sweden (SE)	14.15	0.00	Yes		
United Kingdom (UK)	7.00	5.63	Yes		
Norway (NO)	14.15	0.00	Yes		
Scaling basis - Train-km per year.					

<i>Member State</i>	<i>Risk category 5 - 'Trespassers'</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	72.64	42.34	Yes		
Bulgaria (BG)	900.20	366.34	Yes		
Czechia (CZ)	301.26	42.49	Yes		
Denmark (DK)	116.24	53.91	Yes		
Germany (DE)	113.08	81.59	Yes		
Estonia (EE)	1547.95	416.67	Yes		
Ireland (IE)	85.23	0.00	Yes		
Greece (EL)	722.94	1226.27	<b>No</b>	844.63	Yes
Spain (ES)	167.83	37.01	Yes		
France (FR)	67.16	88.04	<b>No</b>	84.51	<b>No</b>
Croatia (HR)	676.30	413.90	Yes		
Italy (IT)	119.25	167.01	<b>No</b>	141.18	Yes
Latvia (LV)	1314.28	373.16	Yes		
Lithuania (LT)	2045.34	467.71	Yes		
Luxembourg (LU)	79.92	0.00	Yes		
Hungary (HU)	588.06	609.11	<b>No</b>	651.39	Yes
Netherlands (NL)	15.93	6.76	Yes		
Austria (AT)	119.03	58.29	Yes		
Poland (PL)	1213.09	559.47	Yes		
Portugal (PT)	834.33	340.88	Yes		
Romania (RO)	1388.20	559.97	Yes		
Slovenia (SI)	236.44	105.08	Yes		
Slovakia (SK)	1758.00	297.33	Yes		
Finland (FI)	248.74	23.81	Yes		
Sweden (SE)	94.83	31.23	Yes		
United Kingdom (UK)	84.54	37.09	Yes		
Norway (NO)	91.81	57.76	Yes		
Scaling basis - Train-km per year.					

<i>Member State</i>	<i>Risk category 6 – ‘Societal risk’</i>				
	<i>NRV (*10<sup>-9</sup>) [2004-2009]</i>	<i>OBS (*10<sup>-9</sup>) [2018]</i>	<i>OBS ≤ NRV (Yes/No)</i>	<i>MWA (*10<sup>-9</sup>) [2014-2018]</i>	<i>MWA ≤ NRV*1.2 (Yes/No)</i>
Belgium (BE)	275.05	140.82	Yes		
Bulgaria (BG)	1440.00	702.43	Yes		
Czechia (CZ)	591.22	191.78	Yes		
Denmark (DK)	217.92	109.50	Yes		
Germany (DE)	203.16	128.52	Yes		
Estonia (EE)	2107.86	861.11	Yes		
Ireland (IE)	114.43	5.38	Yes		
Greece (EL)	1535.77	1653.19	<b>No</b>	1395.06	Yes
Spain (ES)	322.57	88.53	Yes		
France (FR)	179.94	141.53	Yes		
Croatia (HR)	1467.00	762.23	Yes		
Italy (IT)	230.95	210.70	Yes		
Latvia (LV)	1658.79	758.16	Yes		
Lithuania (LT)	2587.94	799.01	Yes		
Luxembourg (LU)	209.70	229.91	<b>No</b>	58.64	Yes
Hungary (HU)	1020.00	843.79	Yes		
Netherlands (NL)	148.17	101.99	Yes		
Austria (AT)	329.01	124.47	Yes		
Poland (PL)	1590.22	788.77	Yes		
Portugal (PT)	1361.81	516.82	Yes		
Romania (RO)	1704.36	803.94	Yes		
Slovenia (SI)	697.89	300.23	Yes		
Slovakia (SK)	1131.08	643.89	Yes		
Finland (FI)	416.98	111.11	Yes		
Sweden (SE)	169.19	58.71	Yes		
United Kingdom (UK)	119.79	54.49	Yes		
Norway (NO)	50.87	98.18	<b>No</b>	58.21	Yes
Scaling basis - Train-km per year.					

Annex 5 Overview of 'fail' results after the 2<sup>nd</sup> step of the assessment (2010 – 2020).

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1 <sup>7</sup>	1.2 <sup>8</sup>	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

<sup>7</sup> Scaling base: passenger train-km per year.<sup>8</sup> Scaling base: passenger-km per year.

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1 <sup>9</sup>	1.2 <sup>10</sup>	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	

<sup>9</sup> Scaling base: passenger train-km per year.

<sup>10</sup> Scaling base: passenger-km per year.

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2020 Assessment 2018 Data			Bulgaria Slovakia Sweden		Belgium Czechia Germany Latvia Hungary Netherlands Portugal	France	
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Notes: [ ] refer to the fact that Norway is not a MS so the CSM does not formally apply to it.

## Annex 6 Overview of the results of all annual assessments (2010 – 2020).

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1 <sup>11</sup>	1.2 <sup>12</sup>	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 <b>Romania</b>	Romania	n.a.	Romania Slovakia	<b>Romania</b> Slovakia
2012 Assessment 2010 CSI Data					n.a.	Sweden	
2013 Assessment 2011 CSI Data	Slovakia	Slovakia	<b>Bulgaria</b> Romania Slovakia		Romania	Romania Slovakia Sweden	Romania
2014 Assessment 2012 CSI Data			Bulgaria Romania Slovakia Sweden	Bulgaria	(Croatia <sup>13</sup> ) (Romania)		[Norway]
2015 Assessment 2013 CSI Data			Romania Slovakia	Bulgaria		Italy [Norway]	Slovakia [Norway]
2016 Assessment 2014 CSI Data			Hungary Romania <b>Slovakia</b> Sweden	Bulgaria [Norway]	Hungary	France Italy [Norway]	<b>Slovakia</b>

Risk category	Passengers		Staff including employees or contractors	Level crossing Users	Others	Trespassers	Societal risks
	1.1 <sup>14</sup>	1.2 <sup>15</sup>	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	

Notes: [ ] refer to the fact that Norway is not a MS so the CSM does not formally apply to it. () mean 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”.

<sup>11</sup> Scaling base: passenger train-km per year.

<sup>12</sup> Scaling base: passenger-km per year.

<sup>13</sup> Assessment carried out retrospectively for 2010 and 2011.

<sup>14</sup> Scaling base: passenger train-km per year.

<sup>15</sup> Scaling base: passenger-km per year.

## Annex 7 Impact on the results using a hypothetical third set of NRVs/CSTs.

The table shows the intermediate results after the first part of the second step using a hypothetical third set of NRVs compared to using the statutory second set of NRVs. The hypothetical third set of NRVs/CSTs was produced with CSI data for the period 2013-2017. 'No' implies that the country did not pass the second step.

Country	2013-2017 NRVs for 2018 data							2004-2009 NRVs for 2018 data						
	Passengers		Staff	LC users	Others	Tres-passers	Society	Passengers		Staff	LC users	Others	Tres-passers	Society
	NRV 1.1	NRV 1.2	NRV 2	NRV 3.1	NRV 4	NRV 5	NRV 6	NRV 1.1	NRV 1.2	NRV 2	NRV 3.1	NRV 4	NRV 5	NRV 6
Belgium	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Bulgaria	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Czechia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Denmark	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Germany	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Estonia	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ireland	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Greece	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spain	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
France	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Croatia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Italy	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Latvia	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Lithuania	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Luxembourg	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hungary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Netherlands	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Austria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Poland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Portugal	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Romania	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Slovenia	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Slovakia	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Finland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sweden	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
United Kingdom	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Norway	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Total number of fails</b>	7	7	10	1	3	2	1	0	0	3	0	7	1	0

	Fail using 2nd set NRVs
	Fail using 2nd set NRVs, but no fail using 3rd set NRVs
	Fail only with 3rd set NRVs
	Fail both with 2nd and 3rd set NRVs