

Making the railway system
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Report

2018 assessment of achievement of safety targets

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2.0	17/12/2018	Updated version



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1. Executive summary

This report presents the seventh assessment of achievement using the second set of Common Safety Targets (CSTs) and National Reference Values (NRVs) carried out in accordance with the Common Safety Method (CSM) defined in the Commission Decision 2009/460/EC [2], and in particular Article 4 of the Decision. The 2018 assessment is the ninth assessment of achievements of safety targets carried out by the Agency in accordance with the CSM (see the overview of annual assessments in Annex 5). The assessment concerns 26 of 28 EU Member States that have a railway system, plus Norway.

The NRVs and the second set of CSTs were established using Eurostat data for the years 2004-2009 and published as the Commission Decision 2012/226/EU [5] in 2012, which was later amended by the Commission Implementing Decision 2013/753/EU [6]. This assessment is based on Eurostat and Agency data for the years 2012-2016 that were retrieved from Eurobase¹ on 16 February 2018 and updated on 26 March 2018.

For all railway user categories, the respective NRV was lower than the corresponding CST. As with the assessments carried out in the past, NRVs represent the safety targets – thresholds - used for the assessment as described in the CSM.

The results of the assessment of achievements of NRVs indicate other than acceptable safety performance in six Member States, as follows: “possible deterioration of safety performance”:

- › Bulgaria (Railway workers)
- › Bulgaria (Others);
- › Italy (Unauthorized persons);
- › Romania (Railway workers), and
- › Slovakia (Railway workers).

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

In accordance with Article 5 of the Method [2], the Member States for which there is a possible deterioration in safety performance in any category of user, shall send to the Commission a report explaining the likely causes of the results obtained.

The Agency considers that, as with any statistical method, the results obtained through this assessment should be used and considered with caution. In particular, the Agency recognises:

- A limitation in the data used for establishment of NRVs and for their assessment (data submitted by Member States to Eurostat via their national statistical offices);
- The need to update the NRVs used for the assessment;
- The difficulty of using the Method in relation to categories involving small numbers of fatalities, and
- The method is not to be used for proactive safety analysis.

The Agency conducted a consultation with the NSAs, NIBs and NRB on the value of quantitative safety targets, to support the revision of the Method. The key finding from the consultation was to continue with the present method with an updating of NRVs where the current NRV was found to be incorrect e.g. if a value had been incorrectly calculated or where the NRV was derived from another Member.

¹ Statistical database of Eurostat: <http://ec.europa.eu/eurostat/data/database>

2. Introduction

This report presents the results of the annual assessment of achievement of NRVs and CSTs in accordance with the requirements of the Commission Decision 2009/460/EC [2].

The CSM for assessing the achievement of CSTs and of NRVs is set out in Commission Decision 2009/460/EC [2] (hereafter also referred to as the Method).

In 2011, the Agency received a mandate from the Commission to:

1. prepare a second set of NRVs (CSTs) in accordance with the existing CSM in 2011;
2. propose a revision of CSM in 2015; and
3. propose a third set of NRVs (CSTs) in accordance with the revised CSM in 2015.

The first task from the mandate was accomplished by the Agency in 2011 with the proposal for the second set of NRVs (CSTs) published as Commission Decision 2012/226/EU [5]. The values for the second set of CSTs were calculated on the basis of the data from 2004 to 2009, which were supplied to Eurostat by statistical offices of Member States in accordance with Regulation (EC) No 91/2003 [3]. They were calculated using the methodology set out in points 2.1.1 and 2.3.1 of the Annex of the Method [2].

Following the accession of Croatia to EU in 2013, the Agency recommended the amendment of the second set of NRVs (CSTs) to incorporate the NRVs for Croatia. The second set of NRVs (CSTs) were amended through the Commission Implementing Decision 2013/753/EU [6].

As regards the second and third task from the mandate (revision of CSM and proposal of the third set of NRVs), the Agency carried out the necessary work in 2012-2014 with the Working Party on Safety Performance. This work was further reviewed by the Agency in 2015. A draft recommendation revision was prepared, but the Agency decided to recommend no change to the CSM at that time.

In 2017, the Agency conducted a new consultation with the NSAs, NIBs and NRB on the value of quantitative safety targets, to support the revision of the Method. The key finding from the consultation was to continue with the present method with a an updating of NRVs where the current NRV was found to be incorrect e.g. if a value had been incorrectly calculated or where the NRV was derived from another Member.

This 2018 annual assessment is the ninth annual assessment carried out by the Agency so far, concerning the assessment of the achievement of the second set of NRVs and of CSTs with reference to the data available for the period 2012 - 2016. The data for the years 2012 - 2015 used for the assessment was taken from the Eurostat database, as set out in point 1.1 of the Annex of the Method [2]. In cases where data was not available in Eurostat database, the CSI data was used (see the input data overview in Annex 4). Following changes to Eurostat's data collection processes the data for railway safety is now collected via the Agency's Common Safety Indicators.

NRVs and CSTs were calculated for each Member State and for each of the following risk categories: Passengers (1.1 and 1.2), Railway workers (2), Level crossing users (3.1), Others (4), Unauthorized persons on railway premises (5) and Whole society (6).

3. Method for assessing achievement of safety targets

3.1. Data

To assess the achievement of NRVs, the Agency has used the Eurostat data for the four most recently reported years (2012-2015), in accordance with point 3.1.4 of the Annex of the Method [2]. The data for 2016 is the latest observed safety performance (OSP), as referred to in the first step of the assessment procedure, and for this assessment was wholly derived from the Agency's Common Safety Indicator data.

The data was extracted from the Eurostat database on 06 March 2018. The data were sent by Statistical Offices of Member States within five months after the end of the reference period for the 2015 datasets. According to the information from Eurostat, the data in datasets "rail_ac_catvict" and "rail_ac_catnbr" were last updated on 27 February 2018 and the data in dataset "rail_tf_trainmv" and "rail_pa_quartal" were updated on 04 January 2018. These updates were taken into account in the assessment. The consistency of data was verified by the Agency for year 2015 by comparing the Eurostat data with CSI data. There were no major differences².

Until 2015, the CSI data were compared to the Eurostat data derived from Eurostat's Common Questionnaire. Due to changes in the data collection by Eurostat, with effect from 2016, the CSI data only are used. The CSI data were extracted on the 21 February 2018 from the Agency's ERAIL-CSI database. The Annex 4 of this report highlights the instances where the CSI data had to be used in place of Eurostat values in previous years.

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 Eurobase³. However, with this assessment no inference has therefore to be made as these data are available as part of the CSI datasets.

3.2. Definitions

The following definitions are used in the analysis:

- '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 being on board a passenger train;
- 'level crossing users' means all persons using a level crossing to cross the railway line by any means of transportation or by foot;
- 'railway workers' include 'staff' or 'employees and the staff/employees of 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;
- 'unauthorised persons on railway premises' means any persons present on railway premises where such presence is forbidden, with the exception of level crossing users;
- 'others (third parties)' means all persons not defined as 'passengers', 'railway workers', 'level crossing users' or 'unauthorised persons on railway premises', and
- 'risk to the society as a whole' means the collective risk to all categories of persons listed in Article 7(4)(a) of Directive 2004/49/EC and Article 7 (1)(a) of Directive EU 2016/798.

² Minor differences may exist due to the minor differences of the reporting scopes for CSI data and Eurostat data. Two minor differences were identified: number of accidents in 2015 in Poland and number of train-kms in 2014 in Denmark.

³ In Eurobase only the following 3 categories of victims are available: passengers, employees and others.

3.3. Four-step assessment procedure

The four-step assessment procedure described in chapter 3 of the Annex of the Method [2] has been applied for each of the six risk categories:

- › passengers (1.1 and 1.2);
- › railway workers (2);
- › level crossing users (3.1);
- › others (4);
- › unauthorised persons on railway premises (5);
- › whole society (6).

There are four steps in the procedure for assessing the achievement of NRVs; these are described in the flowchart in Figure 1, which is taken from the Appendix 2 to the Annex to the Method [2]. The “yes-arrows” correspond to a passed result and the no-arrows to a failed result at each step.

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 use the input of the Member States concerned for the specifics of the single highest-consequence accident in the most recent years excluding the years used to set the NRVs.

The third and fourth steps are carried out by the Agency autonomously with the Eurostat data.

The detailed description of the content of the each step is available in chapter 3.2 of the Annex to the Method [2].

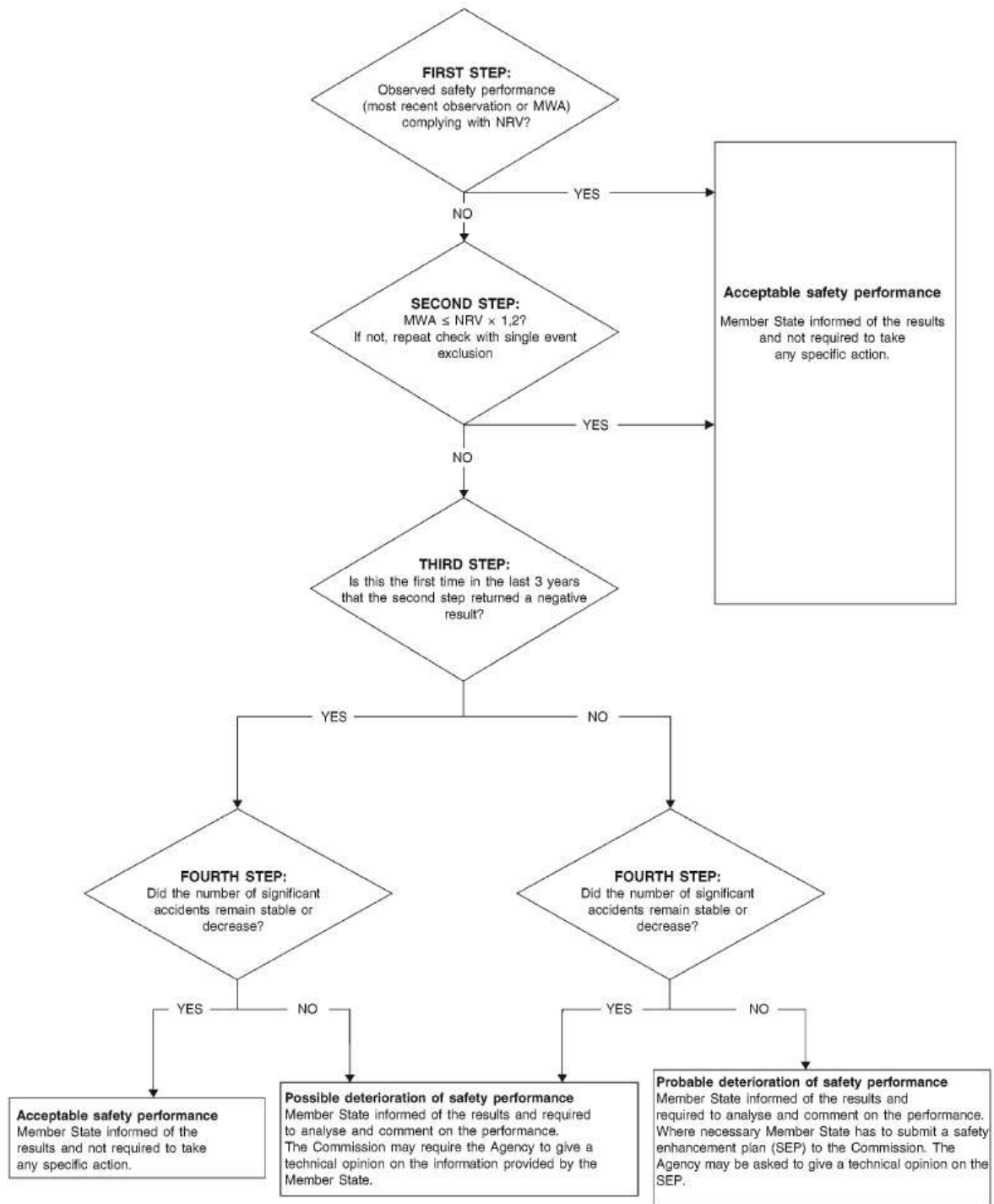


Figure 1 : Decision flowchart for the assessment procedure of CSTs

4. Results of the assessment

4.1. First and second step of the assessment procedure

The majority of Member States achieved a ‘passed’ result at either the first or second step of the assessment for all risk categories considered, indicating acceptable safety performance (see Table 1). For seven Member States and Norway, there was a ‘failed’ result for one or more specific risk categories at the intermediate second step (see Annex 3 and Table 1)⁴.

Table 1 : Intermediate results of the 2018 assessment: Member States failing after two steps of the assessment method - after applying the 20 % tolerance.

Risk category	Passengers		Railway workers	Level crossing users	Others	Unauthorised persons	Whole society
	1.1	1.2	2	3.1	4	5	6
Failing after 2 nd step	None	None	Bulgaria Hungary Slovakia	Bulgaria	Hungary	Italy	Romania

Note: [] in Tables 1-4 and in Annex 3 refer to the fact that Norway is not a MS so the CSM does not formally apply to it.

According to the Annex of the Method [2] describing the assessment method, if the tolerance of 20 % 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 the most recent years excluding the years used to set NRV, here namely in the period 2012 - 2016.

The single highest-consequence accidents were identified in cooperation with Member States (Table 2). Only if this single accident occurring in the period 2012 - 2016 was more severe, in terms of consequences, than the most severe single accident included in the data used for setting the NRV (years 2004-2009), then it will be excluded from the statistics for the revised calculation. The overview in Table 2 shows whether this was the case.

Table 2 : Single highest-consequence accidents during the period 2012 - 2016 for Member States failing after two steps of the assessment

MS	Risk category	Accident specifics (relevant highest-consequence accident in 2012-2016)	Excluded
BG	2	12/07/2014 – Train derailment at the station of Kaloyanovetz resulting in 1 person killed (train driver) and 4 persons seriously injured (employees)	Yes
BG	3.1	04/01/2014 – Level crossing accident at Dona Mahala – Banya crossing resulting in the death of 2 car occupants and 2 seriously injured car occupants	Yes
HU	2	28/11/2016 -Level crossing accident Nyúl resulting in the death of the train driver and one other member of staff suffered serious injuries	No
HU	4	26/12/2015 Accident between Csorna és Szil-Sopronnémeti stations, when a train hit two men who lost their lives	No
IT	5	19/10/2012 – Accident to persons in Viareggio Station resulting in 3 persons killed (others)	Yes
RO	2	29/11/2016 – Other event at Barsesti resulting in 2 persons killed (employees)	Yes

⁴ The NRVs and CST for the risk category 3.2 were not established in the second set due to the lack of data reliability.

SK	2	23/01/2013 – Level crossing accident at section between railway stations Liptovský Hradok and Liptovský Mikulas, resulting in 1 killed (employee) and 1 seriously injured (passenger)	No
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The MWA were recalculated for NRVs of MSs where the single highest-consequence accident was excluded from the dataset. The final results of the second assessment step are summarised in Table 3.

Table 3 : Intermediate results of the assessment: Member States failing after two steps of the assessment method (after exclusion of the single highest-consequence accident).

Risk category	Passengers		Railway workers	Level crossing users	Others	Unauthorised persons	Whole society
	1.1	1.2	2	3.1	4	5	6
Failing after 2 nd step	None	None	Bulgaria Hungary Slovakia	Bulgaria	Hungary	Italy	None

The values and the result of the second step are summarized in the Annex 3 while Annex 6 gives a past overview of Member States failing after two steps of the assessment method after the exclusion of the single highest-consequence accident.

4.2. Third and fourth step of the assessment procedure

Third and fourth assessment steps were applied to the above cases leading to a ‘passed’ result – acceptable safety performance – for the majority of cases, 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 negative result, the final result of the assessment is “possible deterioration of safety performance” despite the decreasing trend in significant accidents.

Table 4 : Final result of the assessment after applying all four steps of the assessment method.

Risk category	Passengers		Railway workers	Level crossing users	Others	Unauthorised persons	Whole society
	1.1	1.2	2	3.1	4	5	6
Result after 4 th step: possible deterioration	None	None	Bulgaria Hungary Slovakia	Bulgaria	Hungary	Italy	None

For **Bulgaria**, it was the third time in the past four years that the second step returned negative result in the category of Railway Workers (2) and Level crossing users (3.1). Because of the methodology, since the number of relevant significant accidents has decreased, the result of the assessment is possible deterioration of safety performance in the category of Railway workers (2) and Level crossing users (3.1).

For **Hungary**, it was the second time in the past three years that the second step returned negative result in the category of Railway workers (2) and Others (4). Because of the methodology, since the number of relevant significant accidents has decreased, the result of the assessment is possible deterioration of safety performance in the category of Railway Workers (2) and Others (4).

For **Italy**, it was the fourth time in the past four years that the second step returned negative result for the category of Unauthorized Persons (5). Because of the methodology, since the number of relevant significant

accidents has decreased, the result of the assessment is possible deterioration of safety performance in the category of Unauthorized persons (5).

For **Slovakia**, it was the fourth time in the past four years that the second step returned negative result in the category of Railway workers (2). Because of the methodology, since the number of relevant significant accidents has decreased, the result of the assessment is possible deterioration of safety performance in the category of Railway workers (2).

Annex 7 provides an overview of the possible and probable deteriorations of railway safety performance broken down by the various categories. This completes the ninth assessment on the achievement of the second set of CSTs and NRVs.

4.3. Analysis of the results

The ninth annual assessment of achievements of safety targets led to acceptable safety performance in the categories of passengers (1) and others (4) in all Member States. Possible deterioration of safety performance was identified in the categories of railway workers (2), level crossing users (3), others (4) and unauthorised persons (5).

Railway workers and unauthorized persons categories are the two categories in which unacceptable safety performance has been identified most frequently across all annual assessments (see Annex 6).

As regards the category of Railway workers (2), due to the small number of fatalities, for Member States failing in this category (between 1 and 2 fatalities per year), the negative results of the assessment may not necessarily reflect a trend in underlying safety performance. It may also reflect poor risk management in this category.

4.3.1. Trend in significant accidents

Although not required by the legislation, the Agency used the procedure to give information to the Member States on the possible trends in the number of significant accidents. The third and fourth step of the assessment procedure was 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 passed either the first or the second step. The results indicated a 'failed' outcome in the following Member States and risk categories (Table 5).

Table 5 : Member States in which there was statistically significant increase in accident risk in 2016

<i>Risk category</i>	<i>All significant accidents</i>	<i>Accidents involving level crossing users</i>	<i>Accidents to persons caused by rolling stock in motion</i>
<i>Trend in significant accidents neither decreasing nor stable</i>	<i>France</i>	<i>Hungary</i>	<i>none</i>

4.3.2. Data limitations

The previous assessments had found discrepancies between the Eurostat and CSI data for 2015 for Poland and Slovakia. These discrepancies had no impact on the result of Poland and the discrepancy was subsequently addressed through the Polish Statistical Office.

In the case of Slovakia, following the correction of Eurostat data by the Slovakian statistical office in 2013, in the Decision 2013/753/EU [6] amending the second set of NRVs (CSTs), the NRVs for categories of passengers (1.1 and 1.2), employees (2) and unauthorised persons (5) have been updated. However, this update did not take into account the category of the whole society (6), which should have been updated as well. The Agency had been alerted about this discrepancy by email from the Slovakian NSA on 22 March 2017. After applying

the assessment to the correctly calculated NRVs, the result of the assessment was acceptable safety performance in the category of the whole society (6) .

5. Conclusions

As result of the application of the CST methodology, railway safety in the EU remains acceptable (below the relevant EU reference value) in all categories of users due to the decreasing number of accidents. Nevertheless, the Agency remains concerned because:

- According to the latest CSIs reported (2016), the raw data reveals a slight increase of fatalities and an increase of serious injuries over a reduced number of accidents.
- Amongst the others, the number of passengers and workers fatalities and serious injuries is increasing or stable in the best case.

Because of the limitation in terms of data granularity and volume, it is once again not possible 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. Railway workers), where the Method is necessarily limited to the small set of lagging indicators collected according to Annex 1 of the Railway Safety Directive [1]. In order to provide more proactive trend analysis, the Agency is developing proposals for wider occurrence reporting and will initiate a wider discussion with stakeholders about the value of numerical safety targets. This will be the basis for a future mandate to the Agency for revising or retaining the current CSM and CSTs.

The Eurostat database is the source of data having precedence over the CSI data, as set out in point 1.1.2 of the Annex of the Method [2]. There is still a limitation associated with reliance on the Eurostat data used for the establishment of the second set of NRVs (e.g. case of Slovakia, as mentioned in chapter 4.3.2.) and for this evaluation, as they are in some cases inconsistent with the CSI data collected by the NSAs and reported to the Agency.

Noting the constraints of using the current set of NRVs as set out in the Method, this 2018 assessment of achievements of safety targets identified “possible deterioration of safety performance” in four categories of railway users in four EU Member States.

In accordance with Article 5 of the Method [2], 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, as well as underlining the requirements on the content of the report.

Annex 1 References

<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)	2004/49/EC (Railway Safety Directive)	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]	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
[3]	Regulation (EC) No 91/2003 of the European Parliament and of the Council on rail transport statistics	(EC) 91/2003	Amended by Commission Regulation (EC) 1192/2003
[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

Annex 2 Abbreviations

<i>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's database)
EU	European Union
MS	Member State
MWA	Moving Weighted Average
NSA	National Safety Authority
NRV	National Reference Value
OSP	Observed Safety Performance

Annex 3 Intermediate results of the assessment (after second step)

Member State	Risk to passengers (1.1)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004-2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA ≤ NRV*1,2 Yes/No
Belgium (BE)	37.26	37.03	Yes		
Bulgaria (BG)	207.00	61.14	Yes		
Czech Republic (CZ)	46.49	44.46	Yes		
Denmark (DK)	9.03	0.00	Yes		
Germany (DE)	8.13	1.33	Yes		
Estonia (EE)	78.18	0.00	Yes		
Ireland (IE)	2.74	0.00	Yes		
Greece (EL)	54.67	5.92	Yes		
Spain (ES)	29.19	26.88	Yes		
France (FR)	22.53	7.60	Yes		
Croatia (HR)	176.90	5.18	Yes		
Italy (IT)	38.10	6.35	Yes		
Latvia (LV)	78.18	0.00	Yes		
Lithuania (LT)	97.16	0.00	Yes		
Luxembourg (LU)	23.81	0.00	Yes		
Hungary (HU)	170.18	67.72	Yes		
Netherlands (NL)	7.43	6.82	Yes		
Austria (AT)	26.25	17.16	Yes		
Poland (PL)	116.13	9.61	Yes		
Portugal (PT)	41.82	6.64	Yes		
Romania (RO)	57.40	0.00	Yes		
Slovenia (SI)	25.27	0.00	Yes		
Slovakia (SK)	62.05	23.12	Yes		
Finland (FI)	9.03	0.00	Yes		
Sweden (SE)	3.54	0.00	Yes		
United Kingdom (UK)	2.73	1.06	Yes		
Norway (NO)	2.83	0.00	Yes		
Scaling basis – Passenger train-km per yer.					

Member State	Risk to passengers (1.2)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004-2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA ≤ NRV*1,2 Yes/No
Belgium (BE)	0.318	0.275	Yes		
Bulgaria (BG)	1.911	0.962	Yes		
Czech Republic (CZ)	0.817	0.589	Yes		
Denmark (DK)	0.110	0.000	Yes		
Germany (DE)	0.081	0.011	Yes		
Estonia (EE)	0.665	0.000	Yes		
Ireland (IE)	0.028	0.000	Yes		
Greece (EL)	0.503	0.084	Yes		
Spain (ES)	0.270	0.166	Yes		
France (FR)	0.110	0.033	Yes		
Croatia (HR)	1.135	0.121	Yes		
Italy (IT)	0.257	0.164	Yes		
Latvia (LV)	0.665	0.000	Yes		
Lithuania (LT)	0.757	0.000	Yes		
Luxembourg (LU)	0.176	0.000	Yes		
Hungary (HU)	1.650	0.321	Yes		
Netherlands (NL)	0.089	0.022	Yes		
Austria (AT)	0.292	0.144	Yes		
Poland (PL)	0.849	0.331	Yes		
Portugal (PT)	0.309	0.200	Yes		
Romania (RO)	0.607	0.000	Yes		
Slovenia (SI)	0.362	0.000	Yes		
Slovakia (SK)	0.883	0.869	Yes		
Finland (FI)	0.110	0.000	Yes		
Sweden (SE)	0.033	0.000	Yes		
United Kingdom (UK)	0.028	0.009	Yes		
Norway (NO)	0.033	0.000	Yes		
Scaling basis – Passenger train-km per yer.					

Member State	Risk to railway workers (2)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004-2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA ≤ NRV*1,2 Yes/No
Belgium (BE)	24.63	11.33	Yes		
Bulgaria (BG)	20.40	37.41	No	36.08	No
Czech Republic (CZ)	16.45	8.02	Yes		
Denmark (DK)	9.10	0.00	Yes		
Germany (DE)	12.56	10.60	Yes		
Estonia (EE)	64.83	0.00	Yes		
Ireland (IE)	5.22	0.00	Yes		
Greece (EL)	77.87	201.52	No	17.06	Yes
Spain (ES)	8.81	10.07	No	4.63	Yes
France (FR)	6.06	2.77	Yes		
Croatia (HR)	73.65	9.61	Yes		
Italy (IT)	18.85	11.25	Yes		
Latvia (LV)	64.83	60.55	Yes		
Lithuania (LT)	41.01	13.83	Yes		
Luxembourg (LU)	11.99	0.00	Yes		
Hungary (HU)	9.31	11.22	No	11.19	No
Netherlands (NL)	5.97	14.60	No	3.74	Yes
Austria (AT)	20.29	9.78	Yes		
Poland (PL)	17.18	5.12	Yes		
Portugal (PT)	53.09	2.69	Yes		
Romania (RO)	22.30	1.17	Yes		
Slovenia (SI)	40.88	0.00	Yes		
Slovakia (SK)	2.71	39.37	No	37.25	No
Finland (FI)	9.21	2.14	Yes		
Sweden (SE)	2.86	2.62	Yes		
United Kingdom (UK)	5.17	0.00	Yes		
Norway (NO)	2.82	0.00	Yes		
Scaling basis - Train-km per year					

Member State	Risk to level crossing users (3.1)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004-2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA ≤ NRV*1,2 Yes/No
Belgium (BE)	138.00	49.43	Yes		
Bulgaria (BG)	141.60	187.04	No	180.48	No
Czech Republic (CZ)	237.76	146.30	Yes		
Denmark (DK)	65.43	15.19	Yes		
Germany (DE)	67.76	29.44	Yes		
Estonia (EE)	399.88	74.66	Yes		
Ireland (IE)	23.57	0.00	Yes		
Greece (EL)	710.26	95.96	Yes		
Spain (ES)	108.72	41.79	Yes		
France (FR)	78.72	68.94	Yes		
Croatia (HR)	611.30	120.17	Yes		
Italy (IT)	42.87	20.35	Yes		
Latvia (LV)	239.16	181.64	Yes		
Lithuania (LT)	521.65	297.33	Yes		
Luxembourg (LU)	95.90	11.48	Yes		
Hungary (HU)	274.20	146.64	Yes		
Netherlands (NL)	126.54	19.68	Yes		
Austria (AT)	160.16	99.15	Yes		
Poland (PL)	277.30	221.51	Yes		
Portugal (PT)	460.58	215.58	Yes		
Romania (RO)	542.00	293.75	Yes		
Slovenia (SI)	364.15	253.73	Yes		
Slovakia (SK)	309.00	116.16	Yes		
Finland (FI)	163.75	153.85	Yes		
Sweden (SE)	63.98	34.06	Yes		
United Kingdom (UK)	23.45	9.37	Yes		
Norway (NO)	21.61	0.00	Yes		
Scaling basis - Train-km per year					

Member State	Risk to 'others' (4)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004-2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA ≤ NRV*1,2 Yes/No
Belgium (BE)	2.86	30.89	No	2.33	Yes
Bulgaria (BG)	35.47	316.27	No	32.29	Yes
Czech Republic (CZ)	2.41	8.64	No	0.69	Yes
Denmark (DK)	14.15	0.00	Yes		
Germany (DE)	3.05	5.91	No	2.00	Yes
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	10.07	No	6.21	Yes
France (FR)	7.71	2.77	Yes		
Croatia (HR)	7.28	4.81	Yes		
Italy (IT)	6.70	2.68	Yes		
Latvia (LV)	11.64	127.15	No	0.00	Yes
Lithuania (LT)	11.64	0.00	Yes		
Luxembourg (LU)	5.46	0.00	Yes		
Hungary (HU)	4.51	8.01	No	12.93	No
Netherlands (NL)	4.70	8.25	No	3.86	Yes
Austria (AT)	11.09	6.52	Yes		
Poland (PL)	11.64	0.00	Yes		
Portugal (PT)	5.54	53.90	No	4.88	Yes
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	21.37	No	1.26	Yes
Sweden (SE)	14.15	13.10	Yes		
United Kingdom (UK)	7.00	5.66	Yes		
Norway (NO)	14.15	0.00	Yes		
Scaling basis - Train-km per year					
Risk category 'others' has been excluded from the assessment					

Member State	Risk to unauthorised persons (5)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2016]	OSP [2016] < NRV [2004- 2009] Yes/No	MWA (*10e-9) [2012-2016]	MWA \leq NRV*1,2 Yes/No
Belgium (BE)	72.64	42.22	Yes		
Bulgaria (BG)	900.20	268.66	Yes		
Czech Republic (CZ)	301.26	48.77	Yes		
Denmark (DK)	116.24	1.52	Yes		
Germany (DE)	113.08	98.64	Yes		
Estonia (EE)	1547.95	14.93	Yes		
Ireland (IE)	85.23	0.00	Yes		
Greece (EL)	722.94	690.91	Yes		
Spain (ES)	167.83	67.97	Yes		
France (FR)	67.16	102.34	No	78.43	Yes
Croatia (HR)	676.30	451.84	Yes		
Italy (IT)	119.25	149.41	No	143.27	No
Latvia (LV)	1314.28	557.04	Yes		
Lithuania (LT)	2045.34	836.68	Yes		
Luxembourg (LU)	79.92	0.00	Yes		
Hungary (HU)	588.06	608.98	No	637.13	Yes
Netherlands (NL)	15.93	8.89	Yes		
Austria (AT)	119.03	109.59	Yes		
Poland (PL)	1213.09	519.00	Yes		
Portugal (PT)	834.33	412.30	Yes		
Romania (RO)	1388.20	816.89	Yes		
Slovenia (SI)	236.44	0.00	Yes		
Slovakia (SK)	1758.00	405.56	Yes		
Finland (FI)	248.74	42.74	Yes		
Sweden (SE)	94.83	42.58	Yes		
United Kingdom (UK)	84.54	35.54	Yes		
Norway (NO)	91.81	59.58	Yes		
Scaling basis - Train-km per year					

Member State	Whole Societal risks (6)				
	NRV (*10e-9) [2004-2009]	OSP (*10e-9) [2014]	OSP [2014] < NRV [2004- 2009] Yes/No	MWA (*10e-9) [2010-2014]	MWA \leq NRV*1,2 Yes/No
Belgium (BE)	275.05	163.74	Yes		
Bulgaria (BG)	1440.00	857.00	Yes		
Czech Republic (CZ)	591.22	243.83	Yes		
Denmark (DK)	217.92	16.71	Yes		
Germany (DE)	203.16	154.25	Yes		
Estonia (EE)	2107.86	89.59	Yes		
Ireland (IE)	114.43	0.00	Yes		
Greece (EL)	1535.77	997.98	Yes		
Spain (ES)	322.57	152.06	Yes		
France (FR)	179.94	182.98	No	160.56	Yes
Croatia (HR)	1467.00	591.23	Yes		
Italy (IT)	230.95	238.85	No	205.31	Yes
Latvia (LV)	1658.79	926.39	Yes		
Lithuania (LT)	2587.94	1147.84	Yes		
Luxembourg (LU)	209.70	11.48	Yes		
Hungary (HU)	1020.00	820.53	Yes		
Netherlands (NL)	148.17	57.76	Yes		
Austria (AT)	329.01	236.79	Yes		
Poland (PL)	1590.22	752.03	Yes		
Portugal (PT)	1361.81	689.86	Yes		
Romania (RO)	1704.36	1135.22	Yes		
Slovenia (SI)	697.89	253.73	Yes		
Slovakia (SK)	1131.08	576.84	Yes		
Finland (FI)	416.98	220.09	Yes		
Sweden (SE)	169.19	92.36	Yes		
United Kingdom (UK)	119.79	51.63	Yes		
Norway (NO)	50.87	59.58	No	58.10	Yes
Scaling basis - Train-km per year					

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Annex 4 Input data overview

The table below shows the instances in which the CSI data had to be used in place of Eurostat data, as they were not available in Eurobase.

<i>Data category</i>	<i>Country and year</i>	<i>Remark (Eurostat)</i>
Fatalities and serious injuries (rail_ac_catvict)	None All (2016)	The Agency now provides the single data collection point
Rail accidents (rail_ac_catnubr)	PL (2015) All (2016)	The Agency now provides the single data collection point
Train movement for all trains Train-km (rail_tf_trainmv)	BE (2012, 2013, 2014, 2015) DE (2011, 2012, 2015) DK (2014, 2015) EL (2012) FR (2011, 2013, 2014, 2015) IT (2011) HU (2015) NL (2012, 2013, 2014, 2015) PT (2014)	Not published due to quality issues.
Train movement for passenger trains Passenger train-km (rail_tf_trainmv)	BE (2012, 2013, 2014, 2015) DE (2011, 2012, 2015) DK (2014, 2015) FR (2011, 2013, 2014, 2015) IT (2011) HU (2015) NL (2012, 2013, 2014, 2015)	Not published due to quality issues.
Train movement Passenger-km (rail_pa_quartal)	BE (2013, 2014, 2015, 2016) AT (2011, 2012, 2013, 2014, 2015, 2016)	Data are confidential.

Annex 5 Overview of annual assessments

This assessment is the eighth assessment of achievements of CSTs carried out by the Agency. The table below provides an overview of the specificities of all assessments made by the Agency so far in respect to the years considered for these assessments.

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

Annex 6 Overview of Step 2 risk level failure 2012 - 2018

The table shows a past overview of Member States failing after two steps of the assessment method after the exclusion of the single highest-consequence accident.

<i>Risk category > Publication Year CSI data year v</i>	<i>Passengers</i>		<i>Railway workers</i>	<i>Level crossing users</i>	<i>Others</i>	<i>Unauthorised persons</i>	<i>Whole society</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>
<i>2012 Assessment 2010 CSI data</i>	<i>Belgium Greece Spain Slovakia</i>	<i>Belgium Greece Slovakia</i>	<i>Bulgaria Estonia Romania Slovakia</i>	<i>Ireland Romania</i>	<i>Romania Slovakia Sweden</i>	<i>Ireland Romania Slovakia</i>	<i>Belgium Greece Spain Slovakia</i>
<i>2013 Assessment 2011 CSI data</i>	<i>Slovakia</i>	<i>Slovakia</i>	<i>Bulgaria Finland Romania Slovakia Sweden</i>	<i>None</i>	<i>Romania</i>	<i>Romania Slovakia Sweden</i>	<i>Romania Norway*</i>
<i>2014 Assessment 2012 CSI data</i>	<i>None</i>	<i>None</i>	<i>Bulgaria Lithuania Poland Romania Slovenia Slovakia Sweden</i>	<i>Bulgaria [Norway]</i>	<i>Croatia Netherlands Romania</i>	<i>Italy</i>	<i>Slovakia [Norway]</i>
<i>2015 Assessment 2013 CSI data</i>	<i>Spain</i>	<i>Spain</i>	<i>Romania Slovakia</i>	<i>Bulgaria [Norway]</i>	<i>Belgium Hungary</i>	<i>France Croatia Italy [Norway]</i>	<i>Slovakia [Norway]</i>
<i>2016 Assessment 2014 CSI data</i>	<i>None</i>	<i>None</i>	<i>Bulgaria Hungary Romania Slovakia Sweden</i>	<i>Bulgaria [Norway]</i>	<i>Hungary</i>	<i>France Italy [Norway]</i>	<i>Slovakia</i>
<i>2017 Assessment 2015 CSI data</i>	<i>None</i>	<i>None</i>	<i>Austria Bulgaria Slovakia Sweden</i>	<i>[Norway]</i>	<i>None</i>	<i>Italy [Norway]</i>	<i>Slovakia [Norway]</i>
<i>2018 Assessment 2016 CSI data</i>	<i>None</i>	<i>None</i>	<i>Bulgaria Hungary Romania Slovakia</i>	<i>Bulgaria</i>	<i>Hungary</i>	<i>Italy</i>	<i>None</i>

The above mentioned Member States or Countries were then analysed at the Step 3 and 4 levels to determine whether their safety performance was:

1. An acceptable railway safety performance, or
2. A possible deterioration in railway safety performance, or
3. A probable deterioration in railway safety performance.

The results from these exercises are summarised in Annex 7.

Annex 7 Overview of the results of all annual assessments 2012 - 2018

The results of all assessments carried out by the Agency between 2012 and 2018 are summarised in the table below.

Risk category > Publication Year CSI data year v	Passengers		Railway workers	Level crossing users	Others	Unauthorised persons	Whole society
	1.1 ⁵	1.2 ⁶	2	3.1	4	5	6
2012 Assessment 2010 CSI data			<i>Romania</i>	<i>Romania</i>	<i>Romania</i>	<i>Romania</i>	
2013 Assessment 2011 CSI data			<i>Lithuania</i>			<i>Romania</i> <i>Slovakia</i>	
2014 Assessment 2012 CSI data						<i>Sweden</i>	
2015 Assessment 2013 CSI data	<i>Slovakia</i>	<i>Slovakia</i>	<i>Romania</i> <i>Slovakia</i> Bulgaria		<i>Romania</i>	<i>Romania</i> <i>Slovakia</i> <i>Sweden</i>	<i>Romania</i>
2016 Assessment 2014 CSI data			<i>Bulgaria</i> <i>Romania</i> <i>Slovakia</i> <i>Sweden</i>	<i>Bulgaria</i>	<i>(Croatia⁷)</i> <i>(Romania)</i>		<i>[Norway]</i>
2017 Assessment 2015 CSI data			<i>Romania</i> <i>Slovakia</i>	<i>Bulgaria</i>		<i>Italy</i> <i>[Norway]</i>	<i>Slovakia</i> <i>[Norway]</i>
2018 Assessment 2016 CSI data			<i>Hungary</i> <i>Romania</i> <i>Sweden</i> Slovakia	<i>Bulgaria</i> <i>[Norway]</i>	<i>Hungary</i>	<i>France</i> <i>Italy</i> <i>[Norway]</i>	Slovakia

Note: For countries in **bold**, the result of “probable deterioration”, for countries in *italic* “possible deterioration” of safety performance. In all other cases, the result was “acceptable safety performance”.

⁵ Scaling base: passenger train-km per year.

⁶ Scaling base: passenger-km per year.

⁷ The assessment was carried out retrospectively for 2010 and 2011 for Croatia with the results showed here.