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 (notified under document number C(2009) 4246) (Text with EEA relevance) (2009/460/EC)

ANNEX

1. Statistical sources and measurement units for calculating NRVs and CSTs

1.1. *Statistical sources*

1.1.1. The NRVs and the CSTs shall be calculated on the basis of data on railway accidents and related consequences, reported according to Annex H to Regulation (EC) No 91/2003 and according to provisions of Articles 5, 18 and Annex I to Directive 2004/49/EC.

1.1.2. Within the framework of determining the first set of CSTs, in case of inconsistencies between data coming from the two sources referred to in point 1.1.1, data reported according to Annex H to Regulation (EC) No 91/2003 shall have precedence.

1.1.3. The time series of data which will be used for attributing values to NRVs and CSTs shall include the four most recent reported years. No later than 31 January 2011 the Agency shall propose to the Commission the adoption of updated values for NRVs and CSTs, calculated from data for the six most recent reported years.

1.2. *Measurement units for NRVs*

1.2.1. The measurement units for NRVs shall be expressed in compliance with the mathematical definition of risk. The consequences of accidents which shall be considered for each of the risk categories are the FWSIs.

1.2.2. The measurement units which shall be used for quantifying NRVs for each of the risk categories are laid down in Appendix 1 and result from the application of the principles and definitions referred to in point 1.2.1 and, where relevant, point 1.2.3. The measurement units include the scaling bases listed in Appendix 1, for the normalisation of NRVs.

1.2.3. For each of the risk categories ‘passengers’ and ‘level crossing users’ two different NRVs shall be set, expressed with the two different measurement units referred to in Appendix 1. For the purposes of the assessment of achievement referred to in chapter 3, compliance with at least one of these NRVs shall be considered sufficient.

1.3. *Measurement units for CSTs*

1.3.1. The measurement units to be used for quantifying CSTs for each of the risk categories shall be the same as the ones described for NRVs in section 1.2.

2. Methodology for calculating NRVs and for deriving CSTs

2.1. *Methodology for calculating NRVs*

2.1.1. For each Member State and for each of the risk categories the NRV shall be calculated by applying in sequential order the following process:

(a) calculation of the values returned by the corresponding measurement units listed in Appendix 1, by considering the data and provisions referred to in section 1.1;

(b) analysis of the results of the process described in point (a), to check presence and recurrence of zero values for the FWSIs in the observed safety performances for the years concerned;

(c) if the zero values referred to in point (b) are no more than two, the calculation is made of the weighted average of the values referred to in point (a), as described in section 2.3, and the returned value is taken as the NRV;

(d) if the zero values referred to in point (b) are more than two, the Agency shall attribute to the NRV a discretional value to be identified by consulting the Member State concerned.

2.2. *Methodology for deriving CSTs from NRVs*

2.2.1. For each of the risk categories, once the NRV has been calculated for each Member State according to the procedure laid down by section 2.1, the corresponding CST shall be assigned a value equal to the lower of:

(a) the value of the NRV which is the highest amongst the Member States;

(b) the value equal to 10 times the European average value of the risk to which the considered NRV refers.

2.2.2. The European average referred to in point 2.2.1(b) shall be calculated by cumulating the relevant data for all the Member States and by using the corresponding measurement units listed in Appendix 1, as well as the weighted average described in section 2.3.

2.3. *Weighted averaging process for the calculation of NRVs*

2.3.1. For each Member State and for each of the risk categories to which the weighted averaging can be applied according to point 2.1.1(c), the following steps shall be applied for calculating, during year Y (where Y = 2009 and 2011), the NRV_Y:

(a) calculation of the annual observations OBS_i(where i is the considered year of observation) returned by the corresponding measurement units listed in Appendix 1, after providing as input the data for the most recent reported n years as referred to in point 2.1.1(a) [initially $n = 4$; from 2011 onwards $n = 6$];

(b) calculation of the arithmetic n-year average (AV) of annual observations OBS_i;

(c) calculation of the absolute value of the difference $ABSDIFF_i$ between each annual observation OBS_i and the AV. If $ABSDIFF_i < 0{,}01 * AV$, to $ABSDIFF_i$ is attributed a constant value equal to $0{,}01 * AV$;

(d) calculation of the weight (W_i) for each single year i, by taking the inverse of $ABSDIFF_i$;

(e) calculation of the NRV_Y in the form of weighted average, as follows:

$$\mathrm{NRV}_Y = \frac{\sum_{i=x}^{N} W_i \times OBS_i}{\sum_{i=x}^{N} W_i}$$

;

where i is a natural number and	*if Y = 2009: x = Y – 5; N = Y – 2* *if Y = 2011: x = Y – 7; N = Y – 2*

3. **Framework model for the assessment of achievement of NRVs and CSTs**

3.1. *Methodology for assessing achievement of NRVs and CSTs*

3.1.1. The following principles shall apply for assessing achievement of NRVs and CSTs:

(a) for each Member State and for each of the risk categories whose respective NRV is equal to or lower than the corresponding CST, the achievement of the NRV will also automatically imply the achievement of the CST. The assessment of achievement of the NRV shall be carried out according to the procedure described in section 3.2 and the NRV shall represent the maximum tolerable level of the risk to which it refers, without prejudice to the provisions on the range of tolerance laid down in point 3.2.3;

(b) for each Member State and for each of the risk categories whose respective NRV is higher than the corresponding CST, the CST shall represent the maximum tolerable level of the risk to which it refers. The assessment of achievement of the CST shall be carried out in compliance with the requirements deriving from the impact assessment and, where applicable, the timetable for gradual implementation of the CST, according to Article 7(3) of Directive 2004/49/EC.

3.1.2. For each Member State, and for each of the risk categories, the assessment of achievement of the NRV and CST shall be carried out annually by the Agency, taking into consideration the most recent four preceding reported years.

3.1.3. No later than 31 March each year the Agency shall report to the Commission on the overall results of the assessment of achievement of NRVs and CSTs.

3.1.4. Taking into account the provisions laid down in point 1.1.3, from 2012 onwards the assessment of achievement of the NRVs and CSTs shall be carried out annually by the Agency taking into consideration the most recent five preceding reported years.

3.1.5. The outcome of the assessment of achievement referred to in point 3.1.1 shall be classified as follows:

(a) acceptable safety performance;

(b) possible deterioration of safety performance;

(c) probable deterioration of safety performance.

3.2. *Stepwise description of the procedure referred to in point 3.1.1(a)*

3.2.1. The procedure for the assessment of achievement of NRVs is composed of four different steps as described in the following points. The overall decisional flowchart of the procedure is shown in Appendix 2, where positive and negative decisional arrows correspond respectively to a ‘passed’ and a ‘failed’ result of the different assessment steps.

3.2.2. The first assessment step shall verify whether the observed safety performance is complying with the NRV or not. The observed safety performance shall be measured by using the measurement units listed in Appendix 1 and the data referred to in section 1.1, with time series which shall include the most recent years of observations as specified in section 3.1. The observed safety performance shall be expressed in terms of:

(a) safety performance observed in the single most recent reported year;

(b) moving weighted average (MWA), as specified in section 3.3.

The values returned by applying points (a) and (b) shall then be compared with the NRV, and if one of these values does not exceed the NRV the safety performance shall be considered acceptable. If this is not the case, the procedure shall continue with the second assessment step.

3.2.3. The second assessment step shall consider the safety performance as acceptable if the MWA does not exceed the NRV plus a 20 % range of tolerance. If this condition is not satisfied, 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 most recent years of observation as referred to in section 3.1, excluding the years used to set the NRV.

If this single accident is more severe, in terms of consequences, than the most severe single accident included in the data used for setting the NRV, it shall be excluded from the statistics. The MWA is then recalculated to check whether it lies within the abovementioned range of tolerance. If this is the case, the safety performance shall be considered acceptable. If this is not the case, the procedure shall continue with the third assessment step.

3.2.4. The third assessment step shall verify whether it is the first time in the last 3 years that the second assessment step did not return evidence of acceptable safety performance. If this is the case, the outcome of the third assessment step shall be classified as 'passed'. The procedure shall continue with the fourth step, whatever the outcome of the third step may be.

3.2.5. The fourth assessment step shall verify whether the number of significant accidents per train-km, with respect to the previous years, remained stable (or decreased). The criteria for this appraisal shall be whether there has been a statistically significant increase in the number of relevant significant accidents per train-km. This shall be evaluated by using an upper Poisson tolerance bound which will determine the acceptable variability based on the number of accidents that occurred in the different Member States.

If the number of significant accidents per train-km does not exceed the abovementioned tolerance bound, it is assumed that there has not been a statistically significant increase, and the outcome of this assessment step shall be classified as 'passed'.

Depending on the risk category to which the different NRVs under assessment of achievement refer, the significant accidents to be considered for carrying out this assessment step are as follows:

(a) risks to passengers: all relevant significant accidents;

(b) risks to staff or employees, including the staff of contractors: all relevant significant accidents;

(c) risks to level crossing users: all relevant significant accidents included in the category 'accidents involving level crossings';

(d) risks to unauthorised persons on railway premises: all relevant significant accidents included in the category 'accidents to persons caused by rolling stock in motion';

(e) risks to others: all relevant significant accidents;

(f) risk to society as a whole: all significant accidents.

3.3. *Moving weighted averaging process for the annual assessment of achievement of NRVs*

3.3.1. For each Member State and for each of the risk categories to which the Moving Weighted Averaging (MWA) is applied for carrying out, in each year Y (starting from Y = 2010 onwards), the assessment steps described in section 3.2, the following phases shall be applied for calculating the MWA_Y:

(a) calculation of the annual observations OBS_i returned by the corresponding indicators listed in Appendix 1, after providing as input the data available from the sources referred to in section 1.1 for the relevant years (the index *i* takes the values as defined in the formula below);

(b) calculation of the arithmetic *n*-year average (*AV*) of annual observations OBS_i [initially $n = 4$; from 2012 onwards $n = 5$];

(c) calculation of the absolute value of the difference $ABSDIFF_i$ between each annual observation OBS_i and the *AV*. If $ABSDIFF_i < 0{,}01 * AV$, to $ABSDIFF_i$ is attributed a constant value equal to $0{,}01 * AV$;

(d) calculation of the weight W_i, by taking the inverse of $ABSDIFF_i$;

(e) calculation of the MWA_Y as follows:

$$\mathrm{MWA}_Y = \frac{\sum_{i=x}^{N} W_i \times OBS_i}{\sum_{i=x}^{N} W_i}$$

;

where *i* is a natural number and	*if Y = 2010 or 2011: x = Y – 5; N = Y – 2* *if Y ≥ 2012: x = Y – 6; N = Y – 2*

APPENDIX 1

MEASUREMENT UNITS FOR NRVS AND CSTS

Risk category		**Measurement units**		**Scaling bases**
1.	Passengers	1.1	Number of passenger FWSIs per year arising from significant accidents/Number of passenger train-km per year	Passenger train-km per year
		1.2	Number of passenger FWSIs per year arising from significant accidents/Number of passenger-km per year	Passenger-km per year
2.	Employees	Number of employee FWSIs per year arising from significant accidents/Number of train-km per year		Train-km per year
3.	Level crossing users	3.1	Number of level-crossing user FWSIs per year arising from significant accidents/Number of train-km per year	Train-km per year
		3.2	Number of level-crossing user FWSIs per year arising from significant accidents/[(Number of Train-km per year * Number of level crossings)/ Track-km)]	(Train-km per year * Number of level crossings)/Track-km
4.	Others	Yearly number of FWSIs to persons belonging to the category ‘others’ arising from significant accidents/Number of train-km per year		Train-km per year

5.	Unauthorised persons on railway premises	Number of FWSIs to unauthorised persons on railway premises per year arising from significant accidents/Number of train-km per year	Train-km per year
6.	Whole society	Total number of FWSIs per year arising from significant accidents/Number of train-km per year	Train-km per year

APPENDIX 2

Decision flowchart for the procedure referred to in point 3.1.1(a) of the Annex