EUROPEAN UNION AGENCY FOR RAILWAYS

Making the railway system work better for society.

Phasing the COR Safety Management Data system

COMMON OCCURRENCE REPORTING PROGRAMME

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1.0	27/09/2016	Consultation document
2.0	28/07/2017	Document revised to reflect consultation responses

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2.1. Reference documents

[Ref. N°]	*Title*	*Reference*	*Version*
[1]	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (recast)	2016/798	OJ: L138/102 of 26/05/2016
[2]	Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union (recast)	2016/797	OJ: L138/44 of 26/05/2016
[3]	Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) N° 881/2004	2016/796	OJ: L138 of 26/05/2016
[4]	Commission Regulation (EU) No 1077/2012 of 16 November 2012 on a common safety method for supervision by national safety authorities after issuing a safety certificate or safety authorisation	1077/2012	OJ: L320/3 of 17/11/2012
[5]	Commission Regulation (EU) No 1078/2012 of 16 November 2012 on the common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and entities in charge of maintenance	1078/2012	OJ: L320/8 of 17/11/2012
[6]	Commission Regulation (EU) No 445/2011 of 10 May 2011 on a system of certification of entities in charge of maintenance for freight wagons and amending Regulation (EC) No 653/2007 (Text with EEA relevance)	445/2011/EU	OJ: L122/22 of 11/5/2011
[7]	Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and amended by the Commission Implementing Regulation (EC) 2015/1136	402/2013/EU	OJ: L 121 of 3/5/2013
[8]	Commission Implementing Regulation (EU) 2015/1136 of 13 July 2015 amending Implementing Regulation (EU) No 402/2013 on the common safety method for risk evaluation and assessment	2015/1136/EU	OJ: L 185 of 14/7/2015
[9]	Commission Decision of 5 June 2009 on the adoption of a common safety method for assessment of achievement of safety targets, as referred to in Article 6 of Directive 2004/49/EC of the European Parliament and of the Council	2009/460/EC	OJ: L 150 of 13/6/2009
[10]	Prospective Study into Harmonized Train Accident Precursors Analysis and Management, Study by TRL for the ERA, 2013	PPR665	Final
[11]	Review of Data quality and approach of the Agency annual report on safety – Impact Assessment	Task 3 - 1LDI90Z-9	Task 3, Rev. 2, Final
[12]	Review of Data quality and approach of the Agency annual report on safety – Assessment of existing national occurrence reporting regimes and systems	Task 1 - 1LDI90Z-12	Task 1, Rev. 2, Final
[13]	Common Occurrence Reporting Programme – Project Plan	ERA-PRG-004	1.0
[14]	Common Occurrence Reporting Programme – Paper on “Designing the common occurrences and taxonomy COR”	ERA-PRG-004-TD-002	2.0
[15]	Common Occurrence Reporting Programme - Paper on “Roles, use of data, governance and confidentiality for COR Safety Management Data”	ERA-PRG-004-TD-006	2.0

Table 1 : Table of reference documents

2.2. Standard terms and abbreviations

The general terms and abbreviations used in the present document can be found in a standard dictionary. Furthermore, a glossary of railway terms that focuses primarily on safety and interoperability terminology, but also on other areas that the Agency can use in its day-to-day activities as well as in its Workgroups for the development of future publications, is available on the Agency website.

2.3. Specific terms and abbreviations

Term	*Definition*	*Legal reference*
Accident	an unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions, derailments, level crossing accidents, accidents to persons involving rolling stock in motion, fires and others [1].	Article 3 (11) Directive (EU) 2016/798
Accident to persons involving rolling stock in motion	Accidents to one or more persons who are hit either by a railway vehicle or by an object attached to, or that has become detached from, the vehicle, this includes persons who fall from railway vehicles as well as persons who fall or are hit by loose objects when travelling on board vehicles [1].	Clause 1.9 of the Appendix to Directive (EU) 2016/798
Agency	The European Union Agency for Railways such as established by the Regulation (EU) No 2016/796 of the European Parliament and of the Council of 11 May 2016.	Regulation (EU) No. 2016/796
Fire in rolling stock in motion	A fire or explosion that occurs in a railway vehicle (including its load) when it is running between the departure station and the destination, including when stopped at the departure station, the destination or intermediate stops, as well as during re-marshalling operations.	Clause 1.10 of the Appendix to Directive (EU) 2016/798
Hazard	Condition that could lead to an accident [7].	Article 3 (13) of the Regulation No. 402/2013 amended by Regulation (EC) 2015/1136
Incident	any occurrence, other than an accident or serious accident, affecting the safety of railway operations.	Article 3 (13) Directive (EU) 2016/798
Information	Data endowed with meaning and purpose. It is inferred from data and deemed useful.	N/A
Occurrence	Occurrence means any safety-related event which endangers or which, if not corrected or addressed, could endanger a train or any rolling stock, its passengers, staff or any other person, and includes in particular an accident and incident.	N/A
Risk	Means the frequency of occurrence of accidents and incidents resulting in harm (caused by a hazard) and the degree of severity of that harm.	Article 3 (1) of the Regulation No. 402/2013 amended by Regulation (EC) 2015/1136

Term	*Definition*	*Legal reference*
Serious accident	Means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety; 'extensive damage' means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total.	Article 3 (12) Directive (EU) 2016/798
Shunting movement	Any movement of railway vehicles not classified as a train, or involving coupling or uncoupling of vehicles.	N/A
Train	One or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point, including a light engine, i.e. a locomotive travelling on its own.	Clause 1.4 of the Appendix to Directive (EU) 2016/798
Union rail system	Means the Union rail system as defined in point (1) of Article 2 of Directive (EU) 2016/797 – Interoperability Directive.	Article 3 (1) Directive (EU) 2016/798

Table 2 – Table of terms

Abbreviation	*Meaning*
COR	Common Occurrence Reporting
CSI	Common Safety Indicator
CSM	Common Safety Method
CST	Common Safety Target
ECDR	European Centralised Data Repository
ECM	Entity in charge of maintenance
IM	Infrastructure Manager
IoT	Internet of Things
MoU	Memorandum of Understanding
NSA	National Safety Authority
NIB	National Investigation Body
NOR	National Occurrence Reporting
RSD	Railway Safety Directive – Directive (EU) 2016/798
RU	Railway Undertaking
SEP	Safety Enhancement plan
SMD	Safety Management Data
SMS	Safety Management System

Table 3 – Table of abbreviations

3. Purpose of the document

This document provides a comprehensive overview on a possible phasing strategy for the COR SMD target system. This work forms part of the Common Occurrence Reporting Project [13] and is provided for written consultation. This document provided also a basis for the consultation workshop which was held on 25th and 26th of October 2016.

It includes:

- a short summary on the current, CSIs based, reporting system, including its scope and purpose.
- a high-level description of the main building blocks for the COR SMD target system, explaining which of them can be used to phase its implementation and how.

The purpose is to invite views and evidence from stakeholders on the most appropriate structure and timing for a European Common Occurrence reporting system, maximising the benefits and reducing the burdens. This consultation will support development of more detailed aspects of the reporting regime (use of data, access, governance, roles and responsibilities).

NOTE:

This document contains assumptions and examples. It is important to clarify that this paper is not suggesting a technical proposal. It aims to generate discussion, constructive proposals and encourage stakeholders to provide evidence to support the impact assessment planned for 2017.

4. Scope and objectives

This deliverable provides:

- clarifications on the current system for monitoring Union rail system safety performance;
- some options for the phasing of the COR SMD project, taking each variable in turn and considering the phases that could be created from these variables;
- some general hypothesis on how the system should work:
    - National or EU database;
    - High level description of the *principles of* governance;
    - Roles and use of data (to be covered in a later consultation – see project plan [13]);
    - Tools and process for reporting.
- A high-level structure of a time plan including the implementation of the different steps.

5. Background

5.1. Current system for measuring railway safety performance of the Union rail system

The current occurrence reporting scheme, based on the Common Safety Indicators and described in Directive (EU) 2016/798 (Railway Safety Directive) [1], is essentially reactive and designed to verify the achievement of safety targets by single Member states and to measure the overall safety performance of the Union rail system.

It is a system based on:

- Common Safety Targets, assessed annually in accordance with the methodology defined by the relevant Common Safety Method: Commission Decision 2009/460/EC [9];
- Common Safety Indicators, which are included in the Annex I of the Railway Safety Directive [1].

Summarising, in the current scheme (Figure 1), Railway Undertakings (RUs) and Infrastructure Managers (IMs) report the set of the common safety indicators (CSIs) once a year to the competent National Safety Authority (NSA). They do that through the annual safety report as stated in Article 9.6 of the Railway Safety Directive [1].

Data from the RU/IM's annual safety report are mainly used by the NSAs[1] to:

- inform its supervision activities, in accordance with Annex I of the Common Safety Method (CSM) on supervision [4], and
- draft its annual report on the development of railway safety, including an aggregation at Member State level of the CSIs, in accordance with Article 5(1) of the Railway Safety Directive [1].

The Agency receives an annual report from the NSAs, assesses the safety performance of each Member State in accordance with the relevant Common Safety Method (CSM) [9] and sends a report to the European Commission.

This assessment may result in three cases:

1. **Acceptable safety performance:** the European Commission informs the Member State, no other actions are required;
2. **Possible deterioration of the safety performance:** the European Commission informs the Member State, which is required to analyse and comment on the performance. The Commission may require the Agency to give a technical opinion on the information provided by the Member State;
3. **Probable deterioration of the safety performance:** the European Commission informs the Member State, which is required to analyse and comment on the performance. When necessary, the Member State has to submit a safety enhancement plan (SEP) to the Commission, which may require the Agency to give a technical opinion on the SEP.

The process is illustrated in the figure below.

[1] Paper on "Roles, use of data, governance and confidentiality for COR Safety Management Data"

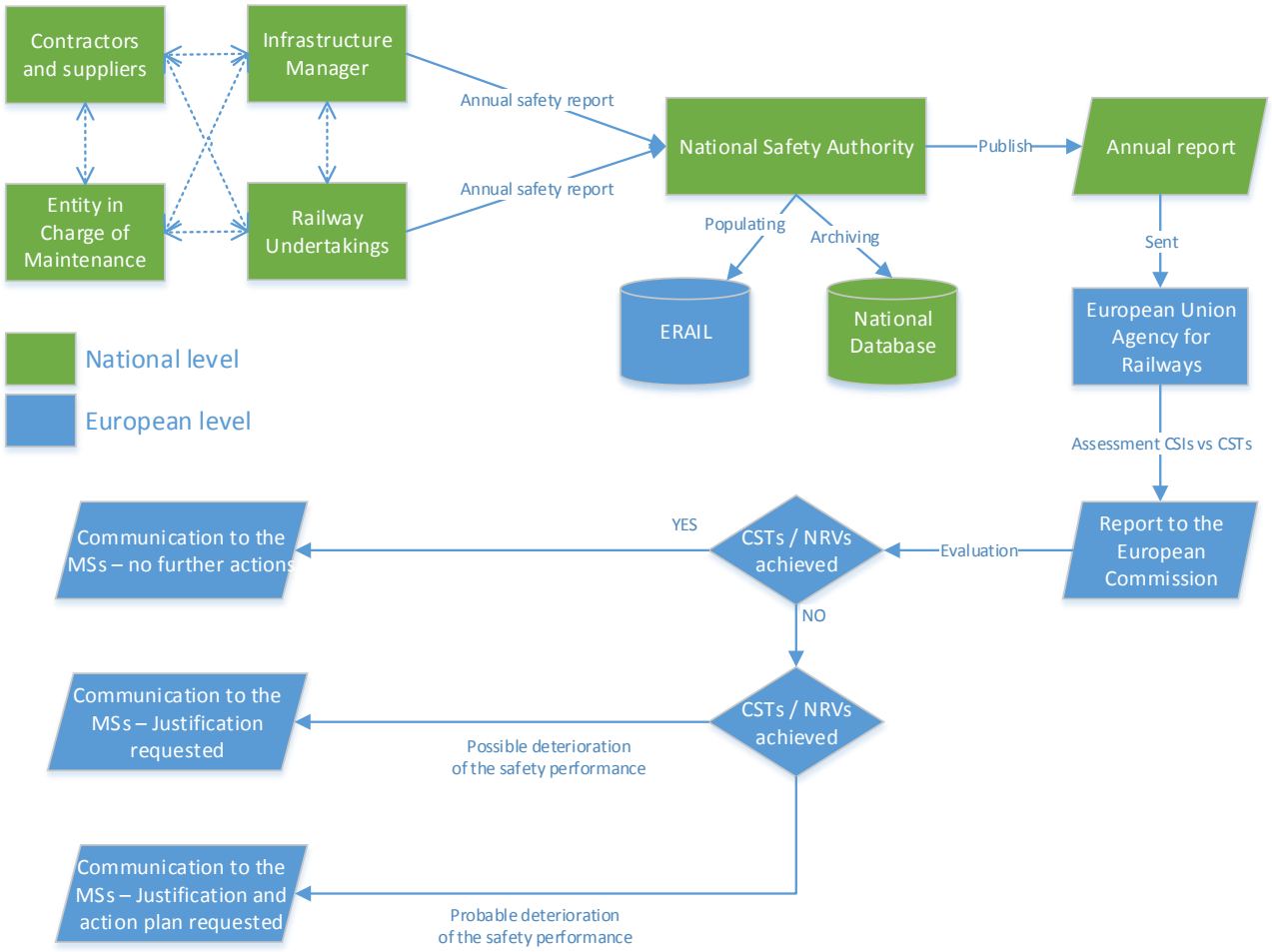

Figure 1 – Structure of the current reporting scheme as defined in the Directive (EU) 2016/798 and the CSM for the assessment of CSTs.

The European Commission designed this process to get the necessary evidences of the impact of the market opening on the safety performance of the Union rail system and to create an interface between the European Commission and the Member States to ensure an appropriate dialogue on their safety performance.

This system is not meant to relieve RUs and IMs from the responsibility to manage their own safety performance.

5.1.1. Limitations of the current reporting scheme

There are two main limitations of the CSIs based reporting scheme:

1. Data aggregation;
2. Event classification and taxonomy.

The first issue is the data aggregation: the information sent to the Agency includes only the total number of accidents, organised by type. The consequences are also aggregated, so the Agency cannot know the consequences of a single accident but only the global consequences of a specific type of accident. The Railway

Safety Directive does not describe the level of aggregation of the data sent by the RUs/IMs to the competent NSA.

The second issue is the event classification and taxonomy of the CSIs-based system. In fact, according to Annex I of the RSD [1], RUs/IMs do not have to report causes of accidents and the number of precursors, to be reported as stand-alone events, is small.

Both issues have a strong impact on the Agency and the Member States in terms of understanding occurrences and, more in general, in having the right understanding of the safety level and risk profile of European railways.

This issue is partially mitigated by the work of the National Investigation Bodies (NIBs), which are obliged to investigate serious accidents and to identify their causes. Nevertheless, for accidents and incidents not considered "serious" within the definition[2] of the RSD[1], the legal framework gives to NIBs a discretion to decide whether to investigate at all. This may lead to inconsistent data because active and well-resourced NIBs might provide more information on a wider range of occurrences. The work of the NIB is not taken into account for the assessment of CSTs.

To conclude, the current system is designed to provide national and European authorities with high-level information on the safety performance of the Union rail system, but it does not provide any tool or supporting information to understand where the main risks are and how those could be controlled.

6. A new reporting scheme

6.1.1. The future of occurrence reporting

This section is not describing the target system of the COR, it provides a vision on how reporting of occurrences could theoretically be optimised in the railway system in the future, according to technical progress.

The main purpose of any future reporting scheme is to allow all the responsible entities to fulfil their roles so that safety is managed in a predictive way, with the aim to preserve or improve it. The future system is based on harmonised high-level accident models and harmonised definitions of occurrences. This harmonisation shall create the basis for an harmonised decision-making framework. This will not prevent RUs, IMs and ECMs, to manage their own risks and to be responsible for their safety performance.

This framework could be achieved by means of a unique European data set, which will be the unique repository providing factual data and information, not necessarily centralised in one database but based on a common data model.

This approach is consistent with the specific objectives of the Safety Management Data Reporting work stream, set out in paragraph 3.2.2 of the Project Plan [13]:

[2] **'serious accident'** means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety;

A. Improved understanding and management of the risks of significant and catastrophic accidents in all Member States
B. Supporting convergence, through improvement, of Member State safety performance across all significant and non-significant accident categories to achieve current EU average;
C. .

A new reporting scheme could reduce the manual reporting (and its costs) done by operators by means of a deep technological change.

The railway system will be impacted by the Internet of Things[3]: rolling stock will be able to provide real-time information on its functioning conditions, driver behaviour, condition of the infrastructure, etc. Also the infrastructure, when properly equipped, will be able to provide real-time information on its state, on the vehicles running on it and on the environment. Occurrences will be reported by IT systems, which will be able to handle automatic and manual reports. Eventually the operators will be relieved of the manual task to report.

In this scenario, the implementation of big-data is obviously necessary to handle the amount of data generated by the whole system and to provide reliable information through proper analytics.

A consequence of this technological progress is that due to the amount and quality of information available in the system, there will be no difference between internal and external reporting, even though the operators will have full control on their data within the boundaries of the national and European legal framework

A new reporting scheme can support operators to manage their own risks using. The same system will be used by the Agency, Member States, NSAs and NIBs to identify the main risks in Member States in order to develop strategies and take increasingly risk-based decisions. These decisions could include decisions about investments, resources, enforcement, investigation, certification, authorisation and supervision.

Variables and controls to phase a possible target system are described in the next chapter.

[3] A proposed development of the Internet in which everyday objects have network connectivity, allowing them to send more information.

7. Phasing the COR SMD

7.1. COR SMD target system building blocks

We have identified the following variables for a reporting system. We will explore each of these elements in terms of possible options for phasing a European occurrence reporting system:

- Scope & purpose;
  - Operational scope:
    - Shunting;
    - Running trains.
  - Geographical scope:
    - Member States involved;
  - Purpose of the reporting scheme:
    - Support regulators;
    - Support operators;
    - Etc.
- Events classifications and taxonomy, which consists of:
  - Events to be reported;
  - Taxonomy, including metadata.
- Legal obligations and reference documentation:
  - Legislation;
  - Technical documents;
  - Guidelines.
- Reporting system:
  - Reporting tool;
  - Data repository.

Figure 2 – Structure of a reporting system

7.2. The need of phasing the COR SMD

The Agency is aware of the burden that a new reporting system may generate if it is imposed to the sector in one step and by mean of legislation. This is the reason why the Agency is thinking of proposing a phased approach for the implementation of the target system defined in the COR project.

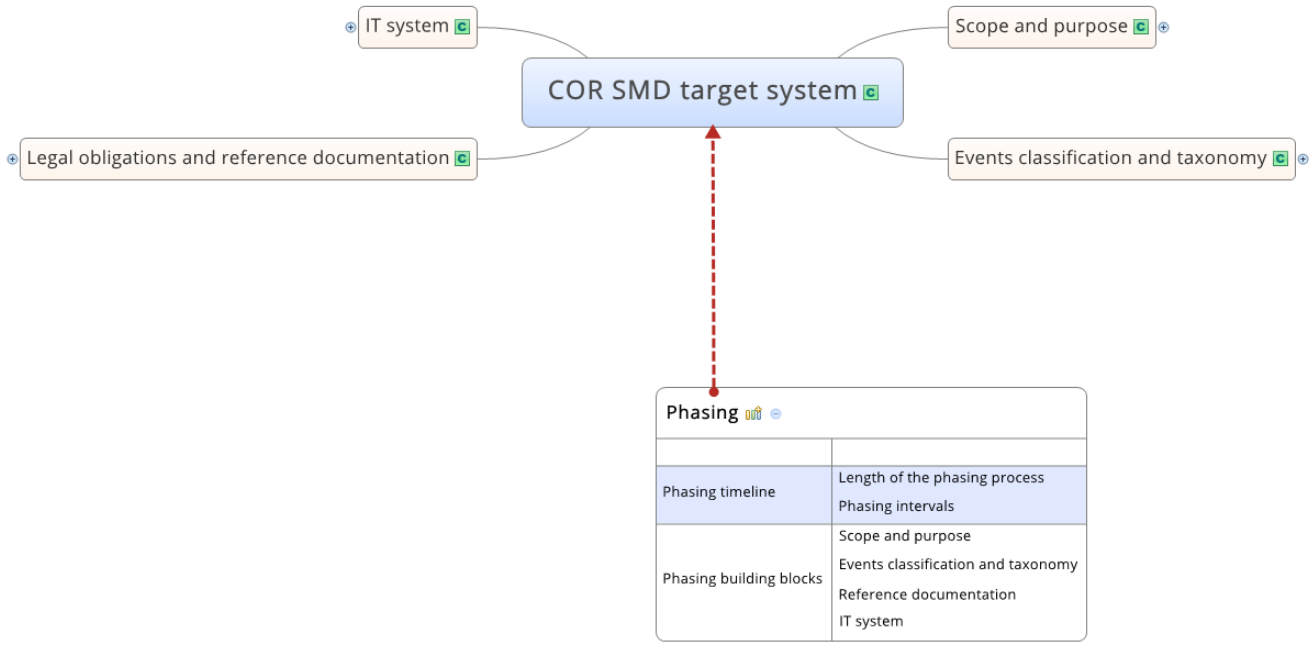

Figure 3 – Phasing – Phasing scheme

The phasing of the COR SMD target system could be structured taking into account the following elements:

› The time horizon during which the implementation of the COR SMD target system is phased;
› The building blocks of the COR SMD target system, which can be gradually implemented to soften the impact on the stakeholders and on the Agency.

It is worth noting again the need to achieve a minimum level of implementation from the beginning or early stages of the system, in order to achieve a positive, or at least neutral, cost benefit ratio.

In general terms, phasing the implementation of target system has advantages and disadvantages:

Advantages:

- Potential users can get familiar with the new reporting scheme, gradually, and adopt it on a voluntary basis; this will boost the implementation when new legislation will be in force;
- The Agency will have time to develop and fine tune the COR SMD target system together with the users;
- In principle, given the low amount of information and the high level of data granularity requested at the initial stages, it could be easier to preserve the compatibility with national reporting systems in force (see also disadvantages).

Disadvantages:

- High risk of double reporting – Coexistence between national and European reporting schemes if the taxonomy is not completely compatible; the users will also still have the obligation to report occurrences to NIBs if the reporting scheme is not implemented fast enough to support their needs;

- Difficulty to promote the use of the new system on a voluntary basis providing immediate benefits to the users;
- Poor data completeness / consistency, for instance a fast transition between two different systems, might raise the risk of losing historical data or of collecting not enough data to carry out a correct analytics.

7.3. Time horizon for phasing

The phasing of the future COR SMD target system could be organised in steps. The number of steps and the length of each of them is still to be defined.

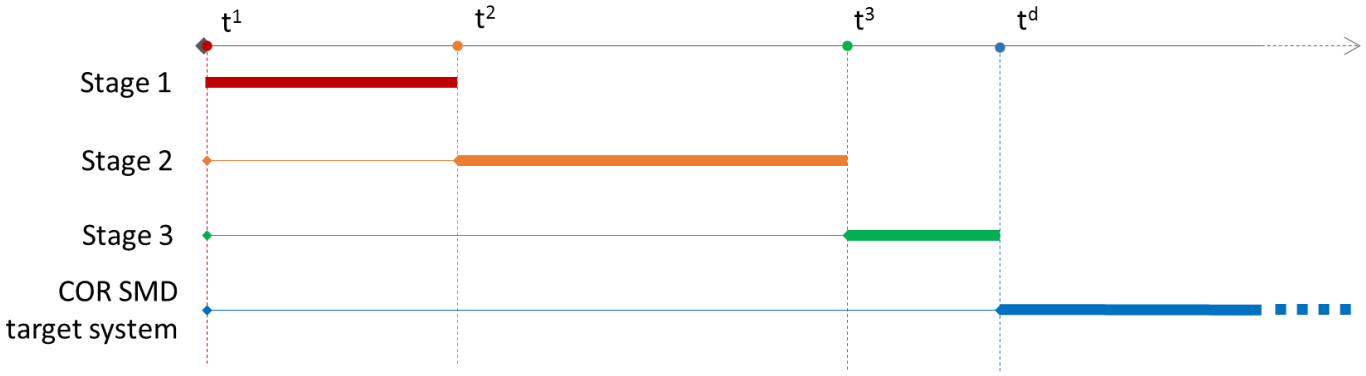

Figure 4 – Stages for phasing the target system

To support the discussion with the stakeholders, the Agency would welcome contribution from stakeholders on the following aspects. Quantitative estimates will support greatly the impact assessment planned for early next year [13]:

- Time needed by the stakeholders and the Agency to adapt their organisation;
- Time needed to deploy IT solutions to support the deployment of the target system;
- Time needed to produce guidance and legislation;
- Coexistence of different reporting systems – double reporting;
- Other factors proposed by the stakeholders.

7.4. Phasing the building blocks of the COR SMD target system

The potential building blocks of the COR SMD target system are described in the previous chapter, phasing their implementation consist mainly of implementing them gradually, taking into consideration factors like:

- human, technical and financial resources to implement the steps;
- the amount of data generated by the implementing step;
- the impact on the sector and the Agency; the actual contribution to the achievement of the COR SMD target system;
- other factors proposed by the stakeholders.

7.4.1. Phasing scope and purpose

This section provides suggestions on the possible phasing of the scope of the COR SMD target system and of its purpose. As already said in this document, further proposals are expected from the stakeholders.

7.4.1.1. Phasing the operational scope

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

The scope of the CSI reporting scheme is limited to movements of trains, accidents to persons involving rolling stock in motion, and fires in rolling stock (while in operation)., while the scope of the COR SMD target system could be wider and including shunting movements and other railway operations.

This will increase the amount of data to be reported. The positive effect is that a substantial part of railway operations will be included in the reporting scheme, improving the accuracy of the safety analysis and the description of the actual risk level in the Union rail system. The negative aspect is linked to uncertainties of monitoring shunting movements because the harmonisation in this field is rather low.

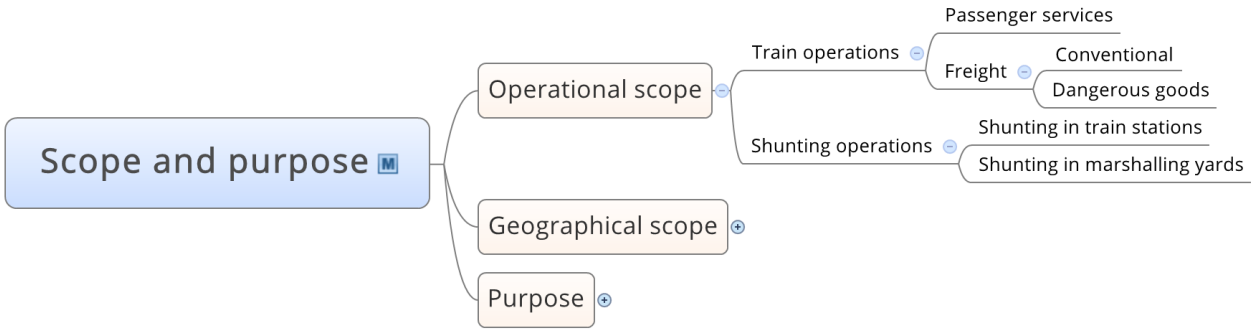

Figure 5 – Overview on scope and purpose

A first option for phasing (**Option 1**) extends gradually the scope from the CSIs based system to the COR SMD one. This is achieved by including shunting movement deployed in stations and then those done in marshalling yards. Splitting the shunting operations in two parts helps because increases gradually the amount of data, starting with the part of shunting which has a stronger interface with train movements, the one done in train stations. This solution has also the advantage of covering from the beginning the current legal obligations in terms of reporting CSIs avoiding two different systems for reporting.

Option 2 is based on a different principle. The idea is to start in stage 1 with reporting occurrences related to freight or passengers trains. Then stage 2 extends the scope of the reporting system to shunting movements of freight or passengers rolling stock operated in train stations, the shunting movements operated in marshalling yards are included in stage 3. The inclusion of freight (or passengers, depending on the initial choice) is done with the deployment of the target system. The solution proposed in option 2 is based on the assumptions that the number of companies delivering both, passengers and freight services, is low. This is a way to phase the deployment of the COR SMD target system to passengers or freight companies. The main benefit of Option 2 is the possibility to test the extensions of the scope (shunting) with a reduced amount of data, this can help verify if the taxonomy is correctly structured or the amount of data is coherent

with the expectations. This is particularly true if passenger companies are selected because of the reduced influence of shunting movements in the passenger transport business overall.

The disadvantages are mainly related to different schemes, applicable to different companies or to two different business units of the same companies (typically the incumbents). This might be a burden for NSAs and for the Agency depending on the use of data that will be considered. This might also require the existence of a dual national system to cover the rest of the scope.

Option 3 is a combination of Option 1 and Option 2. In stage 1, the scope includes only freight or passengers train operations. Stage 2 extends the scope to freight and passengers train operations, shunting is included in stage 3 and the final deployment of the target system.

A summary of the examples on phasing the operational scope is provided in Table 4.

	Operational Scope		
Stages	**Option 1**	**Option 2**	**Option 3**
Preferences	**2**	**-**	**1**
Current	Train operations, freight and passengers		
Stage 1	Train operations - passengers **and** freight	Train operations – passengers **or** freight	Train operations – passengers **or** freight
Stage 2	Train operations and shunting movements in train stations – both related to passengers **and** freight	Train operations and shunting movements in train stations – both related to passengers **or** freight	Train operations – passengers **and** freight
Stage 3	Train operations and shunting movements in train stations and marshalling yards – both related to passengers **and** freight	Train operations (all) and shunting movements in train stations and marshalling yards	Train operations (all) and shunting in train stations
Hypothetical Target system	Train operations and shunting in train stations and marshalling yards		

Table 4 – Summary of the options for phasing the operational scope

Preferences expressed by the stakeholders:

Two stakeholders prefer Option 1, one of them only for Stage 2 and 3, which suggests an immediate extension of the scope to shunting operations. Although this might increase the quantity of the reports, the extension of the scope would simplify the reporting process because sometimes the definition of the operational context (shunting, train movements, etc.) might be difficult. Also, it could be different from a member state to another and this would undermine the building of a common view of the railway safety performance.

One stakeholders expressed a preference for Option 3, with Passenger operations first, as it provides for a more gradual introduction with focus on those areas that provide most benefit first.

7.4.1.2. Phasing the geographical scope

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

Phasing the geographical scope means starting the implementation of the COR SMD target system only with a selected group of countries, the countries not included in the phasing of the COR SMD target system will still have to report data in accordance with the current reporting scheme based on the CSIs.

Possible options for phasing the geographical scope are 3:

Option 1, where all the member states are in the scope of the phasing of the COR SMD target system. This option can help in ensuring the compatibility with the national reporting schemes of all the members states, as they all participate to the initial stages of the COR SMD system. The disadvantage of this option is that the involvement of all the countries foreseen in the scope of the target system can potentially generate a big volume of data to be managed at the earlier stages.

Option 2 includes the participation of selected countries to the deployment of the target system.

Those countries might be selected considering:

- The will to volunteer;
- Geographical coverage;
- Their safety performance (e.g. priority countries), this option might better support the convergence and improvement of Member state safety performance across all significant and non-significant accident categories, to achieve current EU average;
- The number of serious accidents, this option might boost the understanding and management of the risks of serious accidents in all Member States;
- The length of the railway infrastructure;
- The absence of a national occurrence reporting system;
- Other proposals from the stakeholders.

This proposal helps in terms of volume of data generated but may lead to a system that does not consider the presence of all the national reporting schemes. Therefore, the compatibility with the national systems cannot be ensured. In option 2 the extension of the scope to the whole set of countries foreseen in the target system, takes place after stage 3. This may cause a dramatic increase of data in the last stage of the phasing. Moreover, those countries joining the COR SMD target system at the last stage may be unprepared and undermine the quality of the collected data.

Option 3 includes a progressive inclusion of countries into the phasing of the COR SMD target system. The proposal divides equally the countries for each stage[4], but the partition could be organised also considering the criteria defined in Option 2 or others like: traffic volume, amount of data generated or the level of similarity between the event classification and taxonomy of the COR SMD target system and of the national systems. The stakeholders can propose new/different criteria. Option 3 offers the advantage of a gradual involvement of the countries in the scope of the new system and therefore it could facilitate implementation

[4] the last one includes 8 countries, for a total of 29 considering Norway, Switzerland and Channel Tunnel.

when the legislation will come into force. Moreover, the countries have the time to improve their national systems in order to link them with the European one.

The work of the countries willing to volunteer for the initial phase will be regulated through a Memorandum of Understanding.

From the Agency point of view, phasing the geographical scope is an advantage, mainly because it will have to manage a smaller amount of data and can use the first phase as a pilot project to develop the necessary IT solutions to support the COR target system. The disadvantage of this approach comes from the necessity to keep two systems in place at the EU level.

An overview of the options in provided in Table 5.

<table>
<tr><td></td><td colspan="3">Geographical Scope</td></tr>
<tr><td>Stages</td><td>Option 1</td><td>Option 2</td><td>Option 3</td></tr>
<tr><td>Preferences</td><td>3</td><td>1</td><td>-</td></tr>
<tr><td>Current</td><td colspan="3">All the member states,
plus Norway, Switzerland and the Channel Tunnel Safety Authority</td></tr>
<tr><td>Stage 1</td><td rowspan="3">All the member states, plus Norway, Switzerland and the Channel Tunnel Safety Authority</td><td rowspan="3">Selected countries</td><td>7 countries</td></tr>
<tr><td>Stage 2</td><td>14 countries</td></tr>
<tr><td>Stage 3</td><td>21 countries</td></tr>
<tr><td>Hypothetical Target system</td><td colspan="3">All the member states,
plus Norway, Switzerland and the Channel Tunnel Safety Authority</td></tr>
</table>

Table 5 – Summary of the options for phasing the geographical scope

Preferences expressed by the stakeholders:

Three stakeholders have expressed a preference for Option 1. This means that the Geographical scope should not be considered as a phasing element. This was mainly motivated with:

- need of a common view of performance of railway safety, which can only be achieved if all the Member States are included in the scope of the COR SMD;
- allow late joiners to integrate and in particular to accept a system that has been developed by and for the first adopters;

One preference goes to Option 2, where countries without National Schemes should be the early adopters. In this case, all countries should be involved in the development of the system.

7.4.1.3. Phasing the purpose

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

Phasing the purpose means essentially to phase how the data will be used and by whom. This will be covered in more detail in the deliverable outlined at paragraph 3.2.9 of the Project Plan on Roles and Responsibilities [13].

The use of data is a constraint for phasing of the event classification and taxonomy, because the uses of the data will dictate how much data and how much detail is needed and at which stage. For instance, NSAs (or the Agency) might want to build a strategic risk profile at Member state (or European) level to target the assessment of SMSs or to define their supervision strategy, then the data reported by the sector will have to have a small granularity (high level of detail) to provide information on the single process of each applicant. This is also valid if in the earliest stages the purpose of the system will include enhancing risk assessment.

Those are just examples on how phasing the purpose may influence the phasing of the event classification and taxonomy. In the above-mentioned cases, the level of detail requested in the data structure might have to be high, making the transition of reporting data more difficult for the operators.

Phasing the purpose is a complex task because of the roles and responsibilities defined within the Railway Safety Directive. The Agency and the NSAs have similar roles and they will be required to cooperate in specific circumstances to issue single safety certificates and vehicle authorisations, using and sharing the output of NSA supervision. Shared information about risks will support consistent decision-making (about risk profiles, enforcement, supervision and assessment strategies) by NSAs and the Agency. Therefore, the information cannot be made available only for either of the Agency or the NSAs.

Process	Responsible entity	Level of detail of information
Strategic risk profiling	Agency/NSAs	Medium. Mainly events, consequences and causes accompanied by description of the context (metadata)
Measuring safety performance EU	Agency	Low. Events and consequences
Measuring safety performance MS	NSA	Low. Events and consequences
Safety certification/authorisation	Agency (only SSC) and NSA	Medium. Mainly events, consequences and causes accompanied by description of the context (metadata). This data is used to create a strategic risk profile that can be used for the safety certification, on this topic please see the paper on "Roles, use of data, governance and confidentiality for COR Safety Management Data" [15].
Vehicle authorisation	Agency and NSA	High. Events, causes and consequences. This is to identify issues which might be relevant for the vehicle authorisation process (e.g. conditions of use), including the possible safety constraints which are going to impact on companies' SMS (e.g. unusual operational instructions)
Supervision	NSA	High. Events, causes and consequences. This is to identify weaknesses in the SMS processes.
Annual safety plan	Member state	High. Events, causes and consequences. This is to identify weaknesses in the national legal framework, in the work done by the member state and recurrent issues generated by the operators.
Investigations	NIB	High. Metadata, causes, events and consequences.
Implementation and effectiveness of safety recommendations	NIB	High. Safety recommendations can be very specific and related to organizational, operational or technical aspects. Therefore, a feedback on the specific issue is needed for the NIB to evaluate the effectiveness of the recommendation.
Risk management	Railway operator	High. Events, causes and consequences. This is to identify weaknesses (risks) in the SMS processes defined as risk control measures.

Benchmarking	Railway operator	Medium. Due to the different operational conditions of the railway operators, it is unnecessary to use highly detailed information for benchmarking.
Safety management	Railway operator	High. Events, causes and consequences. This is to identify weaknesses in the SMS processes defined as risk control measures.

Table 6 – Level of detail of the information needed to deliver tasks

Another critical element for phasing the purpose is the presence of national reporting schemes, designed with different objectives.

According to the document "Assessment of existing national occurrence reporting regimes and systems" [12], each Member State has some kind of national occurrence reporting regime. The issue is that very few of them have a common purpose. Considering 28 NSAs (member states, plus Norway and Channel tunnel), 26 use the NOR to provide data required by the Agency (so CSIs are part of the regime), 26 of them use the NOR to inform the supervision activities, 19 store the data into a searchable database and only 6 of them use the NOR to populate a risk model. More information is available in the relevant report [12] (pp. 21 and 22).

The proposal included in **Option 1** starts from the current use of the data, which consists of measuring safety performance at European and national level. In stage 2, the data will be analysed and used only by authorities to define strategic risk profiles to guide supervision activities and certification/authorisation. Stage 3 extends the purpose including the possibility to use the data for risk assessment, safety management and for benchmarking (benefits for operators). This is clearly a better option for the authorities, which will benefit of more EU wide information to deliver their tasks, while the sector will see the benefits only in stage 3.

Option 2 is built with a different approach and has the ability to provide immediate benefits to the operators. It is based on the assumption that the "events classification and taxonomy" is phased including precursors in the earliest stages. This is because, normally, risk assessment is supported by detailed information that requires a small data granularity. This option has the advantage of providing immediate benefits to the operators, who may then be more open to supporting deployment of the COR SMD system. The main disadvantage of this proposal is the complexity of the required taxonomy, which will likely generate a big amount of data, the need to harmonise definitions of all the occurrences to be reported and will require immediate actions to ensure data protection and governance.

Option 3 focuses on the authorities, to whom the initial benefits are provided. This option can be ideal to convince the Member States to converge to a single data repository on a short term by proposing a model to use data for supervision (i.e. a maturity model or a risk model at member state level) in a harmonised way. The advantage of this solution is the low level of detail of the information collected in the first stages, which can be initially handled using the national systems, driving them toward a progressive merging into a European one. This would help the Agency also in preparing the supportive IT solutions in a longer time period. The side-effect of this option could be a higher commitment on the development of a reporting culture in all the Member states: as the information is used for the supervision activity, the Agency has to focus on enabling mature and trusted relationship between NSAs and RUs and IMs, in order to avoid under-reporting from the sector.

	Purpose		
Stages	**Option 1**	**Option 2**	**Option 3**
Preferences	**1**	**1**	**1**
Current	› Measuring safety performance at EU level (Agency) and Member state level (NSAs)		
Stage 1	› Measuring safety performance at EU level (Agency) and Member state level (NSAs)	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Risk assessment and Safety management	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Supervision
Stage 2	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Supervision (NSAs) › Setting strategic priorities for Safety certification and vehicle authorisation	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Risk assessment and safety management › Supervision	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Supervision › Setting strategic priorities for Safety certification and authorisation › Vehicle authorisation
Stage 3	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Setting strategic priorities for Safety certification and vehicle authorisation › Risk assessment, Safety management and benchmarking	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Setting strategic priorities for Safety certification and vehicle authorisation › Risk assessment and Safety management › Supervision	› Measuring safety performance at EU level (Agency) and Member state level (NSAs) › Supervision › Setting strategic priorities for Safety certification and authorisation › Vehicle authorisation
Hypothetical Target system	The system could support: › indirectly, the Agency in targeting and monitoring the safety certification and vehicle authorisation process. The Agency will also use the information to focus on the prevention of serious accidents. › the NSAs will use also the information as one of the possible inputs, to define the **supervision** strategy and plan and to draft the **annual safety plan**. Indirectly, this will also help the NSAs in targeting and monitoring the **safety certification** and **vehicle authorisation** process; › the **NIBs** in checking the implementation and the effectiveness of safety recommendations and providing information for the investigation process; › The sector providing data for **risk assessment** and **safety assurance**. The sector could also use the information for **benchmarking**.		

Table 7 – Summary of the options for phasing the purpose

Preferences expressed by the stakeholders:

One preference for each of the options.

Among those proposals, one is to exclude those NSAs with a searchable database and a risk model first and to progressively include these in later stages. However, the early stages would still have to involve those that are excluded in discussion to ensure compatibility with their databases and risk models later.

The same proposal requires to exclude the use of data for supervision in the initial introduction of the COR SMD as this will discourage the learning aspect of the overall COR system but link it to a means of Supervision.

The same stakeholders indicate a preference for Option 2 but without NSAs involved, the system should be working only for the operators and agree with the objective of the hypothetical target system with the focus on Operators benchmarking and risk assessment to learn and influence their own operations rather have this imposed upon them.

Note: reference to a different Agency's paper on "Roles, use of data, governance and confidentiality for COR Safety Management Data" [15].

A proposal on the use of data will be defined within the scope of the paper on roles and governance and access, use of data and confidentiality and then discussed during the specific consultation session. What is presented above is an assumption created to support the discussion between the Agency and the stakeholders.

7.4.2. Phasing the event classification and taxonomy

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

The phasing of event classification and taxonomy has a strong impact on the amount of data, which has to be collected, prepared, analysed and published.

A smooth transition towards the events classification and taxonomy defined in the target system will reduce the burden to the operators (for data collection and preparation) and to the authorities (analytics and reporting). On the other hand, a small amount of information will reduce the benefits of the COR target system for the sector. This means that the amount of data to be collected is a function of the use and purpose of the data system. As stated above, there is also a minimum functionality required to ensure that the system achieves a positive or at least neutral cost benefit ratio.

As said, phasing the event classification and taxonomy means phasing the amount of data generated by the system. This can be done in two ways:

- Asking to report all accidents or relevant occurrences and limiting the level of supporting taxonomy for each event;
- Asking to report only specific accidents with a specific reporting scheme (the other accident types will still be reported according to the current legal framework).

The following options are based on the principles above.

Option 1 consists of a progressive enlargement of the quantity of data to be reported. It is done to ensure the coverage of all type of accidents, incidents and precursors. The minimum set of data is defined in the Annex I of the Railway Safety Directive and the final set of data is defined in the proposal of the COR target system, which is essentially what is proposed in the paper on designing the common occurrences and taxonomy COR [14].

Option 1 includes a first stage that is essentially the same reporting scheme currently in force (for the list of events see Annex I of the Railway Safety Directive [1]), with two additions:

- Taxonomy, even if in a reduced version compared to the one required in the COR target system:
  - Location;
  - Time;
  - Date;
  - Type of operations:
    - Freight train;
    - Passengers train;
    - Shunting;
    - Other types of rolling stock movements.
- The data has to provide for each occurred event.

The level of detail of consequences is limited to:

- Fatalities;
- Injuries;
- Cost of damages.

The two additions are not an issue for the operators because they are already collecting this data, but the NSAs may have to change their internal processes to handle a bigger amount of data.

Stage 2 requires more data, it includes the direct causes of the event, organised according to the classification set out in the Paper on designing the common occurrences and taxonomy COR" [14]:

- Train operations;
- Technical occurrence of vehicles;
- Technical occurrence of fixed installation;
- Human factors;
- External and environmental condition;
- Security (freedom from criminal acts);
- Other direct causes;

The event reporting proposed in stage 3 is more detailed, it is equivalent to the one designed in stage 2 but the requested level of detail of the metadata, causes and consequence is higher.

In other words, stage 3 represents the assumed target system, where accidents are reported together with the full taxonomy. At this stage, precursors are to be reported only as causes of accidents.

The proposal in **Option 2** is phasing the amount of data to be managed by phasing the type of accident and not the granularity of the taxonomy. This solution has the advantage of allowing the users to get an immediate benefit from having a more detailed database, which could work as reference for benchmarking or risk assessment. The disadvantage of this scheme is that the railway system is only partially described and therefore the authorities cannot use the information for their own tasks. Stage 1 focusses only on one accident (for example: collision of train with railway vehicle[5]) for which the maximum level of detail (defined in [14]) is requested. The main reporting structure does not change, the only difference with stage 2 and stage 3 is the type of accident. To be noted that reporting of precursors is also requested at the beginning of the phasing but it is limited to the precursors linked with the specific reportable accident(s).

[5] The type of accident might be chosen in accordance with its "risk level" (frequency, severity or both).

The proposal in **Option 3** is a mix of option 1 and option 2. The operators will still have to apply the current scheme (CSIs based) but for some of the accidents they will have to report more information. Therefore, the Agency, will receive aggregated data on almost all the accidents. Only a few of them will be reported with a taxonomy. This proposal has the advantage of introducing gradually the new reporting scheme only for selected accidents, for which causes, consequences and metadata have to be described in the report. This new information will enable the possibility of building historical data to be used to build a strategic risk profile and for benchmarking and will help the Agency in focusing on serious accidents.

The stages for Option1 can be described as:

Stage 1, where a basic set of consequences, causes and metadata have to be reported only for specific accident types, such as a collision of a train with railway vehicle or with an obstacle within the clearance gauge. For this type of accident, the following information could be required.

Causes could be organised as follows:

- Train operations;
- Technical occurrence of vehicles;
- Technical occurrence of fixed installations;
- Human factors;
- External and environmental condition;
- Security;
- Other direct causes.

Consequences could be organised as follows:

- Fatalities;
- Injuries;
- Cost of damages.

Metadata will could be organised as follows:

- Location;
- Time;
- Date;
- Type of operations:
- Freight train;
- Passengers train;
- Shunting.

Due to the relevant change introduced by the stage 1, stage 2 does not modify the reporting scheme. The next change is foreseen in stage 3 where the level of detail of causes, consequences and metadata is higher.

Stage 3 requires more details for selected accidents types such as collisions, the classification of causes, consequences and metadata is the one described in the paper “Paper on designing the common occurrences and taxonomy COR” [14].

The transition from the stage 3 to the target system consist of enlarging the number of accidents to be reported, applying the level of detail requested at stage 3 and including the reporting of precursors.

	Event classification and taxonomy		
Stages	**Option 1**	**Option 2**	**Option 3**
Preferences	**4**	**-**	**-**
Current	› Event classification included in Annex I of the Railway Safety Directive [1]		
Stage 1	› Events classification included in Annex I of the Railway Safety Directive (CSIs) › Consequences in terms of Fatalities, injuries and costs › Basic metadata	› Collision of train with railway vehicle (or another type of accident) › Full set of consequences › Full set of causes › Full set of metadata › Precursors related to Collisions (all types)	› Collision of train with railway vehicle (or another type of accident) › Collision of train with obstacle within the clearance gauge (or another type of accident) › Basic set of consequences › Basic set of causes › Basic metadata
Stage 2	› Events classification included in Annex I of the Railway Safety Directive (CSIs) › Basic set of consequences › Basic set of causes › Basic set of metadata	› Collision of train with railway vehicle (or another type of accident) › Collision of train with obstacle within the clearance gauge (or another type of accident) › Full set of consequences › Full set of causes › Full set of metadata › Precursors related to Collisions (all types)	› Collision of train with railway vehicle (or another type of accident) › Collision of train with obstacle within the clearance gauge (or another type of accident) › Basic set of consequences › Basic set of causes › Basic set of metadata
Stage 3	› Events classification included in Annex I of the Railway Safety Directive (CSIs) › Full set of consequences › Full set of causes › Full set of metadata	› Collision of train with railway vehicle (or another type of accident) › Collision of train with obstacle within the clearance gauge (or another type of accident) › Train derailment › Full set of consequences › Full set of causes › Full set of metadata › Precursors related to Collisions (all types)	› Collision of train with railway vehicle (or another type of accident) › Collision of train with obstacle within the clearance gauge (or another type of accident) › Full set of consequences › Full set of causes › Full set of metadata
Hypothetical Target system	› Event classification and taxonomy described in the relevant paper [1]		

Table 8 – Summary of the options for phasing the event classification and taxonomy

Preferences expressed by the stakeholders:

Four stakeholders have expressed a preference for Option 1 as it ensures the gradual introduction of a full taxonomy.

7.4.3. Phasing legal obligations and reference documentation

This section deals with the legal obligations that could be introduced by the COR SMD target system. It also assumes the presence of supporting documents (e.g. guidance), defined to facilitate the implementation of the new reporting scheme.

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

The sub-elements that can be used in phasing are:

- Mandatory reporting;
- Voluntary reporting;
- Adoption of guidelines and MoUs;
- Legislation.

A brief description of the building blocks is made in section 7.1, where no proposals were made. To support the discussion on the phasing it is assumed that the reporting scheme might include:

- Mandatory reporting of accidents and of the main precursors in accordance with the new system, this is regulated by legislation and supported by guidance;
- Voluntary reporting of the rest of the precursors in accordance with the new system, this is regulated by legislation, guidelines and MoUs. In this case, to ensure data quality, it could be necessary to define methods and rules to regulate the reporting when this is voluntary. In fact, when operators decide to opt in, they have to assure data quality and consistent reporting.

To achieve what is assumed in the hypothetical COR SMD target system, the Agency is proposing 3 possible options described below and summarised in Table 9.

Option 1, this proposal starts with the voluntary reporting of accidents, in accordance with the classification provided by the COR SMD target system and its relevant phasing option. To support the operators who are volunteering, guidelines will be drafted already in Stage 1. The guidance will help in harmonising occurrence definition and in guiding the operators toward a correct occurrence reporting. In Stage 2, an MoU is added to ensure data quality and to have a more formal approach to the reporting process. This could allow using the data for official reports and statistics. Stage 3 extends the type of occurrence that can be reported on a voluntary basis. The MoU and the guidance will have to be revised to consider this extension. This solution has the advantage of a gradual introduction of the operators and the NSAs to the new system, limiting the initial amount of data. The disadvantages are mainly related to double reporting: national systems are mandatory and, in stage 1, the data quality cannot be controlled because of the lack of a formal agreement (MoU) therefore the reliability of the information might not be enough accurate to be used for official reports and statistics. Another issue with Option 1 is the low amount of data, mainly dealing with accidents, which will not bring benefits at earlier stages for the operators and for the NSAs.

Option 2 is defined with the intention to collect more data at the beginning of the phasing. This is to provide immediate benefits for railway operators and for the NSAs. Guidance is provided starting from Stage 1, which includes the reporting of accidents and precursors as stand-alone occurrence (i.e. not causing accidents). The stage 1 will be necessary to identify critical points in the reporting process, which will be regulated in Stage 2 with a MoU. Reporting accidents will be mandatory in Stage 3, this change has to be supported by new legislation. Stage 3 is actually an early implementation of this phasing element of the target system. The main advantage of the option 2 is the possibility to provide early benefits to the operators and the NSAs, those benefits are related to the amount data, already available in big quantity and variance, form the earlier stage. The disadvantages are related to double reporting and to the impact that a sudden change in the reporting scheme requiring much more information.

Option 3 proposes a different approach characterised by a mandatory reporting of occurrences and a voluntary reporting of the taxonomy. In fact, stage 1 includes the mandatory reporting of events but, causes, consequences and/or metadata can be reported on a voluntary basis[6]. A guidance document will support the operators in this new task. The next step, Stage 2, includes also the voluntary reporting of events included in the national systems. This solution may facilitate the convergence toward a centralised system in the EU, which should be achieved in stage 3, where national systems are consistent with the EU one and then can be used as reference for the EU database. In stage 3, the report of accident will have to include the taxonomy defined in the COR SMD target system. The voluntary reporting of precursors is requested only in the final implementation of the target system. The advantages of Option 3 are mainly:

- The obligation to report accidents helps to avoid double reporting, with the right requirements in time reporting and event classification, it could also be used to report events to the NIBs;
- The information required in stage 1 is already collected by the operators so no burdens are imposed on them;

The disadvantages are related to the need of harmonising the reporting systems (national and European), this requires time and resources and commitment from the Member states.

Something to be noted is the potential amount of information that can be collected. In this option, the report of the taxonomy is voluntary, therefore the operators are not obliged to include causes, consequences and metadata into the report. This weakens severely the usefulness of the data, for instance it will not be possible to classify events according to their causes or geographical location.

[6] This is essentially the current CSIs based system, with the obligation to report single events, not necessarily in real-time.

	Legal obligations and reference documentation		
Stages	**Option 1**	**Option 2**	**Option 3**
Preferences	**1**	**-**	1 (mandatory reporting of causes/consequences/metadata from stage 1)
Current	› The current CSIs based reporting scheme is **mandatory** (Annex I of the Railway Safety Directive [1] and Common safety method [9])		
Stage 1	› Voluntary reporting of accidents in accordance with the new system; › Development and delivery of guidance on occurrence reporting.	› Voluntary reporting of accidents and precursors (as stand-alone events) in accordance with the new system; › Development and delivery of guidance on occurrence reporting.	› Mandatory reporting of accidents (only events); › Voluntary reporting of causes/consequences/metadata; › Development and delivery of guidance on occurrence reporting.
Stage 2	› Voluntary reporting of accidents in accordance with the new system; › Development and delivery of guidance on occurrence reporting; › A MoU defines specifications for the voluntary reporting.	› Voluntary reporting of accidents and precursors (as stand-alone events) in accordance with the new system; › Development and delivery of guidance on occurrence reporting; › A MoU defines specifications for the voluntary reporting.	› Mandatory reporting of accidents (only events); › Voluntary reporting of causes/consequences/metadata; › Voluntary reporting of accidents (national schemes) › Development and delivery of guidance on occurrence reporting; › A MoU defines specifications for the voluntary reporting.
Stage 3	› Voluntary reporting of accidents and precursors (as stand-alone events) in accordance with the new system; › Development and delivery of guidance on occurrence reporting; › A MoU defines specifications for the voluntary reporting.	› Mandatory reporting of accidents in accordance with the new system; › Voluntary reporting of precursors (as stand-alone events) in accordance with the new system › Development and delivery of legislation and guidance on occurrence reporting; › A MoU defines specifications for the voluntary reporting.	› Mandatory reporting of accidents in accordance with the new system; › National schemes are converging into the EU one; › Development and delivery of legislation and guidance on occurrence reporting.
Hypothetical Target system	› Mandatory reporting of accidents and of the main precursors in accordance with the new system, this is regulated by legislation and supported by guidance; › Voluntary reporting of the rest of the precursors in accordance with the new system, this is regulated by legislation, guidelines and MoUs;		

Table 9 – Summary of phasing "Legal obligations and reference documentation"

Preferences expressed by the stakeholders:

Option 3 and option 1 have been considered as 'favourite options' by two stakeholders. Another proposal indicated a preference for Option 1, at the beginning of the phasing process, and Option 3 on the long term. In fact this is a proposal for a hybrid solution where a voluntary approach is used to involve Member States and operators after gaining some practical experience and "beta testing".

Another stakeholder preferred Option 1 as this is a more gradual introduction of the COR SMD with the provision for learning.

Many other stakeholders suggested that legislation and mandatory reporting would inevitably be necessary, both in the written responses and at the workshop. This is the reason why the impact of a mandatory reporting system will be tested as part of the impact assessment.

7.4.4. Phasing the reporting tool and supportive IT system

The last building block to be considered is the reporting system.

DISCLAIMER:

As for the phasing of the other building blocks, please consider the target system as an example to show how it is possible to phase its deployment. At this stage, the Agency is not proposing a specific option for phasing the target system.

In consistency with the approach adopted for the previous building blocks, 3 options are proposed:

Option 1 starts from the national systems, where the sector will report the occurrences in real-time and to which the Agency will be granted access. This option might allow the Member states to keep their system for a longer time and will allow the Agency to have access to the data. This can be useful to support shared processes and could also allow the Agency to start the process to migrate the systems into a single European one. The second stage includes the development of a single access point at EU level, this could be an extension of the current ERAIL system or a new one. This system will allow the interconnection of Member states' database and a first data sharing. Stage 3 will consider the introduction of a web interface to allow the operators to report the occurrences, from a system structure point of view, it will be still distributed in all the countries. A possible last step could be a unique centralised data repository, where the national databases will be closed and all the occurrence reporting will be done at EU level with a centralised system.

Option 2 and **Option 3** are not different in their approach; the difference is merely based on the timescale of the implementation. The extreme is option 3 where, it is assumed that the phasing does not apply to the IT system as it includes the complete IT target system since Stage 1.

	Reporting tools and IT system		
Stages	**Option 1**	**Option 2**	**Option 3**
Preferences	-	-	-
Current	The current CSIs based reporting scheme is mandatory (Annex I of the Railway Safety Directive [1] and Common safety method [9])		
Stage 1	› National databases;	› Interconnected national databases;	› EU data repository, centralised at EU level; › Web interface with extra functionalities; › Possibility for direct access to the database; › Data access granted to all the interested parties; › Real-time reporting.

Stage 2	› Interconnected national databases; › EU centralised access point.	› Interconnected national databases; › EU centralised access point; › Web interface with extra functionalities.	› EU data repository, centralised at EU level; › Web interface with extra functionalities; › Possibility for direct access to the database; › Data access granted to all the interested parties; › Real-time reporting.
Stage 3	› Interconnected national databases; › EU centralised access point; › Web interface with extra functionalities.	› EU data repository, centralised at EU level; › Web interface with extra functionalities; › Possibility for direct access to the database.	› EU data repository, centralised at EU level; › Web interface with extra functionalities; › Possibility for direct access to the database; › Data access granted to all the interested parties; › Real-time reporting.
Hypothetical Target system	› EU data repository, not necessarily centralised at EU level; › Web interface with extra functionalities; › Possibility for direct access to the database to connect Companies' existing IT solutions; › Data access granted to all the interested parties; › Real-time reporting.		

Table 10 – Summary of phasing the reporting system.

Preferences expressed during the consultation phase:

No preference was expressed by the stakeholders, in one case all the options were rejected.

From the generic comments received by the stakeholders, the solution of a unique and centralised database is not supported. The importance of the National systems was often strongly underlined.

8. Conclusions

The options on the phasing of a hypothetical COR SMD target system are suggested to stimulate the discussion between the Agency and the stakeholders. Once again, this document does not want to provide a ready solution.

The possible options were built in order to avoid significant changes in the early stage of implementation, with the intention to minimize the impact of the new reporting scheme on the sector and on the other entities.

This document shows the importance of well-planned phasing or migration to the COR SMD target system.

The document shows also the high number of parameters that can be used to define and phase the target system. The Agency is opening the discussion to all stakeholders to contribute to supporting an evidenced-based approach to migrating to safety management data sharing for European railways.

The Agency needs this contribution in order to produce the best system possible, where costs and benefits are analysed on the basis of real needs and costs of the stakeholders.

9. The consultation process

The Agency drafted the first version of this paper to provide the stakeholders with a proposal of methodology to phase the implementation of the COR SMD system.

All relevant parties were invited to assess the proposed methodology for phasing the COR SMD target system and give their justified views, comments and suggestions.

The paper was approved on 27th September 2016 and published on the Agency's extranet on the 28th September 2016. The last set of comments was sent to the Agency on 21st of December 2016. All the comments received were processed and individual responses are available on the Agency's extranet.

The consultation process can be summarised as following:

- The paper was made available for comments to sector organisations, all of them were invited to the relevant workshop. According to the attendance list, 39 of them attended the workshop.
- With regards to this paper, the Agency got comments from 14 organisations.

The comments received were essentially of three types:

- Generic, mainly related to the COR SMD target system, which will be taken into account in drafting options for the impact assessments and in the proposal for the target system.
- Related to the introductory part of this paper (e.g. to section 5.1 describing the current CSIs-based reporting scheme)
- Comments on the options themselves, where the stakeholders have expressed preferences and made further proposals;

No queries and requests were sent to the Agency during the consultation period.

9.1.1. Results

Considering the conclusions of the workshop and the comments made by the stakeholders, the Agency can draw some conclusions from the consultation on the phasing of the COS SMD:

1. Phasing the operational scope:

There is a substantial agreement on including shunting operations in the scope of the COR SMD, the phasing strategy shall consider starting with reporting events on the mainline and to events occurring on marshalling yards in the later stages.

2. Phasing the geographical scope:

   There is a substantial agreement on not using this building block to phase the deployment of the COR SMD target system. All the countries should be involved in the new reporting scheme from the initial implementation.

3. Phasing the purpose:

   No clear preference results from the comments nor from the workshop. We received useful contribution and views on this topic during the workshop and consultation on the paper dealing with Roles, use of data and governance.

4. Phasing the events classification and taxonomy:

   All the comments received indicated a preference for phasing option 1, which starts with reporting events defined in the CSIs plus a few more data and enlarges the amount of data to be reported over time.

5. Phasing legal obligations and reference documentation:

   The concept of a mandatory reporting system deployed gradually, starting with a voluntary stage, is the main opinion resulting from the workshop and from the comments received.

6. Phasing the reporting tool and the supportive IT system

   The stakeholders expressed no preferences for the options given, but during the workshop and in the written comments, most underlined the importance of existing national systems.