Application guide for the design and implementation of a Railway Safety Management System

DEVELOPING AND IMPROVING SAFETY CULTURE IN THE ORGANISATION

2013-12-19_ERA_GUI_SMS_Safety Culture_1
Disclaimer

This document is conceived to provide the railway sector with an overview on theories, practices and tools on safety culture; for this purpose, references to documents and short abstract / quotations are used, based on the available literature. The selected abstracts and quotations are recognition of a useful reference, and are intended to inspire readers to consult the original and complete texts if they wish to deepen their awareness, by visiting the relevant websites or sourcing the relevant books and documents.

This document does not have any commercial purposes.
General introduction on Safety Management System’s overall implementation and guidance

Why a SMS in the railway companies?

The implementation of a Safety Management System (SMS hereinafter) is legally binding after Articles 4(3) and 9(1) of the Directive 2004/49/EC (sometimes referred to as Railway Safety Directive or RSD, hereinafter). Nonetheless, there are other good reasons for implementing and delivering an effective SMS: it has been recognised that structured management systems add value to business helping to improve overall performances, introduce operational efficiencies, enhance relations with customers and regulatory authorities and build a positive safety culture.

It is important to remind that the essential elements to be considered for developing a SMS are those listed in Article 9 and Annex III of the Directive 2004/49/EC. It is worthwhile to repeat this is the harmonised reference for Europe, and is originated by the need of the SMS to be assessed in an equivalent manner throughout the EU, by the NSAs that have to issue a Safety Certificate or a Safety Authorisation. Therefore the RUs/IMs should be ready to provide evidence of the processes listed in the RSD and in the had hoc Regulations on the Common Safety Methods for assessing the conformity with the requirements for the obtainment of a Safety Certificate (Regulation 1158/2010/EU) or a Safety Authorisation (Regulation 1169/2010/EU).

Why a SMS guidance?

The regulatory framework has introduced legal documents and relevant guidance for the NSAs having to assess SMS in order to deliver safety certificates or safety authorisations. There was nothing foreseen to support the railway undertakings (RUs) and infrastructure managers (IMs) in the design and the implementation of their SMS. The SMS guidance and set of documents (http://www.era.europa.eu/Document-Register/Pages/application-guide-for-SMS.aspx) and website (http://www.era.europa.eu/tools/sms/Pages/default.aspx) are conceived to provide support with explanations and practical advices on the elements constituting the SMS on other elements deriving from generic management systems as, for instance, management commitments

or job design, in order to have a more complete picture of the ‘organisation and arrangements to ensure the delivery of safe operation’. The RUs/IMs may have some other to include in their SMS.

It should be clear that the SMS does not tend to harmonise the structures of the companies but their reference documents (mainly procedures) that illustrate how they are organised and how they manage risks. The SMS should enable the company to ‘write what they do’ and doing so it should be possible to revise proactively their organisation, reflect on the experience and plan for the future, in a continuous cycle, heading to improvement.

**Why a guidance on safety culture?**

In the SMS Application Guide “A system approach” it is stated that “The Agency’s intention is to complement the guidance with texts on a wide range of subjects, containing further explanation on specific elements and cross-cutting items such as: human factor, safety culture, occupational H&S, etc.” In view of the fundamental importance of safety culture and the essential part played by all staff in the safe operation of railways, we have prepared this first version of the guidance to help railway companies so that they can take safety culture into consideration in their SMS and in particular in their risk management processes.
General introduction for the guidance on safety culture

What is the subject that this guidance is trying to address?

There is a need to improve safety culture awareness within railway companies so that the development of Safety Management Systems within the companies is effective. This is specifically a concern for those developing the safety management system and those tasked with justifying any potential additional activity that may result.

Who is the guidance aimed at?

The guidance is addressed to those railway companies across Europe with little widespread information about safety culture and that to those that would like to assess safety culture in their organisation and improve it, based on the results of such an assessment.

It is not the intention of this guide to provide a rating of safety culture; it is expected rather to stimulate reflection and support, with a thorough understanding, the design and implementation of an effective SMS.

What is the guidance trying to do?

This guidance aims at raising the awareness of RUs and IMs that the design and implementation of an effective SMS needs to have consideration of cultural factors and try to build a robust safety and organisational culture in the company.

We would like to convey the following message to RUs/IMs:

- Safety Management Systems already provides a systematic approach to safety
- Minimum standards can be defined but this is not the best way to obtain extra benefits
- A good safety culture fills in the gaps
• Sound systems, practices and procedures are not adequate if merely practised mechanically. They require an effective safety culture to flourish.

• So you need Safety Management Systems AND a Safety Culture

[Adapted from “Safety Culture Informed, Just and Fair”, ICAO\textsuperscript{5} Seminar, Baku, 2006]

How will it achieve this?

The purpose of this guidance is to provide information to RU/IMs on how to, develop or improve the safety culture during all phases of the operational life-cycle (design, implementation, review, changes, etc.) and more specifically to:

• Help design the SMS to achieve an effective safety culture within the organisation, by providing explanation on current practices.

• Develop general safety culture guidance, to fit the improvement of Safety Culture close with the one in SMS (Safety Management System). The integration of the Safety Culture and the SMS is expected to be performed in 3 steps:
  1. Exploring the influence on the SMS of the implementation of improvement measures for Safety Culture and
  2. The influence of the improvement of the SMS in the Safety Culture of the organisation
  3. Studying the link between the Safety Culture and other Management Systems

• Implement a safety culture model, suggesting practical and realistic strategies to improve the different aspects in Safety Culture in their organisations

• Provide links to information on safety culture, since the purpose of the paper is not to reinvent existing information, but to provide references to already existing practices and tools.

• Support the design and use of the SMS and the whole organisation to adapt and include the technological, social, economic and environmental challenges and changes that could rise in future.

\textsuperscript{5} International Civil Aviation Organisation
How will the guidance be used / integrated within railway organisations?

The guidance is in general addressed to those in the companies who are responsible for the development and implementation of the SMS and the control of risks related to the activities performed and the delivered services. Mature organisations recognise that an efficient control of risk can only be achieved through a process that brings together three critical dimensions:

- a **human component** of staff at any level of the organisation, from those that are involved in the design, planning and management of the safety-related activities to those performing operational tasks and supervision (the list is not exhaustive, the organisations should be able to detect all activities and tasks that have an impact on safety with their skills, training and motivation);
- a **technical component** relating to the tools and equipment, and
- an **organisational component** consisting of procedures and methods defining the relationship of tasks.

Consequently, an adequate SMS succeeds in monitoring and improving all three dimensions of its risk control measures. A pro-active safety culture with a just culture policy can be seen as the ‘atmosphere’ that pervades the SMS to make it effective and robust. A just culture is considered essential for the development of a good safety culture.

What are the success criteria and outputs from the guidance?

The document will be successful if the RUs/IMs acknowledge that there are cultural issues and they detect the necessity to improve safety culture within their organisation and, if necessary, put in place actions to improve the processes that are affected.

What is the balance between information content and the links to details?

The guidance will provide:

- general explanations, to provide an overview of the topic of safety culture and on the structure of the document (Part A);
- Some practical information on how cultural issues may be positively managed and enhanced, including descriptions of methodologies and tools to identify and assess safety culture in the organisation (Part B);
- Where safety is more to be considered in relation to each element composing the SMS (Part C); and
- A list of information sources (bibliography, tools, etc.) for those that wish to deepen their knowledge on the subject (Part D).
We have included numerous references to sources of more detailed information, and in some cases have included extensive quotations, as we did not want to simply rewrite information from other sources. The quotations are given in italic text. The references are given to existing principles, methods, techniques and tools and include extensive sources of the psychological and sociological theories, that underpin the concepts of safety culture and, at to some extent the safety management system.
Part A General provisions on safety culture

What is ‘safety culture’?

There is not a unique definition for safety culture. In the literature there are many definitions. Here are some of them:

- “The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization’s health and safety management [...] Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures. [Definition from the UK Health and Safety Executive HSG65, also quoting the Advisory Committee on the Safety and Nuclear installation]

- The Confederation of British Industry describes the culture of an organisation as "the mix of shared values, attitudes and patterns of behaviour that give the organisation its particular character. Put simply it is ‘the way we do things round here’". They suggest that the "safety culture of an organisation could be described as the ideas and beliefs that all members of the organisation share about risk, accidents and ill health". [in: HSE, Human Factors Briefing Note No. 7, http://www.hse.gov.uk/humanfactors/topics/07culture.pdf]

- “A measure of the values and priorities placed on all aspects of safety by everyone at every level of an Organisation”. Safety Culture is a relatively stable concept that does not fluctuate over time. In opposition, Safety Climate: “A temporal state that is influenced by individual perceptions of the organisation””. It is therefore relatively unstable, and subject to change depending on the features of the environment or prevailing conditions and individual differences. [Management - Measurement of safety culture in the rail industry, the UK Rail Safety and Standards Board, http://www.rssb.co.uk/SiteCollectionDocuments/pdf/reports/research/T114_rpt_final.pdf]

- “those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk” [Guldenmund F.W The nature of safety culture: a review of theory and research, Safety Science n. 34, 2000].

- “the attitudes, beliefs and perceptions shared by natural groups as defining norms and values, which determine how they act and react in relation to risks and risk control systems” [Hale, A.R.: Culture’s confusions. Safety Science, 34, 2000.]
“The assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance.” [International Atomic Energy Agency (IAEA), Glossary, http://www.iaea.org/ns/tutorials/regcontrol/intro/glossary.htm]

Safety Culture is the set of enduring values and attitudes regarding safety issues, shared by every member of every level of an organization. Safety Culture refers to the extent to which every individual and every group of the organization is aware of the risks and unknown hazards induced by its activities; is continuously behaving so as to preserve and enhance safety; is willing and able to adapt itself when facing safety issues; is willing to communicate safety issues; and consistently evaluates safety related behaviour [Safety culture framework for the ECAST SMS-WG, European Strategic Safety Initiative, 2009 http://easa.europa.eu/essi/ecast/wp-content/uploads/2011/08/WP1-ECASTSMSWG-SafetyCultureframework1.pdf]

Which ‘culture’ are we addressing?

There are several layers of ‘culture’ in an organisation:

- **The individual’s culture** (values, beliefs, assumptions, experience)
- **The organisational culture for safety** (an attitude towards safety that is supported by all staff in the organisation)
- **The regional or national culture** (influenced by society, economics, politics, etc.)

Being closely related to the implementation of a safety management system that is the specific part of the business devoted to design, plan, deliver and monitor operational safety, **this guidance address more specifically the organisational culture for safety**. Of course an organisation willing to implement a good safety culture is also respectful of the individual’s cultural factors and takes into account the national or regional culture, as a source of reflection or drivers for adjustments and changes. The national culture includes the judicial framework which will have a strong influence and consequences on just culture and society’s response to major accidents.
The importance of the Safety Culture and its impact on safety performance

“A strong Safety Culture is generally considered as a vital condition to a well-functioning SMS. It is sometimes said that is it is well possible to have a good Safety Culture without a formal SMS, but it is not possible to have an effective SMS without a good Safety Culture.”

The railway sector, as civil aviation and other high reliability industries have developed a broad reflection on safety culture. Together with nuclear and sea drilling, the civil aviation has produced guidance documents and methods that are considered world-wide reference. As explained on the SKYbrary website (http://www.skybrary.aero/index.php/Safety_Culture):

“Safety Culture can have a direct impact on safe performance. If someone believes that safety is not really important, even temporarily, then workarounds, cutting corners, or making unsafe decisions or judgements will be the result, especially when there is a small perceived risk rather than an obvious danger. However, a typical and understandable first response to Safety Culture is: “We already have an SMS, why do we need Safety Culture too?”

A Safety Management System represents an organisation’s competence in the area of safety, and it is important to have an SMS and competent safety staff to execute it. But such rules and processes may not always be followed, particularly if people in the organisation believe that, for example, ‘moving traffic’ is the real over-riding priority, even if risks are occasionally taken. Where would people get such an idea? The answer, ultimately is from their peers, but more so their superiors, including the person at the helm of an organisation, namely the CEO. To ensure the required commitment to safety, organisational leaders must show that safety is their priority.”

Therefore, organisations need both an SMS and an effective Safety Culture in order to achieve safety performance, we reiterate again that safety culture can be seen as the ‘atmosphere’ that pervades the SMS and makes it effective and robust.

An effective safety culture is an important element interacting horizontally with the SMS in all its stages and processes, starting from the top management commitment to the involvement of staff at each level of the organisation. Safety culture is important also even when there are very few accidents or other dangerous occurrences, because vigilance should not diminish, it is even more important in the event of changes, when technical, or organisational, or operational modifications have to be understood, accepted, enforced, without impairing safety.

The lack of safety culture may affect the relations between individuals or groups that may not share information because there is no mutual trust.

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The extreme consequence of a lack of Safety Culture is the loss of continuous improvement: aviation, railways, nuclear, etc. are generally very safe, with serious accident outcomes occurring only rarely with high reliability industries. This means that almost all organisations will assume they are already safe. Some other factors may undermine the need for safety culture: the limited number of accident reports, because of the low number of events and their severity, the complexity of accidents investigations where only the major technical causes can be easily identified, and the exhaustiveness and completeness of the regulatory framework. Some other, less evident, contributing situations may affect an organisation’s proactive approach to safety. For example, there may be under-reporting of incidents due to fears of punishment or prosecution; people use shortcuts that may be risky, because they believe that is what they are supposed to do; there is not enough exchange of information because there is no mutual trust, etc. The realistic picture can be obtained when a strong commitment from the top management is demonstrated and a specific assessment of safety culture is conducted using appropriate tools and techniques. Then, necessary actions can be undertaken to improve safety culture and repeated assessment can demonstrate the effectiveness of these measures. As stated in the report “Safety Culture in Air Traffic Management” of EUROCONTROL/FAA 2008:

A positive Safety Culture can be a strong enabler to ensure the SMS works in practice. The reverse can also be true: implementing a good SMS can be an enabler for Safety Culture. Organisations are managed by organisational practices, which affect both performance and reliability of safety systems. A well-developed SMS can therefore serve as an accelerator of Safety Culture (Reason 1993, 1997). Therefore SMS and Safety Culture are inter-dependent: SMS embodies the competence to achieve safety, whereas Safety Culture represents the commitment to achieving safety.

Safety Culture takes time to grow and change: a SMS can be implemented, whereas a Safety Culture cannot, though it can be re-directed. Safety Management Systems can be explained explicitly as they allow a formalised safety within the system by writing down a tangible and documented system of management policy and procedures. In contrast Safety Culture is harder to expound as it is more difficult to identify Safety Culture features and characteristics (e.g. group attitudes, perception and beliefs) that can influence the effectiveness of safety management activities (Kennedy and Kirwan, 1995). Safety Culture is inevitably more ‘fuzzy’ than SMS.

Whilst the sectors mentioned above developed an ‘international dimension’ of their reflection, the railway sector developed activities on a national basis. There are useful examples of ‘safety culture’ approaches in Canada and UK. We give references to these activities in the following parts of the guidance.

What in the SMS delivers the right culture? (High level advice)

There are several processes of the SMS that are particularly important for the deployment of a genuine, robust safety culture and for the promotion of correct attitudes and behaviours across an organisation:

- Demonstrable leadership & visible management commitment to safety (this should to be perceived across the organisation and will be evident from the priority and resourcing given to safety);
- Staff involvement and positive attitudes towards safety; staff at all levels should recognise that they have a responsibility to make sure that their behaviour and decisions do not endanger other workers, passengers or any assets. Generally, the higher the involvement, the more positive the safety culture;
- Organisational learning and continuous improvement, where accidents, incidents and failures are seen as opportunities to learn valuable lessons and improve operations. This depends crucially on the development of a just culture and effective reporting culture;

Specific and more detailed explanation for each SMS process is presented in Part C.

There is a need to lay the foundations for future involvement and participation by the workforce – the key element is the degree of trust between line managers and the workforce; much of this will stem from actions that demonstrate commitment. In order to build employee involvement, the workforce needs to feel consulted on all (health and) safety-related issues.

The importance of leadership

It is acknowledged that for the implementation of a sound, effective SMS the first impetus must be provided by the leadership and, in particular demonstrated by a strong management commitment. If there is a convincing, prompt and attentive participation by the management, from the top to the line or operational managers, the SMS will become much more than just a formal exercise to demonstrate compliance with the law. It will demonstrate that the company actively cooperates, at each level of the organisation, in achieving common values, goals and objectives concerning railway safety.
What is leadership and the first steps

As stated in the SMS application guide\(^8\): “Strong and effective leadership ensures that safety objectives are set and prioritised (Plan), that practices are implemented to meet safety targets (Do), that the system effectiveness is constantly checked (Check) and that corrective and/or proactive measures are taken (Act).” Based on this assumption, the decision to assess and improve safety culture in the organisation may also be an objective that needs to be implemented, acted upon, monitored, etc. This is shown by example, through policy and commitment and the communication of common beliefs and core values such as ‘safety is an integral part of business’, ‘safety must be a company vision and value’, ‘safety is everyone’s responsibility’ that should be supported by all staff in the organisation.

Ideas on how to improve safety culture based on good practice

There is a wide availability of literature and good practice that can support the reflection on safety culture as an ‘added value’ for the implementation of an effective SMS. Many sectors already relate the effectiveness of SMS very closely with the existence of a robust safety culture. Part B considers some key topics relating to safety culture and gives some examples of good practice in the railway and in the aviation sector. There is a considerable amount of material from the aviation sector that can easily be transferred to the railways (the main difference is in the specification of the tasks to be performed); it provides an important benchmark with an international dimension, which is a useful reference for the current opening of the European railway area. Assessment tools, questionnaires, check lists, maturity levels, are all useful practices that can be easily adapted for companies of all sizes.

Further information to explore these issues in more detail from both theoretical and practical perspectives.

The guidance does not aim to be exhaustive, so you may wish to deepen your knowledge on principles and on practical methods for assessing and improving safety culture in your organisation. For this purpose, we have provided the following information:

- a list of techniques, practices, tools and academic literature related to specific SMS elements (tables in Part C)
- a list of texts containing the good practices mentioned in this document, together with links to the texts when they are publicly available, and the publications details for books. (Part D).

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\(^8\) [http://www.era.europa.eu/tools/sms/design-improve/leadership/Pages/default.aspx](http://www.era.europa.eu/tools/sms/design-improve/leadership/Pages/default.aspx)
**Interfaces with other topics**

The two main interfaces to be considered are:

- **Safety Culture – Safety Management System**, because safety culture is the basis for the acceptance, understanding and delivery of the SMS at any level of the organisation (see Part C for exploring how safety culture enables the effectiveness of SMS processes)
- **Safety Culture - Human Factors**, because it supports the optimisation of human performance by:
  - creating a safer working environment,
  - improving the staff involvement, morale, competencies and motivation,
  - defining clearly roles, responsibilities and applicable requirements (e.g. improving procedure writing), and
  - promotes two-way communication (always providing feedback), both top-down and bottom-up.

For this reason the guidance is useful if read in conjunction with the set of SMS guidance documents.

**Using the SMS to deliver the right culture (practical advice)**

The very first step in developing safety culture is to perceive the need of it. This is quite important, as many organisations may never start reflecting on this. Then, when a company intends to improve safety culture, it is necessary to assess the existing culture. Several approaches and techniques exist. They are described in the chapter B.5 on ‘Assessment of safety culture’.

The results of this assessment are an input for the actions to be undertaken, as described in the chapter B.6 on “Improvement of safety culture”.

The following diagram shows how Safety Culture can be effectively established and monitored.

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Further details on safety culture maturity are shown in the chapter B.7.

In accordance with other SMS processes, the willingness of a company to introduce or improve its safety culture needs to follow the principles of PLAN – DO – CHECK – ACT.

**Safety culture or Safety climate?**

This question is frequently asked. Safety climate is a distinct yet related concept which can be seen as the current surface features of safety culture which are discerned from the employees’ attitudes and perceptions (Flin, R., Mearns, K., O’Connor, P., & Bryden, R., 2000 *Bibliography*).

Safety climate denotes “attitudes to safety within an organisation” whilst “safety culture being the strong convictions or dogmas underlying safety attitudes” (Reason, 1998; *Bibliography*).

In practice the terms ‘safety culture’ and ‘safety climate’ are not so clear cut, so we can find them used quite interchangeably.
Part B  Key topics concerning safety culture – good practice

Introduction to Part B of the guidance
This part of the guidance provides examples of how safety culture is addressed in different domains: railway, aviation, nuclear, etc.

Some key topics concerning safety culture originated in these sectors and they are selected because they are widely applied in the railway sector or because their approach is a good basis for increasing awareness and can be also implemented by railways companies. For this reason we have used quotations from references extensively, instead of re-writing information – quotations are given in italic text.

In this part of the document the following topics will be addressed:

- B.1. Perspectives and approaches
- B.2. Cultural layers
- B.3. Key elements of the Safety Culture
- B.4. Development/Improvement of the Safety Culture
- B.5. Assessment of the Safety Culture
- B.6. Improvement of the Safety Culture
- B.7. Safety Culture Maturity

N.B. The elements provided in this part of the guidance should not be considered as exhaustive, more factors may need to be taken into account for specific organisations, depending on their size, internal structure, type of business, etc.
B.1. Perspectives and approaches

In the “Occupational Safety and Health culture assessment - A review of main approaches and selected tools” 2011 from the European Agency for Safety and Health at Work (EU-OSHA)\(^\text{10}\), there is a good introduction to the current perspectives and approaches used for Safety Culture:

“The safety culture concept has, over the past 25 years, been studied internationally by many academics from different scientific backgrounds and disciplines. Roughly, a distinction can be made between the approach taken by psychology-oriented research and the engineering-based approach (based on Antonsen, 2009, pp. 18 ff.; see also HSE, 2005a/b).

- The psychological approach focuses specifically on how workers feel about and perceive safety and safety management, and on their attitudes and behaviour regarding risks and safety. This psychological research refers more to the term ‘safety climate’ than to ‘safety culture’ (see below).
- The engineering approach is more interested in the formal and managerial aspects and systems that have an influence on safety (i.e. management systems, procedures, policies, control systems, etc.). This approach tends to be more practical and oriented towards change and improvement of organisational and safety performance.
- Apart from this divergence between the psychological versus engineering perspective, safety culture can also be analysed from the viewpoint of organisational (culture) theory, anthropology and sociology. Antonsen (2009, p. 24) regards organisational culture “as the primary matter of investigation in safety culture research”. Guldenmund (2010) considers safety culture as that part of organisational culture that is related to safety and risks, and considers this in relation to (amongst others) Schein’s theory of organisational culture. This approach allows Guldenmund to describe the concept of safety culture (or at least to analyse and describe the influence of organisational culture on safety) (see below).

Related to this categorisation, Guldenmund (2010, pp. 183 ff., p. 197) distinguishes respectively the analytic (psychological), the pragmatic, and the academic (anthropological) approach to the study of occupational safety culture. These approaches determine how cultural assessments can be undertaken.”

B.2. Cultural layers

It is possible to visualize the structure of the Safety Culture taking the “onion” model, “showing three different levels at which organisational culture can be studied and analysed, namely - from the outside to the core - (1) artefacts, (2) espoused values, and (3) basic assumptions.

**Artefacts** comprise the tangible/visible and verbally identifiable elements in an organisation. Examples, linked to occupational safety, are safety posters, messages and slogans, documents and reports related to safety (audits, accidents, etc.), work procedures and instructions, dress codes (wearing of personal protective equipment), etc.

**Espoused values** (adopted values) include the aspects stated or aspired to by the organisation. They are the written or spoken statements made by the employer or business manager (e.g. regarding prioritisation of safety before production goals). Values also include workers’ (safety) attitudes towards (1) behaviour (e.g. responsibility, safe working, communication about safety), (2) people (e.g. co-workers, supervision, management), (3) issues related to the “software” (e.g. safety procedures, training), and “hardware” related elements (e.g. preventive measures, personal protective equipment) (Guldenmund, 2010, p. 48).

**Basic assumptions** are the underlying, shared convictions regarding safety among the members of an organisation. These assumptions are implicit and invisible, but evident for the members. Guldenmund (2010, pp. 49 ff.) gives some examples of safety related assumptions: these could be about what is safe and what is not, about workplaces, their hazards and housekeeping, about the time spent on safety, about whether certain people are likely to show risky behaviour, about the extent to which people should take the initiative or await instruction and about whether it is acceptable to correct other people’s unsafe behaviour, etc.”

All these elements that are linked with organisational aspects must be managed in the Safety Management System of the Organisation (for more information, see Part C of the present guidance).
B.3. Key elements of the Safety Culture

As stated in the report “Safety Culture in Air Traffic Management” of EUROCONTROL/FAA 2008: “In the literature there are many relevant insights concerning the characteristics of Safety Culture, e.g. for Reason (1997), Safety Culture encompasses the following four aspects contributing to develop a self-conscious Informed Culture:

1. Reporting Culture
2. Just Culture
3. Flexible Culture
4. Learning Culture

1. Reporting Culture encourages employees to divulge information about all safety hazards that they encounter. It also represents in which level
   a. employees and management are encouraged to report safety concerns (events, dangerous occurrences, any element that could impair safety)
   b. the information is distributed to the right people in the right way (in order to avoid misunderstandings that could lead to hazardous situations)
   c. Open communication is established in all levels of the organisation
2. Just Culture holds employees accountable for deliberate violations of the rules but encourages and rewards them for providing essential safety-related information. It also represents at which level employees and management are aware of the risks (Risk Perception) and are maintaining a high degree of vigilance on the safety issues.

3. **Flexible Culture** adapts effectively to changing demands and allows quicker, smoother reactions to off-nominal events. It represents in which level employees and management are willing to learn from experiences and are able to take the necessary actions in order to enhance the level of safety within the organization.

4. **Learning Culture** is willing to change based on safety indicators and hazards uncovered through assessments, audits, and incident analysis.

The four subcomponents – reporting culture, just culture, flexible culture, and learning culture – combine to form a safety-conscious, **Informed Culture**, where a safety system integrates data from incidents, accidents and near misses and combines them with information from proactive measures such as safety audits and climate surveys.

An **Informed Culture** has also the following components:

- **Commitment**: every level (above all, Top Management) of the organization has a positive attitude and involvement towards safety and recognizes its importance and priority. **Top management** should be the first to be truly committed in keeping a high level of safety and more specifically:
  - Give employees motivation and means to do so as well.
  - Implement an effective decision-making process consistent with the high priority given to safety.
  - Set up a **Safety Management System** consistent not only in an organisational approach but also taking in account the elements of the Safety Culture: basic assumptions, espoused values/attitudes and artefacts/tools.

- **Safety-related Behaviour**: it represents in which level the organisation is complying with procedures, roles and regulations, but also is taking into account aspects such as coaching, recognising, communicating, demonstrating and actively caring about safety.”
B.4. Development/Improvement of the Safety Culture

An organisation intending to develop or improve safety culture should follow a systematic approach, that assures the closing of the loop for the process:

1. **Identifying the needs**, because some issues have been detected, as for instance:
   - Low management commitment to safety (e.g.: priorities are given to cost-reductions and production objectives);
   - Poor competence of managers (at any level) in risk management;
   - Poor job design (little or no task analysis, excessive workload, etc.)
   - Inadequateness of competence management system, for staff performing safety critical tasks and poor preparedness for emergencies;
   - Complacency about risks
   - No (or poor) rewards and incentives for reporting incidents and dangerous occurrences
   - No learning from past events
   - Poor management of changes
   - Poor internal communication / flow of information / involvement of staff

2. **Defining the safety culture model** and the tools/drivers for achievement: SMS already provide effective input: management commitment, organisational learning, involvement of staff, etc. should be documented and become practice in the company;

3. **Assessing the maturity of the company** (measuring safety culture with surveys, interviews, etc., see Section B.5 for further details);

4. **Developing action plans** for deployment

5. **Start actions**

6. **Measure again**, to assess the improvement, possibly through the SMS process of monitoring safety performance.

*The figure shows a typical improvement/ enhancement process as presented in the report “Safety Culture in Air Traffic Management” of EUROCONTROL/FAA 2008*
B.5. Assessment of the Safety Culture

The assessment of safety culture is the cornerstone to measuring key elements of safety culture and identifying an organisation’s current level of development (or ‘maturity’) in order to learn and improve. There are a number of assessment methods; one or several may be more suitable for an organisation than others depending on internal practices. A number of these assessment methods are listed in the UK RSSB ‘Safety culture toolkit’

- **“Safety attitude surveys”**: Questionnaires designed to elicit workforce attitudes on key aspects of safety culture
  - Allows all the workforce’s views to be considered.
  - High profile – and if used correctly can help to enhance belief in the company’s commitment to health and safety.
  - Reveals current attitudes & perceptions towards safety and safety management.
  - Can clearly point to issues that need to be addressed.
  - May be capable of identifying issues in some aspects of the safety management arrangements

- **Safety management audits** (using an audit process and trained auditor to examine the presence and effectiveness of safety management systems);
  - Based on underlying models of safety management that include aspects of safety leadership, competence and commitment to safety;
  - Use trained or accredited auditors – normally external – to perform audits

- **Safety culture workshops**
  - Series of workshops with cross-sections of the workforce.
  - Participants consider and debate their perceptions on key aspects of safety and safety management.
  - Workshops normally elicit views on improvement ideas

- **Leading (and lagging) safety performance indicators**
  - Measures of safety performance, e.g. RIDDOR reportable incidents; loss time injuries etc.
  - Key indicators of aspects of safety culture, e.g. number of safety tours performed; safety observations made; near misses reported etc.”
Improvement of the Safety Culture

Having in mind the key elements of Safety Culture and, following assessment using the tools described in the previous chapter, it is necessary to implement improvement measures and tools. An example of such tools can be found in the “Railway Safety Management System Guide” from the Department of Transport in Canada, 2010:

“The following key practices CHECKLIST for a safety culture are identified:

- **Leadership and Commitment to Safety Culture:**
  1. Clear leadership and commitment to safety at the executive/senior level, as well as by line management.
  2. Safety is a core value at all levels of the company.
  3. Safety is integrated into all levels of the company through policies, processes, procedures, objectives and initiatives.
  4. Executive participation in safety activities, such as health and safety committee meetings, safety walkabouts and audits.
  5. Self-evaluation, including benchmarking and lessons learnt, for purposes of continuous improvement at all levels.

- **Two-Way Communication:**
  1. Multiple processes to promote management–employee communications (e.g., safety meetings, town hall meetings, safety forums, briefings, mentoring, performance reviews).
  2. Multiple processes to augment employee awareness and knowledge of safety (e.g., newsletters, communiqués, brochures, safety flashes, training).
  3. Confidential phone line, or other processes, for employees to report incidents and safety issues without fear of reprisal.
  4. Safety surveys directed towards employees and health and safety committees.

- **Stakeholder / Employee / Employee Representative Involvement:**
  1. Empowered and proactive health and safety committees (e.g., annual action plans for top causes).
  2. Process to support and augment effectiveness of health and safety committees.
  3. Involvement in risk assessments.

4. Participation in safety site visits, walkabouts, audits, etc.
5. Participation in investigations and corrective actions.
6. Involvement in developing and implementing safety programs at all levels.

- **A Learning Culture:**
  1. Continuous improvement through internal and external reviews.
  2. Processes for monitoring safety trends (e.g., trend analysis).
  3. Use of leading indicators (e.g., near-misses, audit results, rule violations, health and safety effectiveness).
  5. Systematic corrective actions following accident / incident investigations.
  6. SMS internal audits.
  7. Audit and quality assurance of accident / incident investigations, corrective actions, etc.
  8. Internal processes for sharing safety knowledge and best practices (e.g., website for health and safety committee minutes and action plans).

- **A Just Culture:**
  1. Company policies will encourage and/or recognize employees, and be fair.
  2. Complete and objective investigations.
  3. Internal escalation process for unresolved health and safety issues.
  4. Internal recourse for employees to deal with safety issues (e.g., safety ombudsman).
  5. Going beyond rule violations when identifying accident / incident causes (e.g., factors such as training, rest, knowledge, familiarity, supervision, and clarity of work process).
  6. Non-punitive reporting processes for employees to report incidents, accidents, near-misses and other safety concerns.
  7. Straightforward and transparent means to determine whether or not disciplinary action is warranted.

- **Non-Punitive Reporting**

  The intent of this process is to encourage employees to identify and report hazards, threats and safety concerns that might otherwise go unreported for fear of reprisal. The goal is to advance safety through the collection, analysis and sharing of data.
A non-punitive reporting system does not eliminate the need for a disciplinary process. Discipline is still a necessary and complex process, and stakeholders, both management and labour, must clearly understand the circumstances which will result in discipline.

The following aspects of non-punitive reporting should be considered in the development of a non-punitive reporting system or policy:

1. recognition that operational failures and errors often result from greater systemic failures in the organization;
2. employees are empowered and encouraged to report any occurrence, hazard, or safety-related concern immediately without fear of punitive action;
3. safety reports are reviewed objectively and neutrally with the goal of learning and enhancing safety;
4. no blame is assigned or punitive action taken against those who honestly report a safety-related issue; and
5. circumstances that will result in discipline will include: wilful negligence or misconduct, illegal activity, and illicit substance use.

Other issues to be considered in the development of a non-punitive system include:

1. reporting time-frames;
2. dealing with breaches of rules and regulations;
3. confidentiality when reporting;
4. repeat offenders;
5. tracking or trending participation through data analysis;
6. training/quality assurance to ensure system is performing as intended; and
7. measuring success.”

B.7. Safety Culture Maturity
As stated in the report “Safety Culture in Air Traffic Management” of EUROCONTROL/FAA 200813, in some industries, such as the software, oil & gas and energy industries, capability maturity models have been defined and adopted to facilitate the enhancement process of Safety Culture. These capability maturity models aim to assist organisations to understand the level of maturity of their culture.

In recent years a sliding scale of Safety Culture [...] has been proposed (Fleming, 2000\textsuperscript{14}). Several industries have referenced and worked to adopt this model. The Safety Culture Maturity Model is used to identify the level of maturity of an organisation’s culture and is adopted in the oil and gas industry to plan improvements in order to achieve the desired Safety Culture enhancement.”

The key features of the 5 maturity levels\textsuperscript{15} are described (in a bottom – up direction) in the table below adapted to the railway sector. They were specifically addressed to health and safety at work, but they can be applied to the overall safety management system. Health and safety management systems (HSMS) and SMS follow a parallel workflow in the companies: they pertain to different legislation and are supervised by different entities, however, as many other management system, they share the same ‘backbone’ and basic processes. Also in HSMS and SMS the operational risks sometimes overlap, since accidents may involve harm to workers, as well as passengers or persons on railway premises, so the control or mitigating measures are related to the protection of all these people.

N.B. The table has been modified to relate more specifically to SMS rather than HSMS.

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td></td>
</tr>
<tr>
<td>Emerging</td>
<td>- Safety focus is on technical and procedural solutions and compliance with regulations.</td>
</tr>
<tr>
<td></td>
<td>- Safety not seen as a key business risk.</td>
</tr>
<tr>
<td></td>
<td>- Safety department perceived as being primarily responsible for safety.</td>
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<tr>
<td></td>
<td>- Many accidents seen as unavoidable.</td>
</tr>
<tr>
<td></td>
<td>- Some front line staff not interested in safety – only used as a lever on other issues</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td></td>
</tr>
<tr>
<td>Managing</td>
<td>- Safety seen as a business risk and management time and effort devoted to accident prevention.</td>
</tr>
<tr>
<td></td>
<td>- Safety focus is on adherence with rules, procedures and engineering controls.</td>
</tr>
<tr>
<td></td>
<td>- Accidents seen as preventable.</td>
</tr>
<tr>
<td></td>
<td>- Management perceives that the majority of accidents are solely due to the unsafe behavior of front-line staff.</td>
</tr>
<tr>
<td></td>
<td>- Safety performance is measured with appropriate indicators\textsuperscript{16}</td>
</tr>
<tr>
<td></td>
<td>- Safety incentives based on reducing loss time incidents.</td>
</tr>
<tr>
<td></td>
<td>- Senior managers only become involved in health and safety if accidents increase; punishment likely to be used.</td>
</tr>
</tbody>
</table>

\textsuperscript{15} Adapted from the RSSB’s Safety culture toolkit
\textsuperscript{16} The Directive 2004/49/EC contains the set of ‘Common Safety Indicators’ (Annex I) that may provide a reliable basis for identifying those indicators that are relevant for an RU/IM. (more information at: [http://www.era.europa.eu/Core-Activities/Safety/Safety-Performance/Pages/Common-Safety-Indicators.aspx](http://www.era.europa.eu/Core-Activities/Safety/Safety-Performance/Pages/Common-Safety-Indicators.aspx)

The RU/IM can develop more indicators on the basis of their risk assessment process. Some practical guidance on the use of Safety Performance Indicators and their inclusion in the overall SMS can be found in the RSSB Guide ‘Measuring Safety Performance’ [http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T852_guide_final.pdf](http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T852_guide_final.pdf)
| Level 3 | - Accident rates are near the industry sector average – but tend to have more serious accidents.  
- Organisation realises employee involvement is essential for safety improvement.  
- Management recognise that a wide range of factors lead to accidents – often stemming from management decisions.  
- A significant proportion of front-line employees are willing to work with management to improve safety.  
- The majority of staff accepts personal responsibility for their own health and safety.  
- Safety performance is actively monitored and the data used. |
| Level 4 | - The majority of staff are convinced that safety is important.  
- Management recognise that a wide range of factors lead to accidents – and the root causes are likely to stem from management decisions.  
- Front-line staff accept responsibility for their own and others’ safety.  
- The importance of all employees feeling valued and treated fairly is recognised.  
- The organisation makes significant effort into proactive measures to prevent accidents.  
- Safety performance is actively monitored using all data available. |
| Level 5 | - The prevention of all injuries or harm to passenger, employees and the wide public concerned is a core company value.  
- The organisation has a sustained period (years) without a recordable accident or high potential incident – but there is no feeling of complacency.  
- The organisation uses a range of indicators to monitor performance but it is not performance driven – it has confidence in its safety processes.  
- The organisation strives to be better and find better hazard control approaches.  
- All employees share the belief that safety is a critical aspect of their job and accept that prevention of accidents is important.  
- The company invests considerable effort in promoting health and safety of staff. |
Part C _ SMS elements and safety culture

In this guidance we emphasise the positive examples of techniques and factors that ‘enable’ the improvement of safety culture in an organisation. In a strict sense the SMS elements that mainly concern safety culture are: management commitment, staff involvement, risk management, organisational learning and communication. However, there are many reasons to explore all SMS elements and see how an effective safety culture positively impacts on them and increases the value of the systemic approach.

To have a complete picture, it is also important to examine those negative factors and attitudes that may hinder or block the development of safety culture in an organisation (and that should be corrected):

- Safety is not seen as a value, it is rather a barrier and there is mainly focus on profit,
- Autocratic and heavy-handed leadership,
- Lack of trust, mainly because of a persisting punitive culture,
- Lack of internal communication, with very few reported accidents/incidents/dangerous occurrences for fear of reprisal and with very limited involvement and consultation of staff,
- Weak monitoring and review (performance indicators, audit findings, accident reporting are not used for analysis SMS effectiveness and for organisational learning).

The tables in Part C present questions relating to how safety culture can be enabled for each of the elements in the SMs (listed in the first column). In the third column examples of the available methods and tools and the relevant theoretical background are listed:

These references to methods, tools, theories and bibliography may be useful to develop or improve safety culture as necessary.

N.B. Please note that it is not intention of this guide to provide a rating of safety culture, but the list of questions in table C may be useful in case a company detects poor safety performance or in the case of an SMS review].
<table>
<thead>
<tr>
<th>Reference to SMS element</th>
<th>How safety culture is enabled in the SMS?</th>
<th>Available methods, tools, theories</th>
</tr>
</thead>
</table>
| Management commitment    | - Does management show signs of demonstrable commitment to safety?  
- Do senior managers show visible interest and commitment on safety by promoting culture as a real priority?  
- Does senior management take care of:  
  - Organisational behaviours and allocation of resources (staff / technology / time),  
  - Promotion of safety training for managers and supervisors at any level of the organisation,  
  - Understanding roles on safety,  
  - Role modelling and required behaviours,  
  - Setting and maintaining standards, targets and objectives,  
  - Seeking of workforce views on safety issues and promote safety,  
  - Regular team briefings to include safety topics,  
  - Regular safety communications, including listen / responding to safety issues raised by staff,  
  - Developing leadership behaviours that are consistent with delivering the company’s strategy and goals safely,  
  - Defining and communicating the company’s goals for safety,  
  - Aligning management structures to safety objectives,  
  - Providing clarity on safety responsibilities and accountabilities,  
  - Developing 2-way communication channels with staff.  
<table>
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</thead>
</table>
| Safety Policy            | - Does the safety policy continuously reflect the strong commitment of the company towards safety?  
                          | - Is management interested in the safety policy and in the consistent arrangement of activities?  
                          | - Is the implementation of actions defined in the policy acted upon and monitored? | A guide to RSSB research in Safety policy and risk management.  
                          |                                                                                          | [http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T938_guide_final.pdf](http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T938_guide_final.pdf) |
| Corporate safety targets | - Does the company assess safety culture?  
| Decision taking          | - Does the decision-taking process includes steps like:  
                          | - all company is made aware of important decision concerning safety (changes)  
                          | - opinions and suggestions are sought and welcomed  
                          | - results of consultation are taken on board? | [http://www.rssb.co.uk/SAFETY/Pages/SAFETYDECISIONMAKING.aspx](http://www.rssb.co.uk/SAFETY/Pages/SAFETYDECISIONMAKING.aspx)  
                          |                                                                                          | - The route to taking safe decisions  
                          |                                                                                          | - Taking Safe Decisions Part 1 – Principles  
                          |                                                                                          | - Taking Safe Decisions Part 2 – Decision taking framework  
                          |                                                                                          | - Taking Safe Decisions Part 3 – Worked examples |
### Reference to SMS element

#### How safety culture is enabled in the SMS?

- Does the company review the SMS cyclically, to check if the system is addressing all of the risks to which the organization is exposed?
- As a result of these reviews, does top management make decisions, give direction, and commit resources to implement their decisions?
- Do managers at all levels of the organisation and supervisors develop a greater understanding of the importance and impact of their role and behaviours, including:
  - Clarifying accountability and responsibilities for safety
  - Providing safety training
  - **Explaining the role and influence of supervisors on safety behaviours**
  - Set expectations for the supervisor's role and behaviours?
- Is awareness of the importance of leadership skills perceived in the company?

<table>
<thead>
<tr>
<th>Available methods, tools, theories</th>
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</table>

#### Control of risks associated with the activity of the RUs/IMs

**Risks arising from the activities of external parties**

The objective of an effective safety culture is to go beyond compliance and promote attitudes that encourage the proactive hazard identification and the assessment of associated risks, in order to put in place measures to control or to mitigate them.

Therefore, to check if a positive safety culture exists, the organisation (RU or IM) should reflect as follows:

- Does the organisation have a thorough knowledge of processes and of the associated risks, concerning the activities carried out internally, at interface with other actors, or related to technical, operational or organisational change?
- Are there operational arrangements (e.g.: developing procedures, using appropriate tools, equipment, etc.) to ensure that the risks are controlled or mitigated?
- Is performance monitored, are safety data analysed, accidents investigated and audits carried out?
- Are the results used to identify, prioritise and enforce corrective or preventive actions?
- Is staff training promoted and developed?
- Is the effectiveness of preventive/corrective actions monitored?
- Are risk assessment procedures periodically reviewed?
- Does the activity of risk management use intelligence and cases to increase organisational learning?
<table>
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</table>
| Compliance with legislation, rules and standards | - Are all the applicable requirements analysed and implemented through appropriate medium: rule book, route book, operational procedure and working instruction?  
- Are requirements checked and acknowledged as barriers against identified (or potential) risks?  
- Are the relevant medium designed, maintained and amended when necessary, taking into account human factors / ergonomics in order to facilitate compliance (see also document management)?;  
- Is the content (and any changes) communicated and/or included in training?  
- Is the compliance monitored to detect evident and latent failures? | Research Programme. Management. Safety critical rule compliance. RSSB.  
http://www.rssb.co.uk/SiteCollectionDocuments/pdf/reports/research/T145_rpt_final.pdf  
Safety critical rule compliance toolkit (T506)  
| Co-ordination tasks for IM | The infrastructure manager has the task to coordinate the operation of all the RUs operating on its infrastructure. Does the IM take into account cultural barriers and take appropriate measures relating to different approaches to be safety and different languages.  
- Are the communication flows established?  
- Is cooperation to identify and manage of risks adequately managed?  
- Are the monitoring of safety performance, the analysis of safety data and organisational learning used as cornerstones for the quality and effectiveness of operational arrangements? |  |
| Data collection and analysis | - Are the monitoring of safety performance, the analysis of safety data and organisational learning used as cornerstone for the quality and effectiveness of operational arrangements?  
- Are preventive/corrective actions directly related to the results of monitoring?  
<table>
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</thead>
</table>
| Accident/incident reporting and investigation                | - Does the company investigate accidents, incidents and dangerous occurrences, with the primary aim of identifying direct and underlying causes (rather than identifying who is to blame), as well as possible cultural issues?  
- Do investigations focus on the following aspects:  
  - Roles, tasks and objectives - are they well defined?  
  - Communication - is it right, Sufficient, Timely, addressed to the right person/structure?  
  - Feedback from staff - is it sought and considered when taking decisions?  
  - Organisational arrangements - appropriateness of resources, Are risks managed Are interfaces correct?  
  - The degree of staff qualification, fitness and empowerment - right task allocation, right role, working alone/in team, supervision?  
  Note: this list is not exhaustive; each company should reflect on its own approaches |
http://www.rail-reg.gov.uk/server/show/nav.1845  
RSSB Accident investigation guidance  
http://www.rssb.co.uk/NP/SMS/Pages/AccidentInvestigationGuidance.aspx  
http://www.tc.gc.ca/eng/railsafety/publications-710.htm  
| Internal auditing                                             | - For investigation of events, do safety audits focus on the effectiveness of processes and detect areas for improvement?  
- Does the company have or appoint reliable and qualified auditors, define the audit scope and review audit findings?  
- Is the audit is designed to include both management and operational activities, in order to provide an inclusive picture of the whole SMS? |
<table>
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</thead>
</table>
| Continuous improvement   | - Does the company define indicators aiming at measuring overall improvement?  
                         | - Do the indicators relate to the following:  
                         |   - Roles, tasks and objectives are well defined,  
                         |   - Profit does not have priority over safety, risks are identified and managed proactively,  
                         |   - Communicating the safety message,  
                         |   - Demonstrable management and organizational commitment,  
                         |   - The degree of employee participation, involvement and empowerment,  
                         |   - Collecting safety data, for the use of correcting deviations and detect system failures rather than for punishing people,  
                         |   - Learning from experience,  
                         |   - Building a culture of trust, openness and empowerment. | ASQ Continuous Improvement guidelines  
|                          |                                          | [http://asq.org/learn-about-quality/continuous-improvement/overview/overview.html](http://asq.org/learn-about-quality/continuous-improvement/overview/overview.html)  
|                          |                                          | Continuous Improvement Guideline for the South Australian Public Service:  
|                          |                                          | Innovation Insights (#10). Leading for Continuous Improvement. Penn State University  
|                          |                                          | [http://www.psu.edu/president/cqi/innovation/Leading_for_Continuous_Improvement_v2.pdf](http://www.psu.edu/president/cqi/innovation/Leading_for_Continuous_Improvement_v2.pdf)  
| Safety recommendations   | - Do the results of monitoring (measurement of safety performance, audit, accident/incident/dangerous occurrences) contain recommendations to the company for implement and improvement? | Lord Cullen’s Report [http://www.rail-reg.gov.uk/server/show/nav.1204](http://www.rail-reg.gov.uk/server/show/nav.1204)  
|                          |                                          | Report of the Baker Panel  

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<tbody>
<tr>
<td><strong>Change management</strong></td>
<td>Managing changes, especially those that are safety related, is a complex and challenging task that involves resources management, revision of processes and concerns feelings and emotions. To a certain extent, if it does not already existing in a company, the introduction of safety culture may result in some reallocation of tasks and management functions. This is an organisational change and may be perceived as a way to redistribute of authority and breakdown of consolidated relationship between groups. Therefore the question is: - Are the transitions in the event of changes managed in a manner to remove barriers and opposition through communication, dialogue and involvement of staff?</td>
<td>Management of major change guidance, covered in Preparation of a rail SMS: <a href="http://www.onrsr.com.au/__data/assets/pdf_file/0015/1923/Preparation_of_a_Rail_SMS.PDF">http://www.onrsr.com.au/__data/assets/pdf_file/0015/1923/Preparation_of_a_Rail_SMS.PDF</a></td>
</tr>
<tr>
<td><strong>Distribution of responsibilities</strong></td>
<td>- Are safety roles, tasks and objectives well defined and reflected in job descriptions? - Is training adequate for the tasks to be performed? - Are there arrangements to check if staff have the required competency? - Does training include briefings on safety, risks and control measures, applicable standards? - Is training appropriately resourced and prioritised? - Is the use of procedures/methods monitored with the aim of improving them (enhancing ergonomics and user-friendliness)? - Is the employees’ contribution to safety rewarded and shared?</td>
<td>Distribution of responsibilities among railway stakeholders. The Railways and Other Guided Transport Systems (Safety) Regulations. Guidance on Regulations. April 2006 <a href="http://www.rail-reg.gov.uk/upload/pdf/rogs-guidance.pdf">http://www.rail-reg.gov.uk/upload/pdf/rogs-guidance.pdf</a></td>
</tr>
<tr>
<td><strong>Management and supervisory accountability</strong></td>
<td>- Do management and supervisors have clear roles and responsibilities in the companies; are they made accountable for the relevant objectives, in the context of the SMS? Some examples: Are management accountable for having safety policy and targets transposed in appropriate procedures and working instructions? Are the supervisors accountable for checking the compliance of processes /procedures and reporting?</td>
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<tr>
<td>Reference to SMS element</td>
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<tr>
<td><strong>Organisational structure</strong></td>
<td>- Does the structure reflect the company’s commitment to safety; is there sufficient staff competent to carry out the tasks for managing the identified risks.</td>
<td>Research Programme. Management. Team-working in the railway industry. The Journey Guide. <a href="http://www.rssb.co.uk/SiteCollectionDocuments/pdf/reports/Research/T146_rpt_final.pdf">http://www.rssb.co.uk/SiteCollectionDocuments/pdf/reports/Research/T146_rpt_final.pdf</a></td>
</tr>
<tr>
<td><strong>Workload planning</strong></td>
<td>- Is the planned workload based on the risk analysis (to define the tasks) and the appropriate identification of necessary resources? - Are Human Factors approaches used for task analyses, in the job and task design and in the work organisation (type and number of tasks, shifts, etc.)?</td>
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<tr>
<td>Reference to SMS element</td>
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</table>
| Competence management system | - Do staff receive adequate basic and on-going training?  
- Is the staff fully and continuously competent for all relevant aspects of safety for their work?  
- Do staff understand safe methods of working?  
- Are the requirements and hazards associated with their work clearly communicated?  
- Is there a good level of risk awareness?  
- Are the skills and competence requirements identified for all tasks?  
- Are good communication methods recognised and practiced?  
- Are there arrangements to check if employees have the competencies they need?  
- Is training provided on a timely basis to staff, both employed and sub-contracted?  
- Is the effectiveness of training evaluated and followed-up by the monitoring of the staff performance of, in order to detect inadequate training, non-compliance and, eventually, the need for further training?  
- Are trainers fully qualified and motivated?  
- Is the competence management system documented and results recorded? | Competence Management Systems for Railway Safety Critical Work  
Developing and maintaining competence. 2008 Rail Professional Development Limited  
http://www.rpd.co.uk/docs/Developing_and_maintaining_competence.pdf  
RSSB Good practice guide on competence development  
Competence management systems for rail engineering organisations. John Baker  
http://www.rpd.co.uk/docs/j_bakers_paper_on_competence_management_systems.pdf  
GOOD PRACTICE GUIDE ON COMPETENCE REVIEW AND ASSESSMENT RS/701 Issue 2, August 2008. RSSB.  
| Configuration control of safety information | - Is the structure of formalised safety information appropriate, consistent and reliable for enabling the company to manage operational risks, internally (among different roles/structures) and externally, with other companies? | MIL-HDBK-61A, Military Handbook: Configuration Management Guidance (07/02/2001)  
Configuration Management Guidance and Tools – CENELEC  
http://en50126.blogspot.fr/2010/02/configuration-management.html |
<table>
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<tr>
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</thead>
</table>
| Involvement of staff and their representatives | - Has the company laid the foundation for workforce involvement and participation – the key element is the degree of trust between line managers and the workforce?  
- Does the company seek the views of the workforce on safety issues and promote safety as a real priority by actions such as:  
  - Ensuring regular team briefings include safety topics  
  - Having regular communication on safety  
  - Listening and responding to safety issues raised by staff  
  - Rewarding employees’ contribution to safety  
  - Actively encouraging the workforce to use their knowledge and experience and using this to build commitment to achieve shared objectives  
  - Removing barriers to learning e.g.: blaming culture. Note: a no blame culture does not mean that there is no redress for violations.  
  - Establishing processes to allow staff to raise concerns - briefings, safety meetings, etc. | The Impact Of Employee Communication And Perceived External Prestige On Organizational Identification. Ale Smidts, Cees B.M. van Riel, Ad Th. H. Pruyn. Rotterdam School of Management.  
http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.32.9236  
Future Rail Communications  
http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T351_rpt_final.pdf |
| Internal / external communication | - Is communication effective across the whole organisation?  
- Is communication accurate, timely and frequent, understood, useful, relevant and accessible?  
- Does the company collect and regularly share communications on safety issues,  
- Is the current level of performance communicated in a variety of ways:  
  - Team briefings/regular staff meetings  
  - Newspaper, bulletins  
  - Posters, local safety information, etc. |  |
| SMS documentation | - Does the company:  
  - develop, maintain update and distribute SMS-related documentation at the appropriate level of the organisation  
  - promote consultation and contribution  
  - provide training and information sessions on this documentation? |  |
<table>
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</table>
| **Document management**                                                                 | - Does documentation management ensure the traceability of processes: proposal(s), justification, development, consideration of ergonomics / human factors, consultation of interested parties, decision making, authorisation, distribution, revision, updated, withdrawn, archive, etc.?  
- Are the SMS-related documents made evident and available for audit and inspections?                                                                                                                                 |                                    |
| **Annual safety report**                                                                 | - Is the annual safety report included in the information sources that feed organisational learning and give proof of the attainment (or not) of the ‘continuous improvement’ in safety performance and in the overall SMS?                                                                                                           |                                    |
| **Procedures to meet applicable rules for type of service delivered -  Procedures to assure compliance throughout lifecycle of equipment and operation (delivery phase)** | - Are rule books/ operational procedures designed to be adopted in order to control risk and operate safely for front-line staff?  
- Are there references to the standards containing the technical characteristics and other operational requirements for the rolling stock or the signalling/control-command system (e.g.: maintenance of rolling stock or infrastructure, operation in degraded mode)?  
- Is there appropriate management (i.e. in the document management system) of documents containing the applicable requirements related to the type of service delivered? |                                    |
<table>
<thead>
<tr>
<th>Reference to SMS element</th>
<th>How safety culture is enabled in the SMS?</th>
<th>Available methods, tools, theories</th>
</tr>
</thead>
</table>
| Use of contractor and control of suppliers | - Do the arrangements for the contracted activities reflect the company’s care and concern about safety?  
- Are there selection criteria for contractors?  
- Are these criteria based on competence and reliability?  
- Do contracts show clearly the expected outputs, responsibilities, monitoring and auditing arrangements?  
- Do the contracts include the exchange of information and lessons learnt in order to provide useful feedback for organisational learning and for the detection of hazards for the risk management process? | Supplier Assurance Framework. Review and Analysis of Existing Supply Chain – Final Report. 28th November 2008 (RSSB).  
http://www.rssb.co.uk/SiteCollectionDocuments/pdf/reports/research/T833_rpt_final.pdf |
| Asset management | - Does asset management reflect the consistent application of the convinced adoption of the P-D-C-A process, and interact with communication flow and organisational learning to support effective asset management for running the specific business activity (e.g.: design, operation and maintenance of rolling stock, equipment, signalling, infrastructure, etc.)? | An Asset Management Model for UK Railway Safety – Literature Review and Discussion Document HSL/2005/34  
Railway Strategies - Rail Asset Management - how hard can it be?  
http://www.railwaystrategies.co.uk/article-page.php?contentid=1671&issueid=80 |
<table>
<thead>
<tr>
<th>Reference to SMS element</th>
<th>How safety culture is enabled in the SMS?</th>
<th>Available methods, tools, theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency management</td>
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</tbody>
</table>

Please note that the references may not be explicitly or solely focused on safety culture, they may address the SMS element in a more generic way. This in-depth information on the topic can be useful for the development of organisational knowledge, learning and, so, safety culture.

Where specific references have not been included, references to relevant publications are provided in the bibliography (Part D)
Part D _ Information sources

D.1. Overview on Safety Culture principles, tools, methodologies and techniques

Some specific principles, tools, methodologies and techniques have been developed by researchers in industrial domains, these are used in the high reliability industries to increase understanding and, assess and improve safety culture in their companies.

This section provides references to some of these principles / tools / methods / techniques used for safety culture development. The list is not exhaustive and further references can be derived from the texts contained in the bibliography [Chapter D.2].

The referenced texts do not contain mandatory requirements; however, RUs/IMs may read them to build or deepen their knowledge.

The table D1 gives a short description of some of the most well-known methods and an indication of the domain where the method was developed.

Table D1

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESCRIPTION</th>
<th>REFERENCE DOMAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSSB toolkit</td>
<td>RSSB provides a Safety Culture Toolkit designed for the rail industry. It provides public access to background information on safety culture, guidance on conducting analyses and development. Registered users can also access the full range of toolkit functions, including the self-assessment package, detailed reports and tailored guidance, interactive discussion forums and the improvement library.</td>
<td>Railways</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.safetyculturetoolkit.rssb.co.uk/home.aspx">http://www.safetyculturetoolkit.rssb.co.uk/home.aspx</a></td>
<td></td>
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<tr>
<td></td>
<td><a href="http://www.rssb.co.uk/RESEARCH/Lists/DispForm_Custom.aspx?ID=735">http://www.rssb.co.uk/RESEARCH/Lists/DispForm_Custom.aspx?ID=735</a></td>
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<td></td>
<td><a href="http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T143_UIC_SafeTrack.pdf">http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T143_UIC_SafeTrack.pdf</a></td>
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<td><a href="http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T143_rpt_final.pdf">http://www.rssb.co.uk/sitecollectiondocuments/pdf/reports/research/T143_rpt_final.pdf</a></td>
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<tr>
<td>HSE toolkit</td>
<td>A review of safety culture and safety climate literature for the development of the safety culture inspection toolkit. Prepared by Human Health and Safety Office, Department for Transport.</td>
<td>Health and Safety</td>
</tr>
</tbody>
</table>
Engineering for the Health and Safety Executive (2005), the reference provides a review on safety culture and safety climate publications. It contains also a review of safety culture toolkits / assessment tools. It defines the following five major safety culture indicators:
- Leadership,
- Two-way communication,
- Involvement of staff,
- The existence of a learning culture,
- The existence of a just culture (focusing on the prevailing attitude of blame).
And describes further each one of the indicators in a specific chapter.

<table>
<thead>
<tr>
<th><strong>Safety Culture Enhancement Toolbox for ATM</strong></th>
<th><strong>Aviation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>“The continuing safety management efforts of Air Navigation Service Providers (ANSPs), seeking to guarantee safe behaviours, have identified a need for an in-depth understanding of Safety Culture, together with an understanding of their ANSP’s strengths and weaknesses in this area. This calls for a robust Safety Culture measurement and improvement process.”</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>CANSO safety culture resources</strong></th>
<th><strong>Health and Safety</strong></th>
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</thead>
<tbody>
<tr>
<td>The worldwide ‘Civil air navigation service organisation’ (CANSO) has developed a set of documents and tools:</td>
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<tr>
<td>- Safety Climate Survey</td>
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<tr>
<td>- Safety Climate Survey Guidelines</td>
<td></td>
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<tr>
<td>- A Safety Culture Model and Enhancement Process</td>
<td></td>
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<tr>
<td>- Communication Tools</td>
<td></td>
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<tr>
<td>Such tools are expected to help Air Navigation Service Providers (ANSPs) to define, understand and measure their safety culture and/or safety climate, and:</td>
<td></td>
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<tr>
<td>- provide access to lessons learned and best practices;</td>
<td></td>
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<tr>
<td>- provide standardised and harmonised measurement across CANSO Member ANSPs;</td>
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<tr>
<td>- are linked to the CANSO Safety Management System Standard of Excellence;</td>
<td></td>
</tr>
<tr>
<td>- are cost-effective and easy to use?</td>
<td></td>
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<tr>
<td><a href="http://www.canso.org/safety/committees">http://www.canso.org/safety/committees</a></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>The Safety Culture Perception Tool®</strong></th>
<th><strong>Generic</strong></th>
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</thead>
<tbody>
<tr>
<td>ProAct Safety® has a perception survey for safety culture. The perception survey can be used as-is, although the survey can be used as a template to create a customized survey for each organization.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Balanced Scorecard</strong></th>
<th><strong>Generic</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The balanced-scorecard approach helps organizations to measure safety and build the association between these metrics and accident data. This multiple-metric for safety helps organizations to determine the effectiveness of safety initiatives (such as training, meetings, committees, etc.) and</td>
<td></td>
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<tr>
<td><strong>S.T.E.P.S.®</strong></td>
<td>As defined in the website: S.T.E.P.S.® (Strategic Targets for Excellent Performance in Safety®) is a proprietary process for accomplishing safety excellence by targeting and addressing the key competencies, conditions, and common practices that have the greatest impact on preventing accidents and sustaining a culture of performance excellence. Each step is prioritized to ensure quick wins, visible progress, and maximum efficiency and effectiveness of effort. <a href="http://www.proactsafety.com/solutions/steps">http://www.proactsafety.com/solutions/steps</a></td>
</tr>
<tr>
<td><strong>Safety Culture Modelling</strong></td>
<td>Application for modelling, analysing, and engineering NASA’s Safety Culture. Phase 1 Final Report, September 2004 to February 2005. Leveson N.G. This method has been applied in other domains in addition to aerospace. <a href="http://sunnyday.mit.edu/Phase1-Final-Report.pdf">http://sunnyday.mit.edu/Phase1-Final-Report.pdf</a></td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td>RACE is an acronym that stands for Research, Action Plan, Communicate and Evaluate. It is useful for the elaboration of a communication plan within an organisation. The meaning of terms can be summarised as follows:  - Research — Investigate and gather all relevant facts  - Action Plan — Develop the action plan including defining the target audience, goals and objectives and communications tactics to be used.  - Communicate — Implement the tactics.  - Evaluate — determine your level of success in achieving the plan’s goals and objectives and adjust the plan accordingly to meet the desired objectives.</td>
</tr>
</tbody>
</table>

Aerospace

Generic
D.2. Bibliography

In this section, references for more detailed reading are listed to provide a full coverage of the work on Safety Culture.

10. Assessing Organizational Culture in Complex Sociotechnical Systems, Teemu Reiman, VTT PUBLICATIONS 627
11. Improving Safety Culture, a practical guide, Dominic Cooper, Applied Behavioural Sciences, Hull, ISBN 1901128 02 4
13. RSSB pages on Human Factors: http://www.rssb.co.uk/EXPERTISE/HF/Pages/default.aspx

19/12/2013


