

# MANAGING THE SAFETY PERFORMANCE OF RAIL SYSTEM STAKEHOLDERS

**Stephen QUÉVA**

**Head of Safety Monitoring Unit**

**Etablissement Public de Sécurité Ferroviaire - French National Safety Authority**



## SUMMARY

To ensure that it carried out its monitoring responsibilities as effectively as possible it appeared to EPSF, as the French National Safety Authority, that it was necessary to implement a system enabling it to make best use of all the data it collected across its various activities so as to assess the maturity level of each stakeholder's SMS. The application of this evaluation system for all types of rail activity (e.g. freight traffic, passenger traffic) was launched by the EPSF in 2014.

This has now resulted in an evaluation system that, for each stakeholder, records the maturity level of their SMS in the form of a performance assessment and, for each type of activity, a performance matrix. The strength of this system lies in its ability to combine and make use of a large number of different kinds of data. Over the five-year validity period for a licence, use is made of data arising from the hearings for licence applications, the results of audits and inspections, as well as analyses of safety events brought to the attention of the EPSF.

The purpose of this article is to explain the "assessment and performance matrix" system by describing the input data and specifying the situations in which it can be applied in practice by EPSF.

## INTRODUCTION

The adoption of various railway packages since 2001 relating to the safety and interoperability of the rail system throughout Europe has enabled the opening up of competition and the free movement of goods and people in the field of rail. European regulations require each Member State to set up a National Safety Authority (NSA). The French national railway safety authority (Établissement Public de Sécurité Ferroviaire (EPSF)) was created in France in 2006 as an organization bringing together the proficiency needed for rail safety, while being independent of the rail operators. EPSF is responsible for issuing licences to railway undertakings, infrastructure managers, training centres, testing centres and licensed qualified organizations. A part of its monitoring programme it is also responsible for auditing the effectiveness of the Safety Management Systems (SMS) implemented by each stakeholder, and to contribute to sharing best practice in the management of an SMS. As the SMSs have been in existence for only a few years, this is based solely on the unique experience of the incumbent operator.

This paper deals the presentation of a tool developed to manage the safety performance of rail system stakeholders.

## AIM AND OBJECTIVES

The aim of the tool presented in this paper is to assess the maturity level of the stakeholder.

To achieve this, several objectives have to be taken into account:

- Which aspects of the safety management system have to be assessed?

- Which data have to be collected and how?
- How do we present a synthesis of the assessment?

### **SMS (Safety Management System)**

The SMS structure used in this tool is inspired by the work of ERA (European Railway Agency) in its “SMS Wheel” [ERA, 2012]. The adaptation was made by EPSF using the application guide [EPSF, 2014] written for the use of stakeholder when they constructed their own SMS. The result of the adaptation is presented in the illustration below.

- Leadership
  - Organization
    - Policy, objectives
    - Policy dissemination / safety culture
    - Safety action plan
    - Organization, responsibility, job descriptions
- Continuous improvement
  - Risk management
    - risk management related to you own activity
    - risk arising from the activities of other parties
  - Activity supervision
    - Control and audit
    - Action plan and implementation
    - Organizational learning
- Implementation management
  - Information management
    - Safety information
    - Event related information
  - Competence management
    - Training, follow-up, skill level
    - Generic skill mistake
  - Documentation management
    - Compliance with legislation, rules and standards / safety annual report writing...
- Operational management
  - Contractor /supplier management
    - Contractor / supplier selection, contractual issues
    - Safety management related to the contract and contractor
  - Emergency management
    - Coordination and investigation

- Rolling stock management
  - Maintenance of freight wagons or other rolling stock
- infrastructure management
  - infrastructure maintenance
- traffic management
  - traffic control
  - dangerous goods transport

**Figure 1: SMS structure used in the assessment tool**

Figure 1 shows a configuration of 20 selected items based on four major processes: “Leadership”, “Continuous Improvement”, “Implementation” and “Operational processes”. Each item on this grid is used to assess the maturity level of the whole SMS. In terms of global analysis, each item is given the same weight. This SMS structure is used for the assessment of RU and IM maturity level but in case of different stakeholders like training centers, exam centers or Notified Bodies.

### **DATA ENTERED**

To arrive at the presentation of these documents, several types of data have to be collected. The following paragraph explains which data are concerned and how EPSF obtains them in the context of its NSA role and responsibilities.

#### **Descriptive data**

EPSF issues authorizations needed to perform railway activities in France. In 2014, for instance, EPSF delivered 5 new safety certificates, which increased the number of railway undertakings to 32, and renewed 22 authorizations in all types. In this process, EPSF collected data from stakeholders which were necessary for authorization. The data concerned type of traffic, launch date, location area, etc ...

#### **Supervision data**

EPSF carries out several types of supervision operations (systematical audit, conjectural audit, inspection and operational checking). In 2014, 211 supervision operations were carried out including 81 audits.

During these audits, SMS maturity was assessed depending of the scope of the supervision operation. Each time, a deviance between the observed organization and the SMS was seen, it could be viewed as a failure of the SMS maturity.

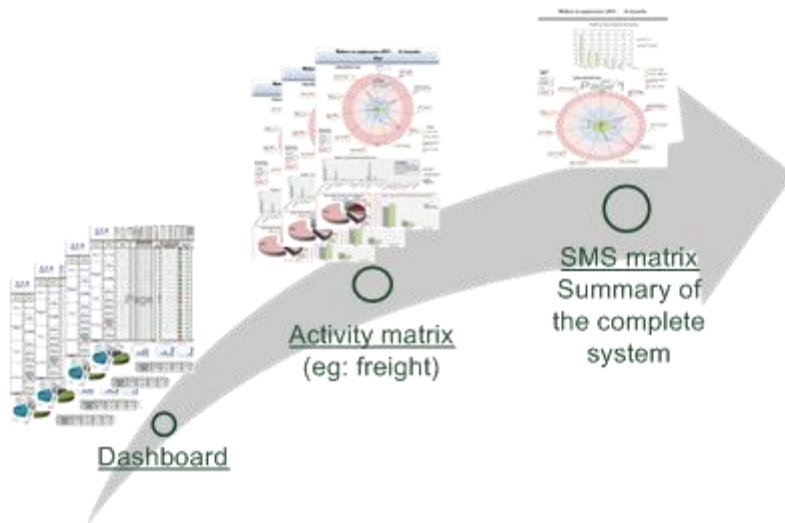
#### **Accidentology data**

EPSF follows up incidents and accidents related to safety by collecting them into a database which was created in 2006. In 2014, 7 000 events were collected with more than 2 000 directly related to safety. In addition to statistical consideration, information from incidents/accidents is used to contribute to all missions of EPSF, such as the issue of authorization or supervision activities.

By analyzing event reports, SMS item can be found as factors which contributed to the occurrence of the event. As deviance seen in audit, SMS item implied in a root cause of an safety related event could be viewed as a failure of the SMS maturity.

### **STRUCTURE OF THE TOOL**

The tool is composed of three types of document explained in the paragraph below. As illustrated in figure 2, all documents are linked. The first set of documents called dashboards are used to generate the second set of documents by combining stakeholder per type (RU, freight, passenger transport ...). The final SMS matrix is a single document summarizing the assessment of the complete system.



**Figure 2: Structure of the assessment tool**

**Dashboard per stakeholder**

Each dashboard is structured into three parts described below.

Part 1 is essentially an identity card of the stakeholder, presenting and classifying its activity. (See figure below) Note the data such as the name of the stakeholder, its type of authorization, its kind of activity (freight/passenger), or its activity area (whole railway network/local area). In parallel, data about traffic, number of events in the EPSF database, and audits made by EPSF are presented with a history of five years.

LOGO	<b>nom</b>	[entreprise]		<b>année</b>	milliers km/train	Evntmts	événmts/millier km/train	Nb de dossier	Nb audit	start non sold
	<b>type d'autorisation</b>	Certificat de sécurité		2010	0,0001	0	0,0	0	0	0
	<b>date de délivrance</b>	xx/xx/xxxx		2011	0,0001	0	0,0	0	0	0
	<b>lancement commercial</b>	xx/xx/xxxx		2012	0,0001	0	0,0	0	0	0
	<b>activité</b>	Fret		2013	0,0001	0	0,0	0	0	0
	<b>zone d'action</b>	[Zone d'action]		2014	0,0001	0	0,0	0	0	0

**Figure 3: Identity card of the stakeholder**

Part 2 is about the presentation of historical data from supervision and accidentology. This part is a detailed assessment of each SMS item for the past five years (corresponding to the period of validity of a safety certificate or safety agreement) with regards to supervision and accidentology data.

The figure 6 below shows an example of this part with on left several items of SMS,

In this document, several icons are used:

- green/red light to indicate which SMS items was viewed during supervision operations from five years;
- trend arrow relating to events. It indicate if the considered SMS item was implied in a root cause of a safety related event;
- green/yellow/red light to put together supervision and accidentology data. The result is an assessment of the considered item during the last five years.

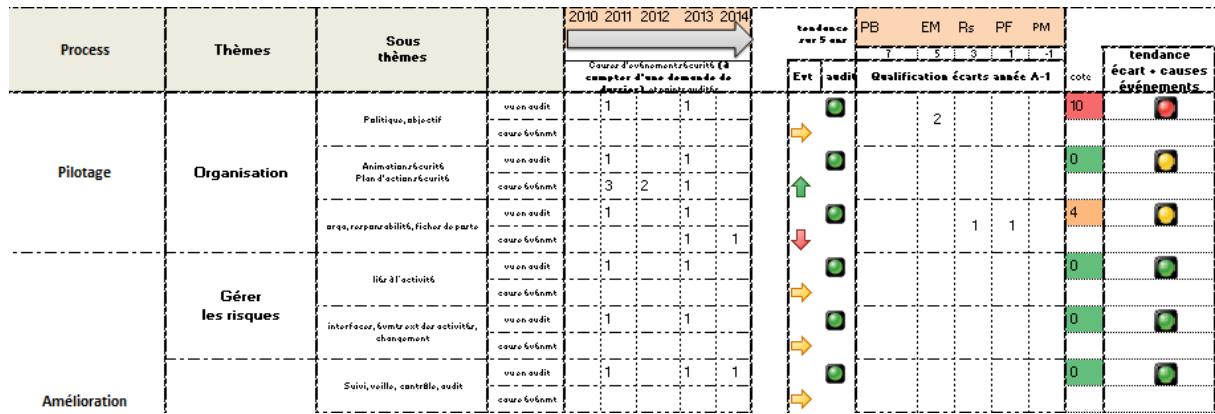


Figure 6: Dashboard of accidentology and supervision data per SMS item

Part 3 is a summary of the assessment. In this part, a pie chart presents the global assessment as a composition of the evaluation of each item. A three column chart represents the evolution of traffic, accidentology and supervision data. Finally, an evaluation graduation is used to put the assessment of this stakeholder in the context of the average evaluation of similar (in terms of activity) stakeholders.

The results of assessments in each area of a stakeholder's SMS are shown using a rating scale based on the following levels: satisfactory, acceptable, needs improvement, unsatisfactory.

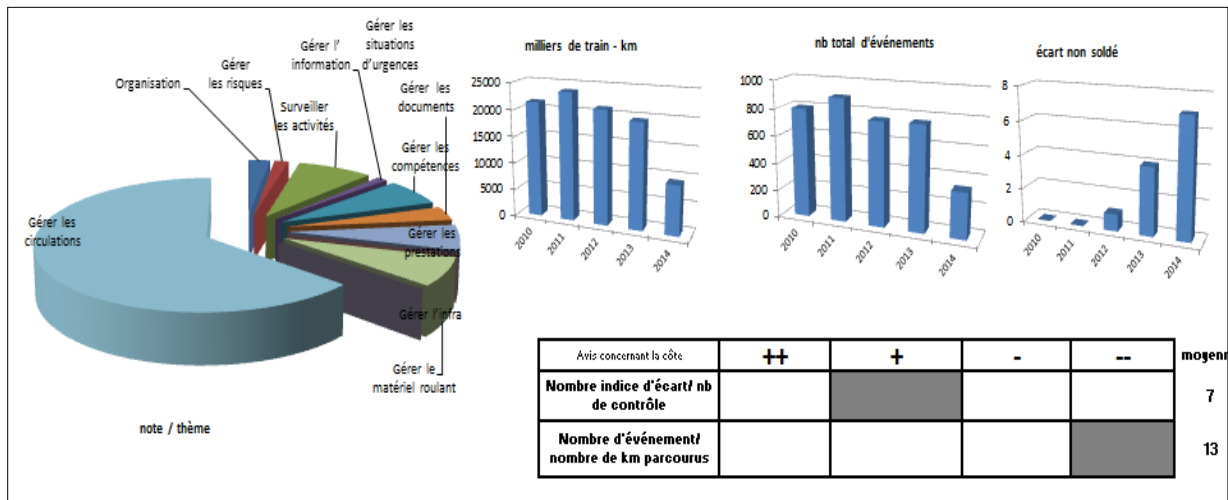


Figure 7: Summary of the stakeholder's dashboard

**Summary per type of stakeholder**

The purpose of this document is to put together data from the same type of stakeholder. As explained in the identity card part of each dashboard, data from this part can be used to create more families than simply considering their type of authorization. Consequently, two main types of category exist. The first is based, as explained above, on type of authorization (safety certificate, safety agreement ...). The second concerns the type of transport (passenger/ freight), the location area, the type of infrastructure manager (high speed line, local desert or mix).

Figure 8 shows a circular area chart used to present the assessment of a type of stakeholder.

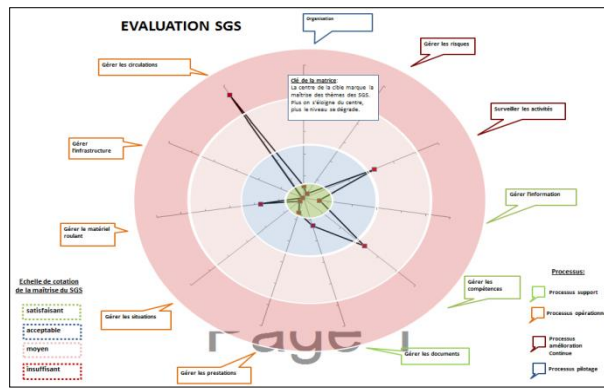


Figure 8: Example of summary assessment

In addition to this chart, another chart can be added to respond to conjectural need depending on the type of stakeholder. For instance, the level of dangerous goods incidence for freight transport company.

**Final summary**

The final assembly of all dashboards is done to assess the whole railway system including all stakeholders.

A two column charts presents two indicators chosen to compare the different kind of authorization in terms of supervision results (number of differences/number of audits) and accidentology data (number of safety related events)

On the lower part of the summary is a circular area chart that includes all the topics of the SMS structure. The aim of this chart is to present the assessment of a topic as point on a the rating scale used on dashboard (based on levels: satisfactory, acceptable, needs improvement, unsatisfactory). The more close to the center the better the assessment is.

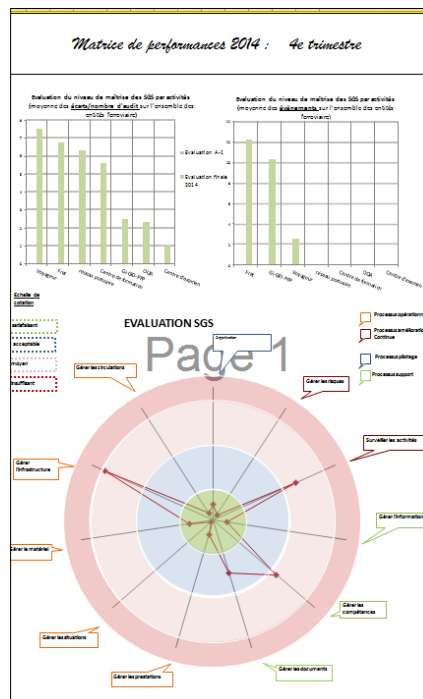


Figure 9: SMS matrix

## USE OF THE TOOL

The purpose of this tool is to assist decision-making at the hearings for applications for licence renewals, and during the preparation of monitoring plans.

It also helps in drawing up annual safety reports. The intention is that this system will be passed on to each railway undertaking and each infrastructure manager in order to share with them the assessment of their performance. For EPSF, it is a tool for exchanging information with all stakeholders.

This tool can be also used by EPSF when stakeholders submit their action plans addressed at resolving any possible weaknesses that may have been brought to light.

## STRENGTHS AND WEAKNESSES

Strengths:

- brings together different types of data
- concerns all authorized stakeholders

Weaknesses:

- not all stakeholders have accidentology data

As a result, several evolution axes can be considered. The first concerns data availability. Currently, accidentology data from training centres or notified bodies are not available but a more profound analysis of report accident would make this possible.

Quality of currently available data can also be improved. This axis concerns the control of the correct use of SMS structure during supervision operations and incident analysis. In practice, it can be resolved with the use of a check-list and guidelines to assist in the submission of data.

At the moment, the tool is based on an Excel file which implies lots of manual input. Software developed with exchange gateways between existing IT tools may introduce more automatic input and updating of data. Moreover it would allow more reporting about the tool quality and thus improve efficiency in the assessment of the maturity level of the stakeholder.

## CONCLUSION

This paper shows the assessment tool of the maturity level of the stakeholder in operation since the end of 2014. Its main advantage is to synthesize objectives up to date accidentology and supervision data. The next step is to improve the tool according to several identified axes.

## REFERENCES

[EPSF, 2014] EPSF, 2014, guide EPSF, *Guide d'élaboration et de mise en œuvre d'un système de gestion de la sécurité*.

[ERA, 2012] European Railway Agency, Safety Management Systems (SMS) website, <http://www.era.europa.eu/tools/sms/Pages/SMS.aspx>