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Rail *Safety*

Oversight and Expertise



Railway Safety Management Systems *Guide*

TC- 1004043



Canada

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A Guide for Developing, Implementing and Enhancing Railway Safety Management Systems

Updated 2010



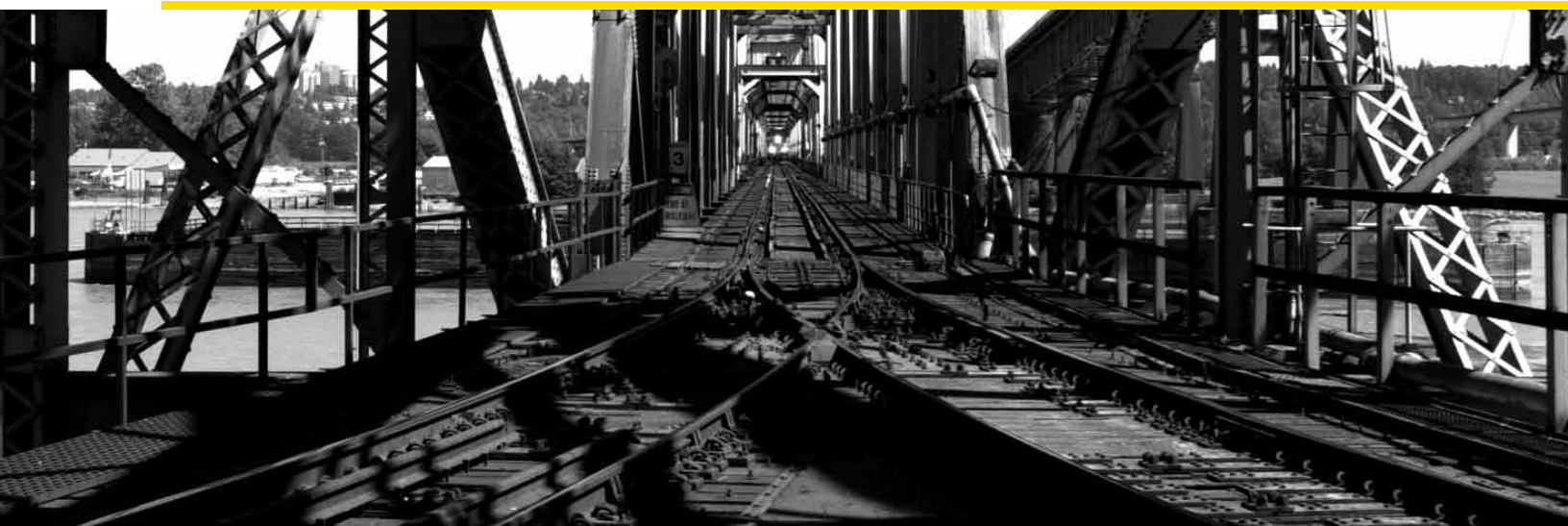


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Introduction

This updated guide is intended to assist railway companies in developing, implementing and enhancing safety management systems (SMS) to meet the requirements of Transport Canada's *Railway Safety Management System Regulations*, pursuant to section 37 and subsection 47.1(1) of the *Railway Safety Act*. Together with its two annexes, it provides **practical advice and suggestions**, as well as specific **examples** of SMS methods and approaches that have been adopted by various Canadian railway companies.

The guide has been updated through the collaborative efforts of Transport Canada, the rail industry and railway unions, under the auspices of the Safety Management Systems Working Group. The SMS Working Group was formed in 2008 to respond to three specific SMS recommendations of the 2007 *Railway Safety Act* review: that the railway companies and Transport Canada focus their efforts to improve the implementation of SMS; that Transport Canada and industry work together to develop tools to assist railway companies in improving their safety management systems; and that Transport Canada and the industry take specific measures to attain an effective safety culture.

The Working Group included representatives of Transport Canada, railway companies, railway unions, provinces and the Railway Association of Canada. Co-chaired by Transport Canada and industry, the group held six meetings between September 2008 and September 2009. It focused on updating and improving existing SMS guidance material, adopting a common definition of safety culture and developing specific tools, including an inventory of best practices, to assist railway companies in improving their SMS.

Following a general overview of SMS, this updated and **colour-coded** guide discusses the 12 components of safety management systems that are required by section 2 of the *Railway SMS Regulations*, and demonstrates how these components are integrated in the SMS process. It goes on to discuss the other requirements of the regulations. Finally, the guide defines the key concept of safety culture, and describes how a strong safety culture can be achieved by building on the information contained in the previous chapters.

Two annexes, containing specific **examples** of SMS methods and approaches used in industry, accompany this guide. *Annex 1 - Best Practices* provides examples of best practices that demonstrate how each required component of an SMS could be implemented. *Annex 2 - Best Practices for Small Railways* provides tools for smaller railway companies, and should be read in conjunction with *Annex 1*.



Overview

2.1 What is a Safety Management System?

A safety management system (SMS) is a systematic, explicit and comprehensive process for managing safety risks, much like an International Organization for Standardization (ISO) approach to safety. As with all management systems, an SMS provides a directed and focused approach to safety with a clear process for setting goals, planning, and measuring performance. Woven into the fabric of an organization, an SMS becomes part of the culture – the way people at all levels do their jobs.

A safety management system is much like an ISO approach to safety

The organizational structures and activities that make up an efficient safety management system are found throughout an organization. Every employee contributes to the safety culture of the organization, and an effective SMS includes both management and employee participation. The SMS philosophy requires that responsibility and accountability for safety be retained within the management structure of the organization. Senior management should always be ultimately responsible for safety, as they are for other aspects of the enterprise. The SMS approach ensures that authority and accountability always co-exist.

In larger organizations, safety management activity will be more visible in some departments than in others, but the system must be integrated into “the way things are done” throughout the establishment. This will be achieved by the implementation and continuing support of a coherent safety policy that leads to well-designed procedures.

The “four Ps” of management represent the foundation of a good and rigorous safety management system:

Philosophy – Safety management starts with management philosophy:

- recognizing that there will always be threats to safety;
- setting the organization’s standards; and
- confirming that safety is everyone’s responsibility.

Policy – Specifying how safety will be achieved:

- clear statements of responsibility, authority, and accountability;
- development of organizational processes and structures to incorporate safety goals into every aspect of the operation; and
- development of the skills and knowledge necessary to do the job.

Procedures – What management wants people to do to execute the policy:

- clear direction to all staff;
- means for planning, organizing, and controlling; and
- means for monitoring and assessing safety status and processes.

Practices – What really happens on the job:

- following well-designed, effective procedures;
- avoiding the shortcuts that can detract from safety; and
- taking appropriate action when a safety concern is identified.

2.2 The Essence of Safety Management Systems

... there will always
be hazards and risks...

Safety management systems are based on the premise that because there will always be hazards and risks in your business, proactive management is needed to identify and address these safety concerns before they lead to mishaps. Any system used to manage safety should clearly answer these five questions:

1. *What is your business?* What are the processes that govern your business and that make it a safe one?
2. *What could go wrong?* What are the safety issues or concerns, the hazards, and the incidents or accidents that happened or could happen?
3. *How bad is it?* What are the causes, the sources, the probabilities and the severities of those negative events?
4. *What can be done about it?* What corrective actions, controls or mitigation measures can be developed and implemented?
5. *How effective are corrective actions?* Has the situation been resolved?

2.3 Legislative/Regulatory Requirements for Railway Safety Management Systems

The *Railway Safety Management System Regulations* (Appendix A) came into effect in 2001, and are directly linked to the requirements of section 37 and subsection 47.1(1) of the *Railway Safety Act* concerning the maintenance and production of safety records and the making of regulations.

The *Railway Safety Act* defines a safety management system as:

“a formal framework for integrating safety into day-to-day railway operations and includes safety goals and performance targets, risk assessments, responsibilities and authorities, rules and procedures, and monitoring and evaluation processes.”

The goals of the *Railway SMS Regulations* are to ensure that safety is given management time and corporate resources and that safety performance measurement and monitoring are given the same priority as corporate financial and production goals.

The regulations do not replace, suppress or precede any existing rules, regulations or standards. Rather, the requirement for a systemic approach to managing safety is integral to the current framework. These regulations constitute the “how to” for railway companies to demonstrate – in a concrete and visible manner – their commitment to the four objectives of the *Railway Safety Act*:

- a. promote and provide for the safety of the public and personnel, and the protection of property and the environment, in the operation of railways;
- b. encourage the collaboration and participation of interested parties in improving railway safety;
- c. recognize the responsibility of railway companies in ensuring the safety of their operations; and
- d. facilitate a modern, flexible and efficient regulatory scheme that will ensure the continuing enhancement of railway safety.

The regulations do not replace, suppress or precede any existing rules, regulations or standards.

Compliance with the *Railway SMS Regulations* is assessed through Transport Canada’s compliance monitoring program, which is designed to verify that:

- a railway’s safety management system is in compliance with the minimum regulatory requirements;
- the railway is operating in accordance with the commitments, processes and procedures outlined in its safety management system; and
- the safety management system is effective in improving safety.

An effective SMS includes both management and employee participation. As a result, it is highly desirable to involve employees and their representatives in developing the SMS; in ongoing risk management, audit, and evaluation; and in developing corrective action plans. Existing health and safety committees, established for the purposes of the *Canada Labour Code* (Part II), can provide a forum for employee involvement, if these committees are not diverted from their intended purpose. Alternatively, customized consultation processes can be developed.

The *Railway Safety Act* pertains “not only to the safety of persons and property transported by railways but also to the safety of other persons and other property.”¹ While this mandate is relatively broad, the scope of safety management systems is even broader. A comprehensive SMS would normally include items in addition to those under the jurisdiction of the *Railway Safety Act* (e.g., programs to meet the requirements of environmental protection legislation, compliance with the *Transportation of Dangerous Goods Act* and regulations, and occupational safety and health programs under the *Canada Labour Code* (Part II)).

Including programs to meet the requirements of other legislation in a safety management system helps railway companies to avoid duplication, meet their regulatory obligations and improve safety. This does not mean, however, that the jurisdiction of the *Railway Safety Act* extends into areas covered by other legislation, or that compliance with the *Railway Safety Management System Regulations* in any way lessens a railway company’s obligation to comply with other legislation.

2.4 Myths about Railway Safety Management Systems

SMS does not mean:

- ***De-regulation***
The *Railway SMS Regulations* do not eliminate existing regulatory requirements. Rather, the regulations act as an umbrella requirement, enabling railways to better meet the existing requirements of the rules, regulations and standards.
- ***Self-regulation***
The *Railway SMS Regulations* came into effect under the *Railway Safety Act*. As such, Transport Canada has the mandate to monitor compliance with the regulations as it does with any other legislated requirement. While the regulations put the onus on the railway companies to proactively demonstrate their management of safety, it is Transport Canada that oversees compliance with the regulations.
- ***Eliminating inspections***
Inspections are an important component of Transport Canada’s regulatory oversight regime, and they continue to be used in the regulatory oversight of the *Railway SMS Regulations* as part of the assessment of a company’s SMS, or as a separate oversight activity.
- ***Eliminating corrective action***
Companies are required to comply with the *Railway SMS Regulations* as with all regulatory obligations under the *Railway Safety Act*. This includes the requirement for railways to take corrective actions for any safety concerns and incidents of non-compliance identified by the regulator.

¹ *Railway Safety Act*, section 4(4).





Railway Safety Management System Components

3.1 Regulatory Requirements

The 12 components required for an SMS are found in section 2 of the *Railway Safety Management System Regulations* (see Appendix A). Part 1 of this chapter defines the requirements and expectations for each component. The introductory boxes for each component contain the official text of the requirements from the regulations. This is followed by a detailed description of the requirements and how to meet them.

Examples of methods and approaches adopted by various railway companies to meet these regulatory requirements, as well as excerpts from relevant standards and guidelines, are included in the companion annexes to this guide, *Annex 1 - Best Practices*, and *Annex 2 - Best Practices for Small Railways*. **The 12 components have been colour-coded in all three documents for ease of reference.**

The 12 required components are:

- a. Safety Policy, Annual Safety Targets and Associated Safety Initiatives
- b. Safety Authorities, Responsibilities and Accountabilities
- c. Employee and Representative Involvement
- d. Compliance with Applicable Regulations, Rules, Standards and Orders
- e. Risk Management Process
- f. Risk Control Strategies
- g. Accident and Incident Reporting, Investigation, Analysis and Corrective Action
- h. Skills, Training and Supervision
- i. Safety Performance Data Collection and Analysis
- j. Safety Audit and Evaluation
- k. Corrective Action, Approval and Monitoring
- l. Documentation



Safety Policy, Annual Safety Targets and Associated Safety Initiatives

2. A railway company shall implement and maintain a safety management system that includes:

(a) the railway company safety policy and annual safety performance targets and the associated safety initiatives to achieve the targets, approved by a senior company officer and communicated to employees;

A company's safety policy should:

- demonstrate senior management's commitment to safety;
- set the organization's safety philosophy and guide the establishment of goals and objectives, policies, procedures, and programs;
- be communicated to all employees and to other stakeholders (e.g., customers, the public); and
- be periodically reviewed and revised.

Experience has shown that there is a strong correlation between companies with low accident rates and companies whose senior management is seen to be concerned with safety and communicates this concern to employees. To maximize this effect, the safety policy should be approved at the highest possible level within the company.

In addition to a safety policy, the regulations require railways to establish annual safety performance targets and identify initiatives that will be undertaken to achieve those targets. While the ultimate goal is to eliminate accidents, it is useful to have intermediate targets – set annually – against which continual progress toward the ultimate goal can be measured. Annual targets should be associated with planned safety initiatives designed to ensure that the company can meet its safety performance targets.

Annual safety performance targets should:

- be measurable, meaningful and realistically achievable;
- promote continual safety improvement;
- be tailored to the needs of the organization; and
- be set at each relevant level in the organization.

The target-setting process should:

- be linked to the railway's risk management process;
- identify the safety initiatives to be undertaken to achieve the targets, the associated time frames and the data that will be collected to measure progress;
- include a plan for an annual evaluation of performance relative to the targets; and
- provide for annual review and revision or reconfirmation of safety performance targets.

The safety policy and annual safety performance targets should be communicated to all employees. In some circumstances, it may also be desirable to communicate the safety policy to other stakeholders, such as customers, communities through which the railway operates, and the general public.



Safety Authorities, Responsibilities and Accountabilities

-
2. A railway company shall implement and maintain a safety management system that includes:
- (b) clear authorities, responsibilities and accountabilities for safety at all levels in the railway company;**
-

The safety management system should include the following:

- identification of a senior company officer with overall responsibility for maintaining and implementing the safety management system;
- identification of responsibility for annual safety initiatives and for various components of the safety management system;
- safety roles, responsibilities, authorities and relationships of all organizational units and all classes of employees who manage, perform or verify work affecting railway safety;
- safety roles and responsibilities of customers, contractors and other parties whose activities may affect railway safety;
- methods of communicating roles and responsibilities;
- procedures for ensuring accountability for these responsibilities of all who are involved at each level of a company in the application of SMS; and
- identification of the resources dedicated to ensuring that the responsibilities can be carried out (including people, skills, technology and funding).

Typically, clear authorities, responsibilities and accountabilities for safety can be demonstrated through:

- an organization chart that shows both the chain of safety responsibilities and the linkages to ensure that responsibilities are understood and don't "fall through the cracks;"
- job descriptions that include safety responsibilities and authorities;
- performance evaluation systems that include safety criteria; and
- reward and recognition programs that reinforce safe behaviours and working practices, as well as the achievement of safety objectives.

Some companies appoint a single, identifiable individual at the executive level within the organization as the "Accountable Executive" to assume full responsibility for the implementation of SMS and ongoing compliance with safety requirements.

The Accountable Executive is responsible for establishing and maintaining the overall corporate culture, which by definition starts at the top.

With the introduction of an Accountable Executive, existing key personnel would retain their current responsibilities and reporting relationships. The Accountable Executive would be notified of any systemic safety-related problems or trends and the actions necessary to correct or mitigate them. This includes, where applicable, the requirement for additional financial or other resources.



Employee and Representative Involvement

-
2. A railway company shall implement and maintain a safety management system that includes:
- (c) a system for involving employees and their representatives in the development and implementation of the railway company's safety management system;**
-

Experience has shown that a railway company will be markedly more successful in developing a safety culture if employees and their representatives, where applicable, are involved in the development and implementation of the safety management system.

Employee and representative participation in drafting the company safety policy is highly recommended. A collaborative approach helps ensure that significant employee concerns are addressed in the policy and provides an additional vehicle for communicating the railway's commitment to safety to employees. Existing health and safety committees could assist in this process provided that they are not diverted from their intended purpose under the *Canada Labour Code* (Part II). Alternatively, a customized consultation process could be developed.

Often, companies will develop global targets and then have policy committees review and comment on the targets and associated safety initiatives. Consulting with employees and their representatives and linking the target-setting process with the railway's risk management process will help ensure that the most significant outstanding safety issues and concerns are addressed. Health and safety committees may be the most convenient forum for this process, although their purview would have to be expanded to include crossing and trespassing issues, as well as the other operational safety concerns that form part of a complete safety management system.

Employees and their representatives can make important contributions to each step of the risk management process (as required by component 2e).

The risk management process will include mechanisms for employees to identify safety issues and concerns on a routine and ongoing basis. These mechanisms need a high level of visibility and participation to ensure that all risks are captured. Experienced and knowledgeable employees are a good source of expert judgment for evaluating the probability and severity of safety issues and concerns where quantitative, historical data are not available.

Finally, employees and their representatives shall be involved in the development of risk control strategies for risk assessments in which they are involved and where employee safety is impacted. As a best practice, management in consultation with the Policy Committee should develop the process to involve employees in the risk assessment process.

The following principles should apply to selecting participants for risk assessments:

It is recommended that issues and/or concerns with the process that cannot be agreed upon at a local level should be addressed through a jointly agreed-upon escalation process.

Note that this cannot delay the risk assessment process.

Employees will be informed of actions that are being taken or that are planned to address the safety issues and concerns they have identified. Feedback is essential to ensure continued participation.





Compliance with Applicable Regulations,
Rules, Standards and Orders

2. A railway company shall implement and maintain a safety management system that includes:

(d) systems for identifying applicable

- (i) railway safety regulations, rules, standards, and orders, and the procedures for demonstrating compliance with them, and**
 - (ii) exemptions and the procedures for demonstrating compliance with the terms or conditions specified in the notice of exemption;**
-

The *Railway Safety Management System Regulations* do not replace the current railway safety framework of rules, regulations and standards, and the existing railway safety requirements continue to apply in their current form. Safety management systems provide a framework for identifying legal obligations, monitoring changes to them, and demonstrating and evaluating compliance.

The safety management system should include:

- procedures to ensure that the organization is aware of its legal obligations with respect to rail safety and to monitor changes;
- procedures for ensuring compliance with these requirements; and
- procedures for evaluating compliance with regulatory requirements, reporting the results of such evaluations and making recommendations.

In addition to the legal obligations contained in rules, regulations, standards and orders, other standards that the railway company has developed or has voluntarily adopted, such as those issued by the Railway Association of Canada (RAC), American Association of Railroads (AAR) or the American Railway Engineering and Maintenance of Way Association (AREMA), should be documented.

A list of currently applicable rail safety legislation, regulations, rules and standards, as well as any exemptions that have been obtained by the company or orders that apply to its operations, provides a starting point for meeting this requirement. Appendix C contains a sample list of rail safety regulations, rules and general orders.

Information on new and amended regulations, rules and standards is available from the following sources:

- Transport Canada (www.tc.gc.ca)
- The Railway Association of Canada (www.railcan.ca)
- Human Resources and Skills Development Canada (www.hrsdc.gc.ca)
- Justice Canada (www.canada.justice.gc.ca)
- Government of Canada (www.gc.ca)



Risk Management Process

2. A railway company shall implement and maintain a safety management system that includes:

(e) a process for

- (i) identifying safety issues and concerns, including those associated with human factors, third parties and significant changes to railway operations, and**
 - (ii) evaluating and classifying risks by means of a risk assessment.**
-

Risk management does not mean taking risks, but rather identifying risks and working to mitigate or eliminate them. The safety management system should include a formal risk management process that includes the following steps:

Step 1 – Identification of Safety Issues and Concerns

- Highly visible and participatory mechanisms for employees and/or their representatives to identify safety issues and concerns on a routine, ongoing basis.
- Input from incident/accident investigations and safety data collection and analysis.
- Analytical methods, such as failure mode and effect analysis, hazard and operability studies, and fault-tree analysis and event-tree analysis for new equipment, systems, practices and procedures where experience and a safety history are not available.
- Special consideration of safety issues and concerns related to human factors, third-party interfaces and the introduction of significant changes to operations.
- Feedback from safety management system processes, such as incident and accident investigation, decreasing safety trends from safety data collection and analysis, proficiency testing, and internal audits.
- Safety monitoring technology, such as hot box detectors, wheel impact detectors, high water detectors and on-train monitoring systems.
- Input from the public (1-800 numbers), customers (complaint monitoring) and regulatory agencies (findings of non-compliance or unsafe situations).

Railways are expected to do a thorough analysis of both new operations and significant changes to existing operations (see Figure 3.1). In the case of new equipment, systems, operations, practices and procedures where experience and a safety history are not available, formal analytical techniques should be applied. These techniques are more demanding in terms of data, time, effort and expertise; however, this extra effort is justified for new equipment, systems, operations, practices and procedures and should be considered a normal part of the process of implementing change.

Examples of significant changes requiring a risk assessment process include:

- railway company mergers,
- major organizational transitions,
- the introduction of new technology (e.g., Light Emitting Diodes), and
- major operational changes (e.g., new commuter lines, speed changes).

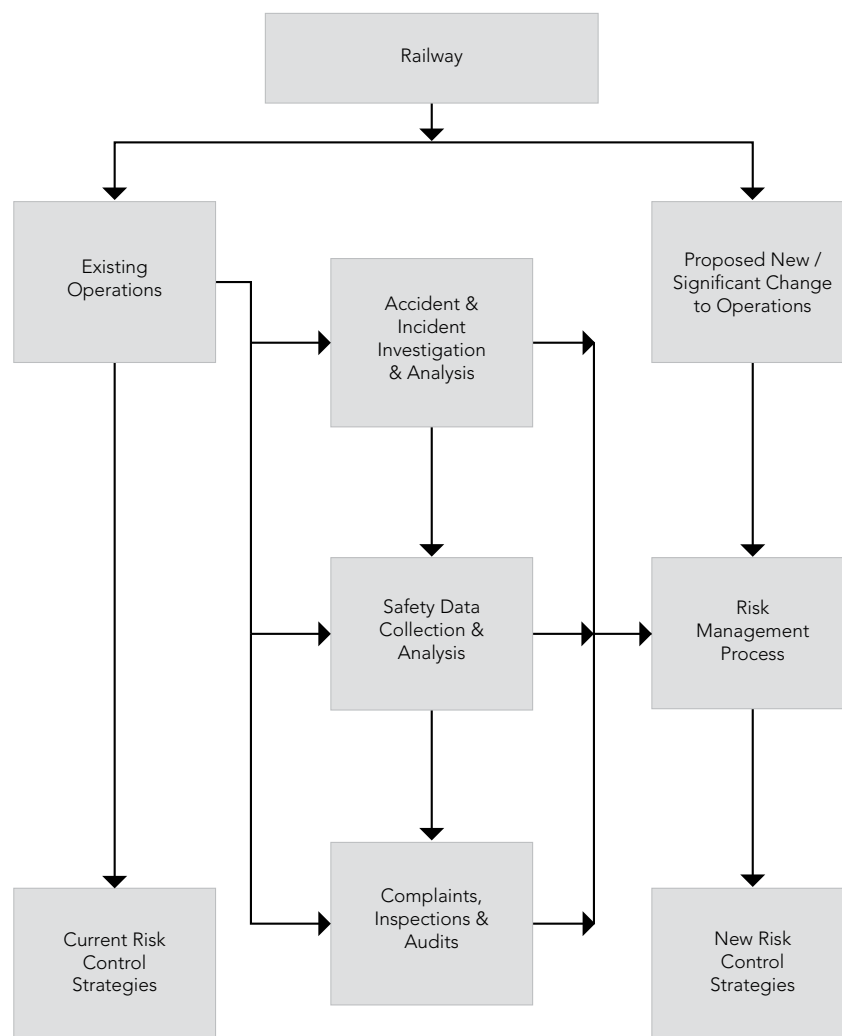
A complete analysis of existing operations is not required provided that current risk mitigation strategies are documented (see component 2f). Input from accident and incident investigation, safety performance data collection and analysis, and complaints, inspections and audits should be used to identify areas of existing operations that require a thorough analysis.

Risk assessments will be triggered by the following:

- accident and incident investigation and analysis;
- safety data and analysis;
- complaints, inspections, and audits; and
- proposed new and/or significant changes to operations.

In addition to the above, it is understood that risk assessments are also performed during job briefings, when the work environment/conditions change and tasks are initiated or changed.

Figure 3.1
Application of Risk Management to Existing
and New / Significantly Changed Operations



Step 2 – Risk Estimation

- Assessment of the probability and severity of the safety issue/concern, either qualitatively or quantitatively.

Quantitative estimates of the probability and severity of the safety issue/concern can sometimes be developed from safety performance data, illness and injury records, etc. Probability estimates based on historical data assume that future conditions will mirror those of the past. Where no relevant historical data are available, other methods such as fault-tree or event-tree analysis may be used to generate estimates.

Severity is normally measured in terms of the number of deaths or injuries, the value of property damage, or the cleanup costs and environmental impact, either as an average based on the experience of the company or industry over a certain time period, or as a range. Other types of losses associated with accidents and incidents that are less easily measurable, such as damage to the company's reputation and degradation of the quality and timeliness of service to customers, should also be evaluated in assessing the severity of risks. Where quantitative probability and severity estimates cannot be derived due to a lack of relevant data, qualitative estimates based on expert judgment may be substituted.

Step 3 – Risk Evaluation

- Evaluate and determine whether the associated risk is tolerable, tolerable with mitigation or unacceptable, using a predetermined company risk classification methodology.

Risk evaluation is the process of assessing the significance of risks and determining which risks are tolerable, tolerable with mitigation or unacceptable. These decisions should be made using a predetermined risk classification methodology/tool, such as the risk resolution matrix from the *Manual for the Development of System Safety Program Plans for Commuter Railroads*, by the American Public Transit Association.

Risk resolution matrices may have varying numbers of probability and severity categories (rows and columns). The number of categories and the category definitions should be established based on company size and experience. Category definitions used by one Canadian railway are shown in *Annex 1* to this guide. Severity categories have a number of different dimensions and safety issues are assigned the severity category associated with the “highest” severity rating over all dimensions.

The safety management system should include:

- documentation of the risk analysis;
- procedures for updating the analysis
 - periodically,
 - after a major accident, and
 - when safety performance is not improving (as indicated by safety data analysis);
- periodic review of the analysis by senior management.



Risk Control Strategies

2. A railway company shall implement and maintain a safety management system that includes:
(f) risk control strategies;

Risk control strategies are required for risks that have been classified as unacceptable or tolerable with mitigation. In generic terms, these strategies can focus on:

- eliminating the situation, substance, condition or activity that generates the risk;
- reducing the probability of occurrence; or
- mitigating (reducing) the consequences.

A list of risks that are unacceptable or tolerable with mitigation can be found in *Annex 1* to this guide. This list is not exhaustive, but is intended to exemplify common risks and typical control strategies and to indicate the process each railway company should undertake.

For existing operations, many of the risks will have already been considered and risk control strategies will form part of the railway's current rules, standards, procedures and operating practices. In this case, the risk assessment process would document this link and then focus on the results of accident and incident investigations, safety data analysis, complaint follow-up, inspections, and audits to ensure that the risk is being mitigated to an acceptable level. This analysis should point railway companies to areas where they could undertake initiatives beyond their current practices in an effort to improve their overall safety performance.

For new operations, or for changes to technology, staffing levels, types of operation or other areas where a railway company lacks historical data and experience, a formal risk management process as described in component 2e should almost always be undertaken.

The safety management system should include procedures for the development of the required strategies, approval at an appropriate management level and effective implementation. Employees and their organizations should be involved in the development of risk control strategies, particularly for risks that they have identified, and they should be informed of the actions that are being taken or that are planned.



Accident and Incident Reporting,
Investigation, Analysis and
Corrective Action

-
2. A railway company shall implement and maintain a safety management system that includes:
- (g) systems for accident and incident reporting, investigation, analysis and corrective action;**
-

The safety management system should include:

- procedures for internal and external accident and incident notification and reporting, including third-party reporting;
- procedures, formats and approaches (e.g., site protocol) for investigations (e.g., environmental, employee injuries, transportation of dangerous goods);
- a formal link to the risk management process; and
- procedures for reporting and documenting findings, conclusions and recommendations, and for ensuring implementation of recommendations and corrective actions.

Appendix D provides a sample emergency/accident contact list, using telephone numbers for Transport Canada's Ontario region as an example. This could be used as the basis for developing similar lists for other locations.



Skills, Training and Supervision

2. A railway company shall implement and maintain a safety management system that includes:

(h) systems for ensuring that employees and any other persons to whom the railway company grants access to its property, have appropriate skills and training and adequate supervision to ensure that they comply with all safety requirements;

The safety management system should include:

- identification of required position qualifications;
- identification of required qualification and training of customers, contractors, other railways and other third parties whose activities may directly affect railway safety;
- periodic reviews of qualification requirements that take into account the results of proficiency testing, compliance evaluations, risk assessments, accident/incident investigations and safety data analysis;
- procedures for ensuring that employees have received the necessary training and certification and that qualifications are kept current;
- procedures for keeping records of training and certification requirements as well as the status of employees relative to these requirements;
- procedures for compliance and proficiency testing in all disciplines and for record keeping and follow-up corrective action such as additional training;
- procedures for communicating to employees any changes to safety policies, work procedures, practices, requirements, rules and standards;
- supervisor job descriptions that identify responsibilities, including coaching and direct field observation;
- systems for ensuring accountability for these responsibilities; and
- adequate resources for supervision.



Safety Performance Data Collection and Analysis

2. A railway company shall implement and maintain a safety management system that includes:

(i) Procedures for the collection and analysis of data for assessing the safety performance of the railway company;

The safety management system should include:

- identification of the safety data to be collected to assess performance with respect to the company's annual safety targets and to meet other analytical requirements;
- systems to collect data on accidents and safety-related incidents;
- procedures for periodic analysis of the data and feedback into the risk management process;
- analysis of safety data to assess safety performance relative to the organization's annual targets and to identify safety trends using appropriate statistical techniques; and
- periodic senior management review of safety data analysis.

Safety performance should be measured through a range of indicators designed to ensure accurate reporting. Safety performance indicators should be:

- simple and easily understood;
- clearly defined and consistently applied; and
- in the form of a rate, where possible, to facilitate year-to-year and place-to-place comparisons.

Data collection and analysis should include not only lagging indicators (e.g. accidents), but also leading indicators, such as:

- incidents;
- near-misses;
- rule violations;
- audit/inspection results;
- track inspection findings; and
- train inspection findings.

Safety performance data can be captured by automated techniques or through inspection activities and reporting systems. Modern technology, such as test cars, impact detectors and crossing systems, has greatly expanded the type and quantity of safety data that can be captured at a reasonable cost.



Safety Audit and Evaluation

2. A railway company shall implement and maintain a safety management system that includes:

- (j) **procedures for periodic internal safety audits, reviews by management, monitoring and evaluations of the safety management system;**
-

Safety audits and evaluations of the safety management system are important mechanisms for ensuring that all of the organizational elements, functions and procedures in the system are working well. Internal audits and evaluations are one of the key feedback loops for identifying required changes to the system.

The safety management system should include:

- periodic audits of the performance of the components of the organization's safety management system, including audit frequencies, methodologies, responsibilities and reporting processes;
- audits by suitably qualified personnel who are impartial and objective;
- use of recognized audit methodologies that include validation through interviews, random spot checks, etc.;
- audit reports that include recommendations for corrective action;
- reporting of audit results to senior management;
- retention of audit reports for review by Transport Canada;
- periodic evaluations of the safety management system to ensure the continued suitability, adequacy and effectiveness of the policy, annual safety targets, procedures and other components of the system, taking into account changing circumstances and the results of compliance evaluations, risk assessments, accident/incident investigations, safety performance analyses and audits;
- feedback gathered from employees and other relevant stakeholders; and
- consideration and approval of evaluation reports as well as the resulting recommendations by senior management.

When performing audits of the workplace, it is beneficial to involve the employees who work in those areas in the auditing process.

Audit and evaluation frequencies are expected to vary depending on the size and complexity of the railway, the risks involved, and the railway's safety performance history. One major Canadian railway audits every component annually and conducts ongoing safety assessment activities through health and safety committees.

Larger railway companies will likely have the staff and expertise necessary to establish auditing processes and teams, although they may choose to hire external resources to obtain specific skills or assistance. Smaller companies that may not have the resources to conduct an audit program internally may be able to obtain assistance from a variety of sources, including railways with which they interchange, consultants and professional auditors.



Corrective Action, Approval and Monitoring

2. A railway company shall implement and maintain a safety management system that includes:

(k) systems for monitoring management-approved corrective actions resulting from the systems and processes required under paragraphs (d) to (j);

The keys to the effectiveness of a safety management system are the feedback loops that ensure that corrective action is taken. The need for corrective action may be identified through the following:

- evaluation of compliance to regulations, rules and standards (component 2d);
- the risk management process (component 2e), particularly step 1 – identification of safety issues and concerns;
- risk control strategies (component 2f);
- accident and incident investigation (component 2g);
- reviews of skills and training requirements and the results of supervision and proficiency testing (component 2h);
- safety performance data analysis (component 2i); and
- safety audits and evaluations of the safety management system (component 2j).

The safety management system should include:

- procedures for developing corrective action plans that focus on ensuring that the problem, incident or accident does not recur;
- procedures for obtaining the appropriate management approvals of recommended corrective actions; and
- procedures for formal monitoring of the implementation of and compliance with the corrective actions approved by management.



Documentation

-
2. *A railway company shall implement and maintain a safety management system that includes:*
- (l) consolidated documentation describing the systems for each component of the safety management system.**
-

The safety management system should be documented and the applicable sections readily available to those with defined responsibilities in the system. Procedures for updating and distributing the documentation should be specified. The documentation should show how each of the requirements is being met, including references to process and procedure documents, standards, guidelines, manuals, job descriptions, organization charts, etc., the current edition number or date, and the locations where these documents can be found. For a large company, the safety management system documentation may be a summary document that describes how the company is meeting its obligations in each area, while referencing other documents that describe the specific process and procedures that form the system.

System documentation can be stored electronically provided that it is accessible to the regulator for audit purposes.

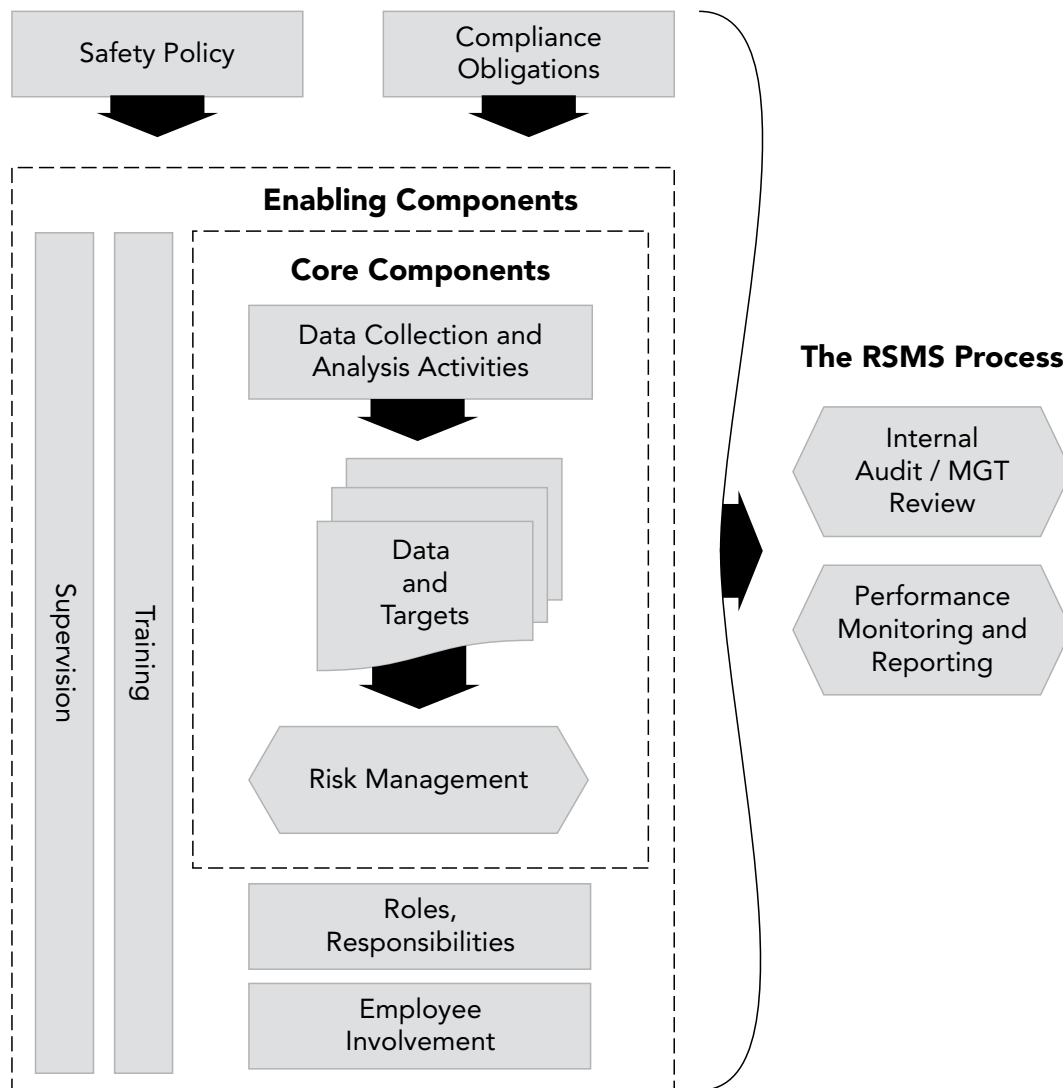
Generally, SMS documentation should have a meaningful business purpose. It is not the intent of the regulator to force companies to produce documentation simply for the sake of meeting SMS regulations.

3.2 The Safety Management System Process

Part 1 of this chapter discussed the regulatory requirements for each of the 12 components of section 2 of the *Railway SMS Regulations*. The diagrams in Part 2 illustrate these components and break them down to show how they are linked and integrated, through successive layers of defences, barriers and safeguards, in the process that drives a safety management system. Risk management is the central goal of this process.

Figure 3.2 shows the relationships between the **core**, **enabling**, **safety policy and compliance**, and **evaluation** components of a safety management system.

Figure 3.2:
Safety Management System Components



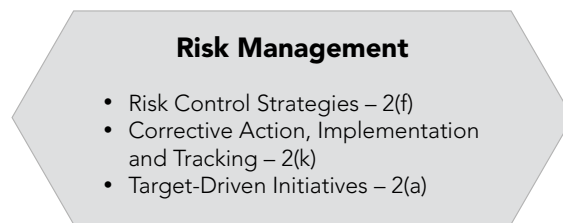
3.2.1 Core Components

As shown in Figure 3.2, there are three core components of the SMS process: risk management; data and targets; and data collection, analysis and reporting.

a. Risk Management

At the heart of the safety management system are risk management actions to prevent, control or mitigate losses.

Section 2 of the *Railway SMS Regulations* requires **Risk Control Strategies** (2f) resulting from risk assessments to be in place; **Corrective Action** (2k) to be implemented and tracked in response to deficiencies (identified internally through supervision, inspections, etc.); and **Target-Driven Initiatives** (2a) to focus risk prevention activities. Each of these components is designed to directly tackle the loss issue.



b. Data and Targets

Risk management actions are driven by certain data. To know what action to take in order to prevent, control or mitigate losses, specific information is needed on the kinds of losses that can and do occur.

Essential data include both reactive outcome data, such as **Accident Experience and Rate Statistics** (2g), and proactive data, such as risk assessments and data from day-to-day operations, which identify **Safety Issues and Concerns** (2e). Both types of data are required in order to focus safety-driven initiatives and set **Safety Targets** (2a).



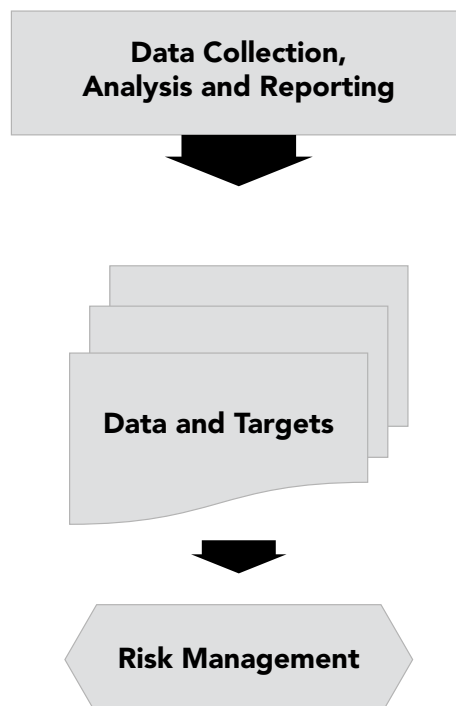
c. Data Collection, Analysis and Reporting

Data are often seen as a starting point of management systems. To obtain basic information on safety performance and the kinds of losses that occur, *Data Collection, Analysis and Reporting Processes* must be in place.

The *SMS Regulations* require systems for *Accident Reporting, Investigation and Analysis* (2g); *Identifying Safety-Related Issues and Concerns* (2e) (such as safety logbooks, health and safety committees); and *Risk Evaluation* (2e). These processes shape information to enable the company to take certain actions to control risks.



Collectively, these are the core components of a safety management system.



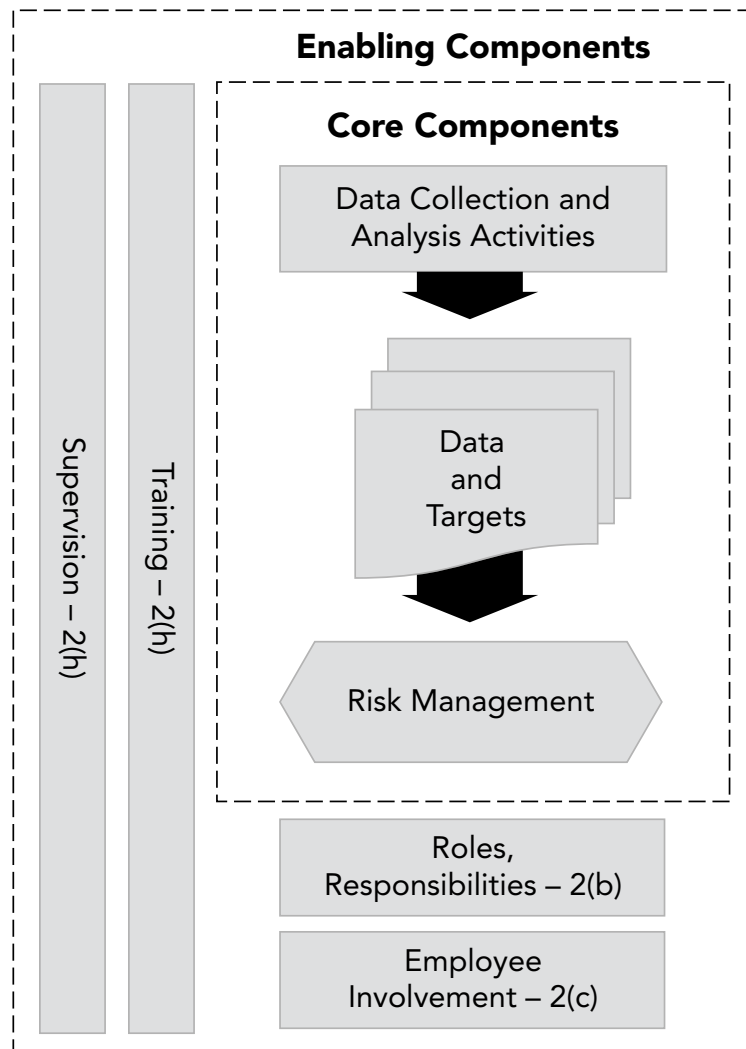
3.2.2 Enabling Components

To enable the functioning of the three core components, employees need four enabling components. As required by the *Railway SMS Regulations*, they need **Clear Roles, Responsibilities and Authorities** (2b), for example, from job descriptions. To understand their roles, responsibilities and accountabilities, and to develop the necessary skills to carry them out, employees need **Training** (2h).

To make sure that employees are doing their jobs properly, **Supervision** (2h), in terms of supervisory support and oversight, is required. To obtain field input and to develop, implement and modify the SMS, that is, to make SMS happen, **Employee Involvement** (2c) is key.

Figure 3.3 shows the relationship of the enabling components to the core components.

Figure 3.3:
Safety Management System Enabling Components

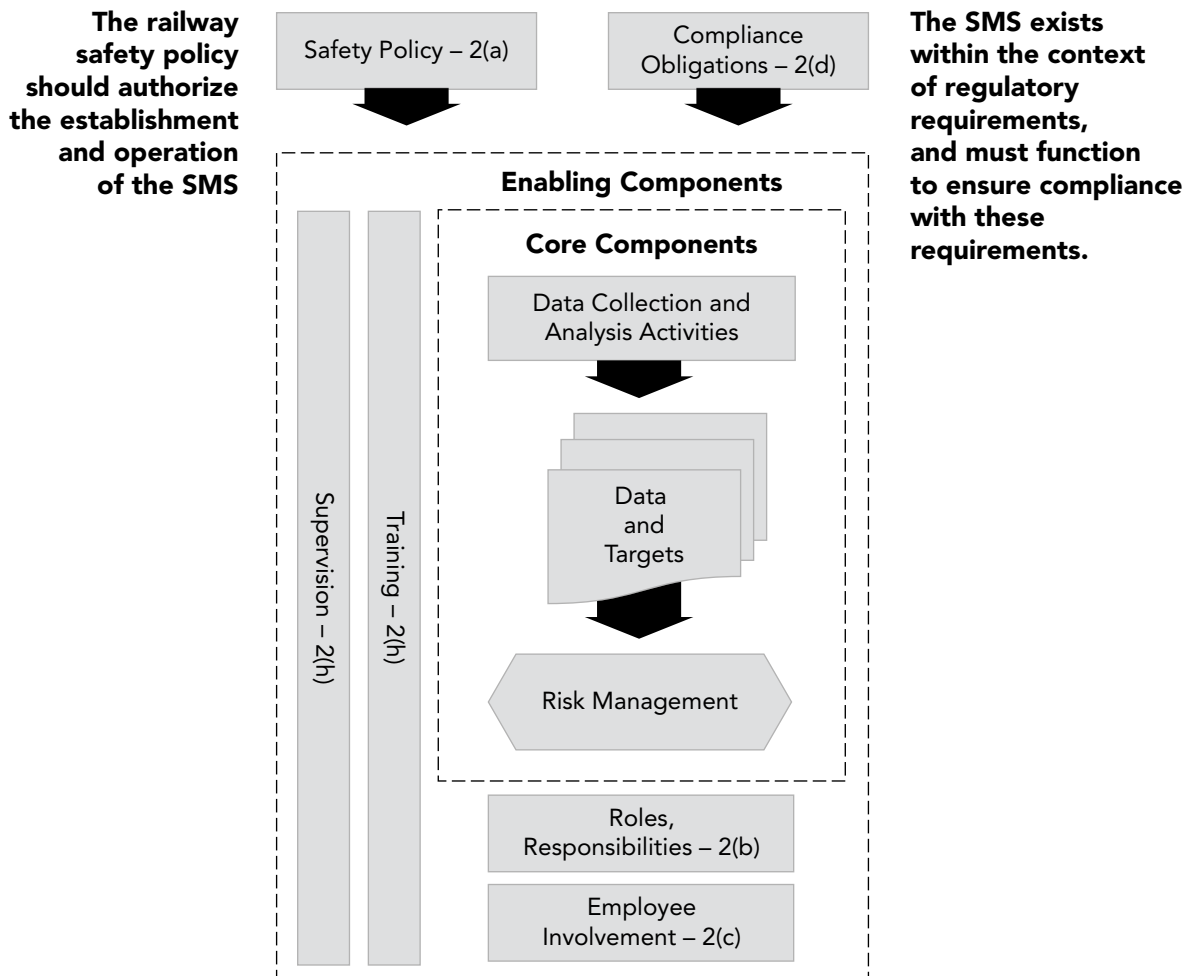


3.2.3 Safety Policy and Compliance Components

The core and enabling components of the *Railway SMS Regulations* all function within a regulatory framework with **Compliance Obligations** (2d). The railway company must be familiar with the existing rules, regulations and standards and must have processes to achieve compliance with these requirements. To do this, however, the company must have senior management support in terms of a **Safety Policy** (2a). The safety policy gives the SMS authority in a company and demonstrates senior management commitment to a safety culture.

Figure 3.4 shows the relationship of safety policy and compliance obligations to the core and enabling components.

Figure 3.4:
Safety Management System – Safety Policy and Compliance Obligations

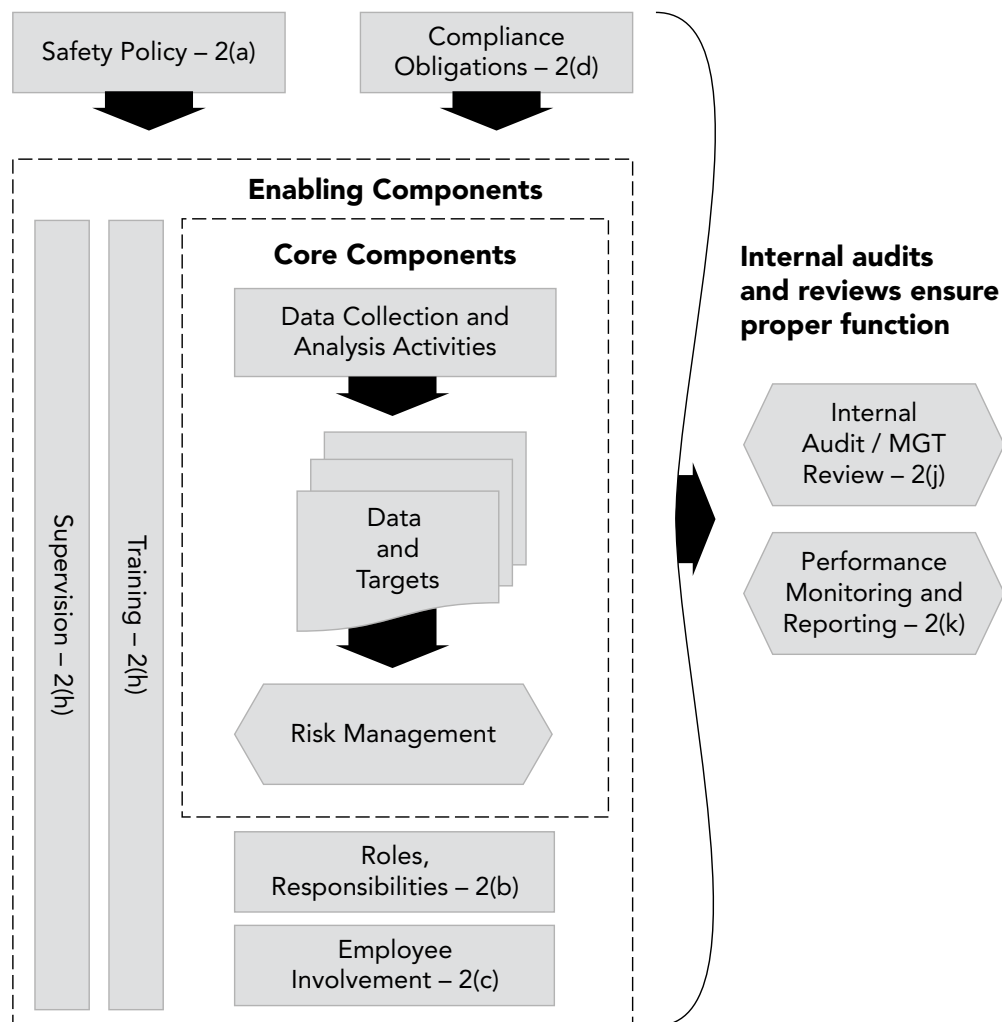


3.2.4 Evaluation Components

When all the components of an SMS process are in place, the entire process must be evaluated and its performance monitored. The *Railway SMS Regulations* state that a company must undertake an *Internal Evaluation* (2j) of its SMS to ensure that it is effective and to identify gaps. They also require that the performance of the system be *Monitored and Reported to Senior Management* (2k).

Figure 3.5 adds these functions and shows the complete SMS process that appears in Figure 3.2.

Figure 3.5:
Safety Management System – Safety Evaluation





Other Requirements of the *Railway Safety Management System Regulations*

Chapter 3 of this guide discussed the 12 components required in a railway safety management system, and the process that links and integrates these components. The *Railway SMS Regulations* also contain four other requirements:

4.1 Requirements for Record Keeping

- 3. (1) A railway company shall maintain records of the following information for the purposes of assessing its safety performance:**
- (a) accident and incident investigation reports and a description of the corrective actions taken for accidents and incidents that meet the reporting criteria; and**
 - (b) accident rates expressed as follows:**
 - (i) employee deaths, disabling injuries and minor injuries, per 200,000 hours worked by the employees of the railway company, and**
 - (ii) train and grade crossing accidents that meet the reporting criteria, per million train miles.**
- (2) At the request of the Minister, a railway company shall collect, maintain and submit to the Minister specified performance or safety data for the purpose of monitoring the effectiveness of its safety management system and its safety performance.**
-

In addition to maintaining information on “reportable” accidents/incidents, railway companies are encouraged to maintain records of investigations along with descriptions of the corrective actions taken for “non-reportable” accidents and incidents. Indeed, to accurately assess safety performance, railway companies should maintain information on all accidents and incidents. Annual safety performance targets and the associated safety initiatives to achieve the targets should be linked to this data.

4.2 Requirements for Initial Submission

- 4. (1) A railway company shall submit to the Minister the following information in respect of its safety management system:**
- (a) the name, address and position of the person responsible for the safety management system;**
 - (b) a description of the railway company's operations and rail network;**
 - (c) the railway company's safety policy;**
 - (d) the railway company's safety performance targets and the associated safety initiatives to achieve the targets for the calendar year in which the submission is made;**
 - (e) information showing the reporting structure and safety relationships of positions and departments in the company, including organization charts;**
 - (f) a list of the applicable railway safety regulations, rules, standards, orders and exemptions;**
 - (g) a description of the railway company's risk management process and risk control strategies;**
 - (h) a list of the railway company's training and qualification programs, including those of external sources;**
 - (i) a description of the data being collected by the railway company for the purpose of assessing its safety performance;**
 - (j) a description of the railway company's internal safety audit program; and**
 - (k) a list of the titles and dates of all documents in the railway company's safety management system that describe how the railway company is meeting its obligations with respect to each safety management component set out in section 2.**
- (2) The information shall be submitted**
- (a) in respect of a railway company that is in operation on March 31, 2001, before April 30, 2001; and,**
 - (b) in any other case, at least 60 days before the railway company begins operations.**
-

A railway company shall not operate unless it has a safety management system in place that meets the requirements of these regulations.

It is understood that the information listed above in subsection 4(1) of the regulations will be made available to employee representatives.

The initial safety management system submission required by the regulations is intended to provide preliminary assurance to the department that the railway company has developed and implemented a safety management system that meets regulatory requirements. The SMS documentation required by component 2(l) should be much more comprehensive. Transport Canada audits will scrutinize the system and its documentation in detail to verify adequacy and effectiveness.

The items (a-k) listed under section 4(1) of the *Railway SMS Regulations* include information extracted from a company's SMS. The requirement for companies to maintain an SMS containing this information is outlined in section 2(a-l) of the regulations. Table 1 below matches the section 2(a-l) regulation components to the corresponding Section 4(1) (a-k) items.

Table 1
Section 4(1) items and corresponding Section 2 components

SMS Initial Submission Requirements Section 4(1)	SMS Component Requirements Section 2
(a)	(b)
(b)	*
(c)	(a)
(d)	(a)
(e)	(b), (c)
(f)	(d)
(g)	(e), (f)
(h)	(h)
(i)	(g), (i)
(j)	(j)
(k)	(l)

* The description of the company's actual or projected network (owned or leased) and operations (item 4(1)(b)) should include:

- miles of track;
- location of subdivisions (from-to) and the maximum allowable speed;
- number of employees;
- number of revenue car loads generated;
- type of operation(s) (e.g., passenger, freight, transportation of dangerous goods);
- interconnections with other railroads; and
- a list of railways operating over the host railway.

4.3 Requirements for Annual Submission

- 5. (1) Not later than March 1 of each year following the year in which a railway company submits the information required pursuant to subsection 4(l), the railway company shall submit to the Minister the following information in respect of the preceding calendar year:**
- (a) any revisions made to the information referred to in subsection 4(1);**
 - (b) its safety performance relative to its safety targets; and**
 - (c) its accident rates expressed as required in section 3(1)(b).**
- (2) The railway company shall include in the information its safety targets for the calendar year in which the submission is made.**
-

The annual safety management system submissions required by the regulations are intended to provide assurance to the department that the railway company is maintaining an up-to-date safety management system that meets regulatory requirements. The record-keeping and annual reporting of safety performance relative to safety targets and accident rates allow the railway company to assess the results/effectiveness of its safety management system. In addition, the annual submissions will better enable Transport Canada to provide assurance to the public on the continuing state of railway safety in Canada.

Subsection 5(1)(a) stipulates that the annual submissions include any revisions made to the information included as part of the company's initial SMS submission (see subsection 4(1)). Note that the annual submissions in fact should include any revisions made to information included in prior annual submissions.

It is understood that the information listed above in section 5 of the regulations will be made available to employee representatives.

4.4 Requirements for Production of Documents

- 6. *To enable a railway safety inspector to monitor compliance with these Regulations, a railway company shall keep readily available all documents that are mentioned in its safety management system.***
-

At any time after the initial submission, and with reasonable notification, a Railway Safety Inspector (RSI) may require a railway company to produce for inspection any of the documentation referenced in the safety management system for the purpose of compliance monitoring. The railway company is required to provide documentation to an RSI upon request.



Achieving an Effective Safety Culture

As the *Railway Safety Act* review panel noted in its report, “The cornerstone of a truly functioning SMS is an effective safety culture.”²

Achieving an effective safety culture is the ultimate goal of SMS. The tools described in this guide are building blocks for railways to achieve this goal. An effective safety culture in a railway company can reduce public and employee fatalities and injuries, property damage resulting from railway accidents, and the impact of accidents on the environment.

Safety culture is a complex concept, however, and one that is challenging to define. In simple terms, an organization’s safety culture is demonstrated by the way people do their jobs - their decisions, actions and behaviours define the culture of an organization.

Following an extensive review of the literature on safety culture, as well as best practices in other industries, the SMS Working Group advanced the following definition of safety culture for rail, which has been adopted by Transport Canada:

The safety culture of an organization is the result 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 system.

Organizations with a positive safety culture are characterized by communications from various stakeholders founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures.

The Working Group also identified the following key practices for a safety culture:

- Leadership and commitment to safety culture
- Two-way communication
- Stakeholder / employee / employee representative involvement
- The existence of a learning culture
- The existence of a just culture

² Stronger Ties: A Shared Commitment to Railway Safety, Review of the Railway Safety Act (November 2007), p. 68.

The following checklist describes the elements of each of these practices:

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).
4. Systematic risk assessments.
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:

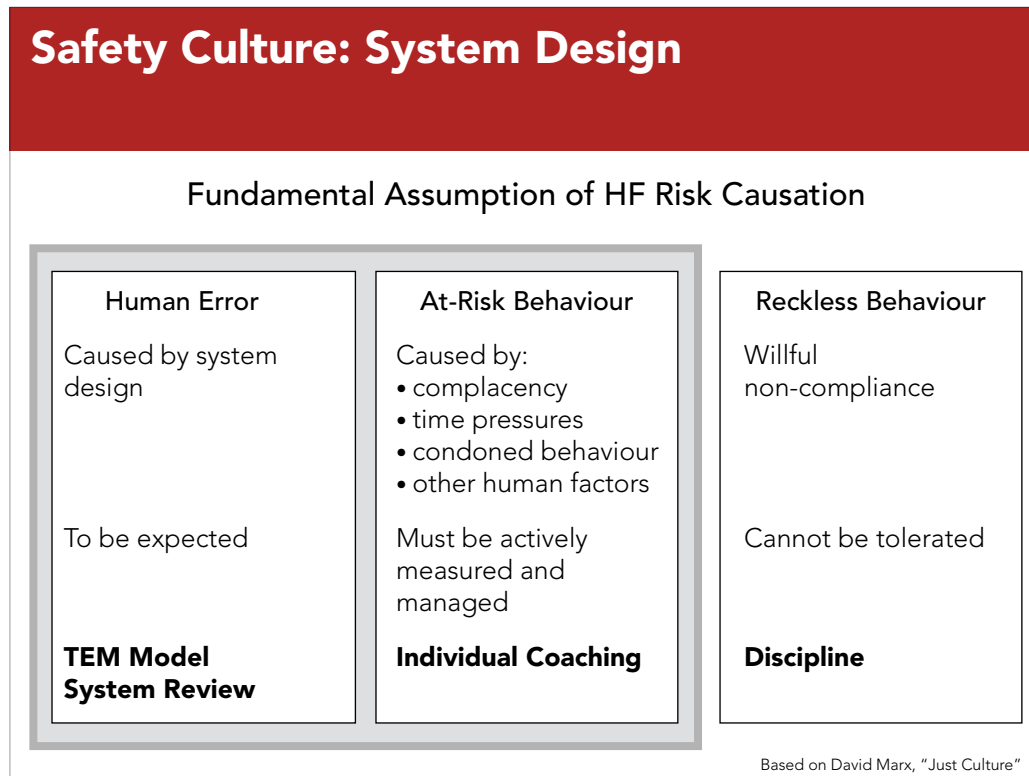
1. Company policies will encourage and/or recognize employees, and be fair.
2. Complete and objective investigations.
3. Internal escalation process for unresolved health and safety issues.
4. Internal recourse for employees to deal with safety issues (e.g., safety ombudsman).
5. Going beyond rule violations 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

In its review of best practices of safety culture, it became clear to the Working Group that a best practice employed by leading companies involved the institution of a non-punitive reporting process. 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 model depicted below, taken from the aviation sector, illustrates such a process.

Example - An Aviation Company Model:



RSA Review SMS Working Group - 14 Jan 09

HF= Human Factor
TEM = Threat Error Model

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

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

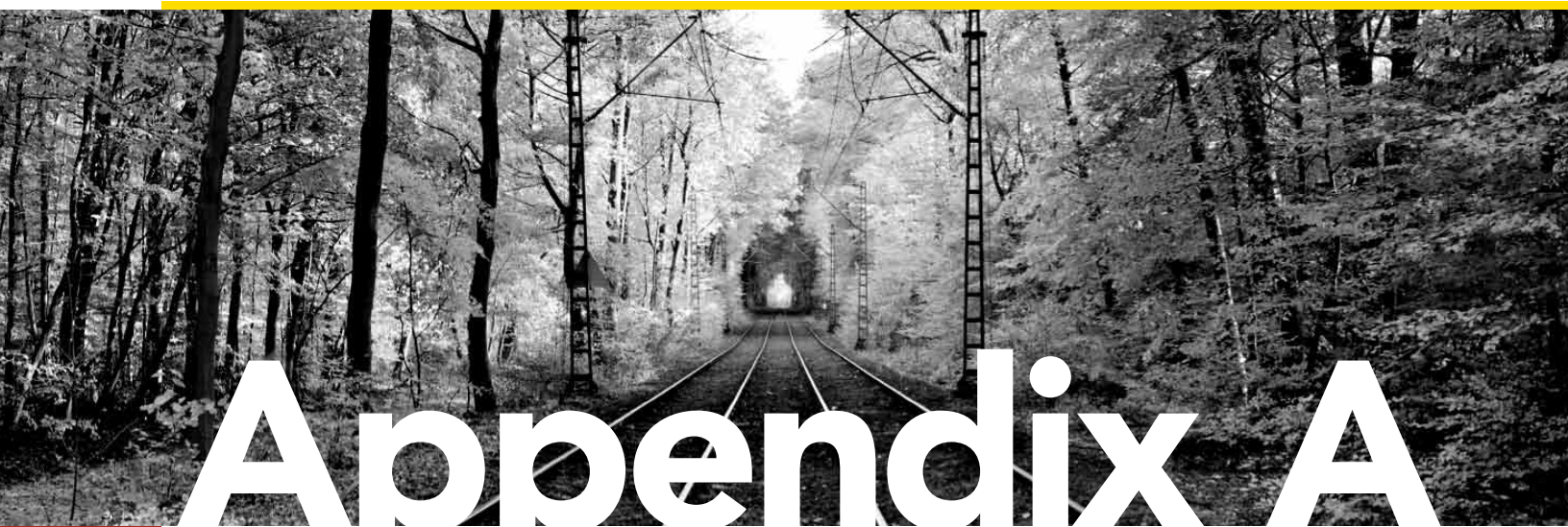
Other issues to be considered in the development of a non-punitive system include:

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

Non-punitive reporting is only one of the many elements that contribute to a strong safety culture, the ultimate goal of SMS. As the above description makes clear, safety culture is not created by regulatory requirement, limited to an exclusive part of an organization or maintenance-free. It requires much effort and is not achieved overnight.³

To instill a safety culture in a company, the first step is to establish an efficient SMS process. Once all of the SMS components described in the previous chapters, including mutual trust, good communications and effective risk prevention measures, are in place, a strong and effective safety culture can result.

³ Helping Build a "True Safety Culture" Through the Development of a "Safety Management System" – Transport Canada, Atlantic Region, 2005.



Appendix A

Railway Safety Management System Regulations

SOR/2001-37

Interpretation

1. The definitions in this section apply in these Regulations.

“*disabling injury*” has the meaning assigned in section 15.1 of the *Canada Occupational Safety and Health Regulations* and section 11.1 of the *On-Board Trains Occupational Safety and Health Regulations*. (*blessure invalidante*)

“*minor injury*” has the meaning assigned in section 15.1 of the *Canada Occupational Safety and Health Regulations* and section 11.1 of the *On-Board Trains Occupational Safety and Health Regulations*. (*blessure légère*)

“*reporting criteria*” means

(a) in respect of an accident, the criteria set out in the definition “reportable railway accident” in subsection 2(1) of the *Transportation Safety Board Regulations*; and

(b) in respect of an incident, the criteria set out in the definition “reportable railway incident” in subsection 2(1) of the *Transportation Safety Board Regulations*. (*critères à signaler*)

“*risk*” means the chance of injury or loss measured as the probability and severity of an adverse effect on health, property, the environment or other things of value. (*risque*)

“*risk control strategy*” means a course of action intended to reduce the frequency or severity of injury or loss, including a decision not to engage in or not to continue an activity. (*stratégie de contrôle du risque*)

Safety Management System

2. A railway company shall implement and maintain a safety management system that includes, at a minimum, the following components:

(a) the railway company safety policy and annual safety performance targets and the associated safety initiatives to achieve the targets, approved by a senior company officer and communicated to employees;

- (b) clear authorities, responsibilities and accountabilities for safety at all levels in the railway company;
- (c) a system for involving employees and their representatives in the development and implementation of the railway company's safety management system;
- (d) systems for identifying applicable
 - (i) railway safety regulations, rules, standards and orders, and the procedures for demonstrating compliance with them, and
 - (ii) exemptions and the procedures for demonstrating compliance with the terms or conditions specified in the notice of exemption;
- (e) a process for
 - (i) identifying safety issues and concerns, including those associated with human factors, third-parties and significant changes to railway operations, and
 - (ii) evaluating and classifying risks by means of a risk assessment;
- (f) risk control strategies;
- (g) systems for accident and incident reporting, investigation, analysis and corrective action;
- (h) systems for ensuring that employees and any other persons to whom the railway company grants access to its property, have appropriate skills and training and adequate supervision to ensure that they comply with all safety requirements;
- (i) procedures for the collection and analysis of data for assessing the safety performance of the railway company;
- (j) procedures for periodic internal safety audits, reviews by management, monitoring and evaluations of the safety management system;
- (k) systems for monitoring management-approved corrective actions resulting from the systems and processes required under paragraphs (d) to (j); and
- (l) consolidated documentation describing the systems for each component of the safety management system.

Safety Performance Assessment

3. (1) A railway company shall maintain records of the following information for the purpose of assessing its safety performance:
 - (a) accident and incident investigation reports and a description of the corrective actions taken for accidents and incidents that meet the reporting criteria; and

(b) accident rates expressed as follows:

- (i) employee deaths, disabling injuries and minor injuries, per 200,000 hours worked by the employees of the railway company, and
- (ii) train and grade crossing accidents that meet the reporting criteria, per million train miles.

(2) At the request of the Minister, a railway company shall collect, maintain and submit to the Minister specified performance or safety data for the purpose of monitoring the effectiveness of its safety management system and its safety performance.

Submissions to the Minister

4. (1) A railway company shall submit to the Minister the following information in respect of its safety management system:

- (a) the name, address and position of the person responsible for the safety management system;
- (b) a description of the railway company's operations and rail network;
- (c) the railway company's safety policy;
- (d) the railway company's safety performance targets and the associated safety initiatives to achieve the targets for the calendar year in which the submission is made;
- (e) information showing the reporting structure and safety relationships of positions and departments in the company, including organization charts;
- (f) a list of the applicable railway safety regulations, rules, standards, orders and exemptions;
- (g) a description of the railway company's risk management process and risk control strategies;
- (h) a list of the railway company's training and qualification programs, including those of external sources;
- (i) a description of the data being collected by the railway company for the purpose of assessing its safety performance;
- (j) a description of the railway company's internal safety audit program; and
- (k) a list of the titles and dates of all documents in the railway company's safety management system that describe how the railway company is meeting its obligations with respect to each safety management component set out in section 2.

- (2) The information shall be submitted
 - (a) in respect of a railway company that is in operation on March 31, 2001, before April 30, 2001; and
 - (b) in any other case, at least 60 days before the railway company begins operations.
- 5. (1) Not later than March 1 of each year following the year in which a railway company submits the information required pursuant to subsection 4(1), the railway company shall submit to the Minister the following information in respect of the preceding calendar year:
 - (a) any revisions made to the information referred to in subsection 4(1);
 - (b) its safety performance relative to its safety targets; and
 - (c) its accident rates expressed as required in paragraph 3(1)(b).
- (2) The railway company shall include in the information its safety targets for the calendar year in which the submission is made.

Production of Documents

- 6. To enable a railway safety inspector to monitor compliance with these Regulations, a railway company shall keep readily available all documents that are mentioned in its safety management system.





Appendix B

Definitions

Disabling Injury – has the meaning assigned in section 15.1 of the *Canada Occupational Safety and Health Regulations* and section 11.1 of the *On-Board Trains Occupational Safety and Health Regulations* (*Blessure invalidante*)

Employee Representative – refers to an employee who does not exercise managerial functions and who has been selected from among those employees; where employees are represented by a trade union, it refers to the person selected by the trade union (*Représentant des employés*)

Human Reliability Analysis – identifying likely occurrences of human errors in system components (e.g., matching machine to human capability) (*Analyse de fiabilité humaine*)

Human Factor Analysis – applying human psychological, social, physical and biological characteristics in the design, operation or use of products or systems (*Analyse des facteurs humains*)

Minor Injury – has the meaning assigned in section 15.1 of the *Canada Occupational Safety and Health Regulations* and section 11.1 of the *On-Board Trains Occupational Safety and Health Regulations* (*Blessure légère*)

Railway Safety Inspector – any person designated by the Minister as such under section 27(1) of the RSA (*Inspecteur de la sécurité ferroviaire*)

Reporting Criteria –

(a) in respect of an accident, the criteria set out in the definition “reportable railway accident” in subsection 2(1) of the *Transportation Safety Board Regulations*; and

(b) in respect of an incident, the criteria set out in the definition “reportable railway incident” in subsection 2(1) of the *Transportation Safety Board Regulations* (*Critères à signaler*)

Resources – the means to achieve an end or fulfill a function (e.g., people, money, material, tools, equipment) (*Ressources*)

Risk – the chance of injury or loss measured as the probability and severity of an adverse effect on health, property, the environment, or other things of value (*Risque*)

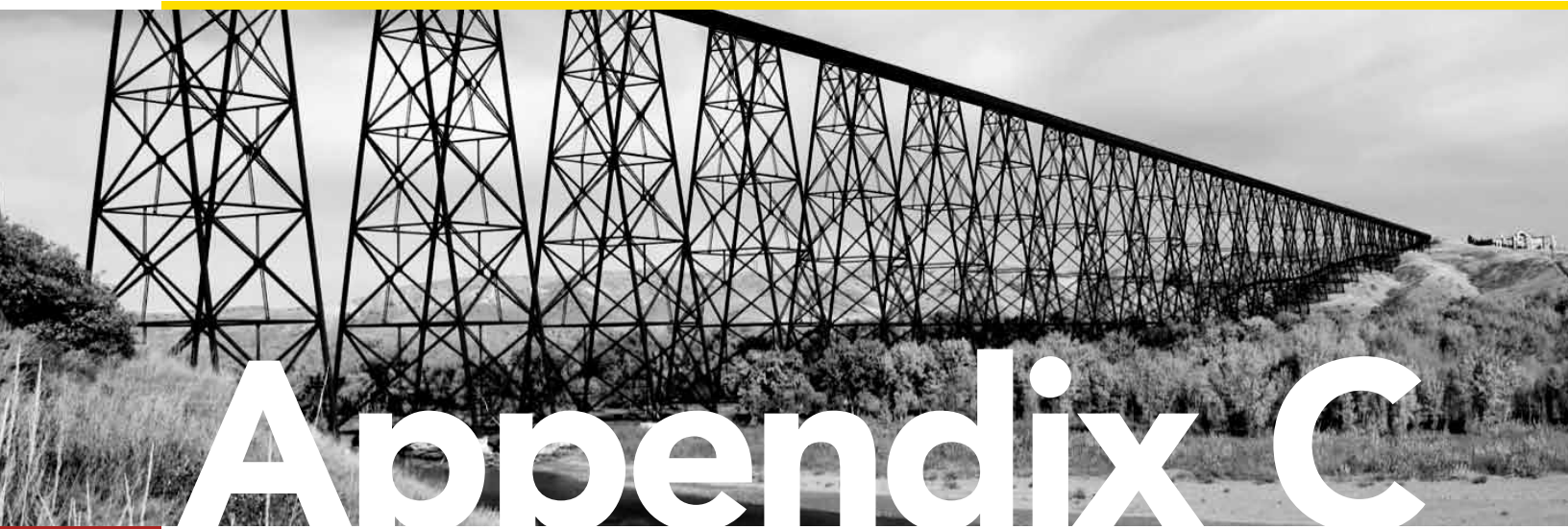
Risk Control Strategy – a course of action intended to reduce the frequency or severity of injury or loss, including a decision not to pursue the activity (*Stratégie de contrôle du risque*)

Safety Initiative – a proposed plan, project or course of action designed to achieve a specific safety target (*Initiative de sécurité*)

Safety Management System – a formal framework for integrating safety into day-to-day railway operations and includes safety goals and performance targets, risk assessments, responsibilities and authorities, rules and procedures, and monitoring and evaluation processes (*Système de gestion de la sécurité*)

Safety Targets – quantitative or qualitative safety improvements to be achieved (*Objectifs de sécurité*)





Appendix C

List of Rail Safety Regulations, Rules and Orders

(as of June 2010)

Title / Subject	Number and / or Date	Type	Discipline
<i>Ammonium Nitrate Storage Facilities Regulations</i>	GO 0-36 (C.R.C., c.1145)	Regulations	Equipment
<i>Anhydrous Ammonia Bulk Storage Regulations</i>	GO 0-33 (C.R.C., c.1146)	Regulations	Equipment
<i>Canada Occupational Health and Safety Regulations</i>	SOR/86-304	Regulations	Supplementary
Caboosless Ore Trains Operations (Applies to QNS&L only)	R-40691 May 27, 1987	Order	Operations
Cabooses, Marshalling of Occupied	R-40809 June 26, 1987	Order	Operations
<i>Canada Labour Code, Part II</i>	R.S., 1985, c. L-2	Act	Supplementary
Canadian Rail Operating Rules	February 26, 2008 with editorial changes March 19, 2008 (English) and March 26, 2010 (French)	Rules	Operations
<i>Canadian Transportation Accident Investigation and Safety Board Act</i>	S.C. 1989, c.3	Act	Supplementary
<i>Chlorine Tank Car Unloading Facilities Regulations</i>	GO 0-35 (C.R.C., c. 1147)	Regulations	Equipment
<i>Controlled Products Regulations</i>	SOR/88-66	Regulations	Supplementary
Ditch lights installation (Amtrak Only)	R-39613- amending July 25, 1986 R-38525, October 7, 1985	Order	Operations

Title / Subject	Number and / or Date	Type	Discipline
Ditch lights installation – CN and Amtrak	R-39244, April 2, 1986	Order	Operations
Ditch lights installation – CN and VIA	R-39243 April 2, 1986 (amended by R-39398)	Order	Operations
Ditch lights installation – CN and VIA	R-39398 May 23, 1986 (amending R-39243)	Order	Operations
Ditch lights installation – CN	R-39245 April 2, 1986 (amending R-38525)	Order	Operations
Event Recorders Installation – CN	R-40614 April 30, 1987	Order	Operations
Event Recorders Installation – CP	R-40340 February 19, 1987	Order	Operations
Event Recorders Installation – VIA	R-39921 October 23, 1986	Order	Operations
<i>Flammable Liquids Bulk Storage Regulations</i>	GO 0-32 (C.R.C., c. 1148)	Regulations	Equipment
Gateway Inspection	R-31780, January 23, 1981	Order	Operations
<i>Handling of Carloads of Explosives on Railway Trackage Regulations</i>	SOR/79-15	Regulations	Equipment
<i>Hazardous Products Act</i>	R.S., 1985, c. H-3	Act	Supplementary
<i>Heating and Power Boilers Regulations</i>	GO 0-11(C.R.C., c. 1151)	Regulations	Equipment
<i>Highway Crossing Protective Devices Regulations</i>	GO E-6 (C.R.C., c. 1183)	Regulations	Engineering
<i>Liquefied Petroleum Gases Bulk Storage Regulations</i>	GO 0-31(C.R.C., c. 1152)	Regulations	Equipment
<i>Mining Near Lines of Railways Regulations</i>	SOR/91-104 (revised SOR/94-692, s. 5)	Regulations	Engineering
Ministerial Order Declaring Relevant Associations and Organizations	MO 10-04, February 4, 2010	Ministerial Order	General
<i>Non-Smokers' Health Act</i>	S.C. 1985, c. 15 (4th suppl.)	Act	Supplementary
<i>Non-Smokers' Health Regulations</i>	SOR/90-21	Regulations	Supplementary

Title / Subject	Number and / or Date	Type	Discipline
<i>Notice of Railway Works Regulations</i>	SOR/91-103 (revised SOR/94-692 s. 4)	Regulations	Engineering
Occupational Safety and Health, MOU – Human Resources and Skills Development Canada (HRSDC) and Transport Canada (TC)	OSH-MOU July 24, 1998	MOU	Supplementary
<i>On Board Trains Occupational Safety and Health Regulations</i>	SOR/87-184	Regulations	Supplementary
Rail Grinding Equipment Operations	R-37621 January 9, 1985	Order	Operations
<i>Railway Employee Qualification Standards Regulations</i>	SOR/87-150	Regulations	Operations
Railway Employee Radio Communication Rule	September 9, 1994	Rules	Operations
Railway Equipment Reflectorization Rules	February 27, 2006 as amended on July 19, 2006	Rules	Equipment
Railway Freight and Passenger Train Brake Inspection and Safety Rules	May 5, 2010	Rules	Equipment
Railway Freight Car Inspection and Safety Rules	October 25, 1994 with editorial changes February 1, 2007	Rules	Equipment
<i>Railway – Highway Crossing at Grade Regulations</i>	SOR/80-748	Regulations	Engineering
Railway Locomotive Inspection and Safety Rules	February 4, 2010	Rules	Equipment
Railway Medical Rules for Positions Critical to Safe Railway Operations	December 22, 2006 with editorial changes February 1, 2007	Rules	Operations
Railway Passenger Car Inspection and Safety Rules	November 8, 2001 with editorial changes February 1, 2007	Rules	Equipment
Railway Passenger Handling Safety Rules	March 31, 2000	Rules	Operations
Railway Prevention of Electric Sparks	SOR/82-1015	Regulations	Engineering
Railway Rules Governing Safety Critical Positions	June 16, 2000	Rules	Operations

Title / Subject	Number and / or Date	Type	Discipline
<i>Railway Safety Act</i>	1985, c.32 (4 th Suppl.)	Act	General
<i>Railway Safety Appliance Standards Regulations</i>	GO 0-10(C.R.C., c. 1171)	Regulations	Equipment
<i>Railway Safety Management System Regulations</i>	SOR/2001-37 January 9, 2001	Regulations	General
Railway Signal and Traffic Control Systems Standards	June 4, 2007	Standards	Engineering
Reset Safety Control System – CN	R-40950 July 31, 1987	Order	Equipment
Reset Safety Control System – CP	R-40951 July 31, 1987	Order	Equipment
Reset Safety Control System – VIA	R-40537 April 10, 1987	Order	Equipment
Rules for the Installation, Inspection and Testing of Air Reservoirs (Other than locomotives)	December 5, 1994	Rules	Equipment
Rules for the Control and Prevention of Fires on Railway Rights-of-Way	July 28, 1995	Rules	Engineering
Rules Respecting Track Safety	November 3, 2008	Rules	Engineering
<i>Safe Containers Convention Act</i>	(R.S., 1985, c. S.1)	Act	Supplementary
<i>Safe Containers Convention Regulations</i>	SOR/82-1038	Regulations	Supplementary
<i>Safety and Health Committees and Representatives Regulations</i>	SOR/86-305	Regulations	Supplementary
<i>Service Equipment Cars Regulations</i>	SOR/86-922	Regulations	Operations
<i>Specification 112 and 114 Tank Cars Regulations</i>	SOR/79-101	Regulations	Equipment
Standards Respecting Pipeline Crossings Under Railways	June 21, 2000 with editorial changes February 1, 2007	Standards	Engineering
Standard Respecting Railway Clearances	May 14, 1992	Standards	Engineering

Title / Subject	Number and / or Date	Type	Discipline
Switch Locks Installation – CN	R-39612 July 25, 1986	Order	Operations/ Engineering
Switch Locks Installation – CP	R-39611 July 25, 1986	Order	Operations/ Engineering
Switch Locks Installation – CP	R-39910 October 21, 1986	Order	Operations/ Engineering
Train Speed on CN's Weston and York Subs. (for DC's)	NTA 1988- R-915 October 11, 1988	Order	Operations
Train Speed on CP's MacTier, Galt, North York and Bellville Subdivisions (for DC's)	NTA 1988- R-916 October 11, 1988	Order	Operations
Train Speed on Smiths Falls and Brockville Subdivisions	R-36883 June 15, 1984 (amended by R-36977 July 27, 1984)	Order	Operations
Train Speed on Smiths Falls and Brockville Subdivisions	R-36977 July 27, 1984	Order	Operations
Train Speed Restriction - show cause	R-36550 April 19, 1984	Order	Operations
Train Speed, CN Rail	R-38525 October 7, 1985 (amended by R- 39612 July 24, 1986)	Order	Operations
Train Speed, CP Rail	R-38524 October 7, 1985 (amended by R- 39611 July 25, 1986)	Order	Operations
Transport Canada Standard for LED Signal Modules at Highway/Railway Grade Crossings	October 10, 2003	Standard	Engineering
<i>Wire Crossings and Proximities Regulations</i>	GO E-11 (C.R.C., c. 1195)	Regulations	Engineering
Work/Rest Rules for Railway Operating Employees	June 1, 2005	Rules	Operations



Appendix D

Sample Emergency / Accident Contact List

This matrix was developed for use in Ontario to assist railways in understanding the roles and reporting requirements of government agencies when train accidents occur. Roles and reporting numbers differ from province to province; however, this list should serve as a general guide for emergency/accident contact requirements.

Example of Ontario Reporting Requirements

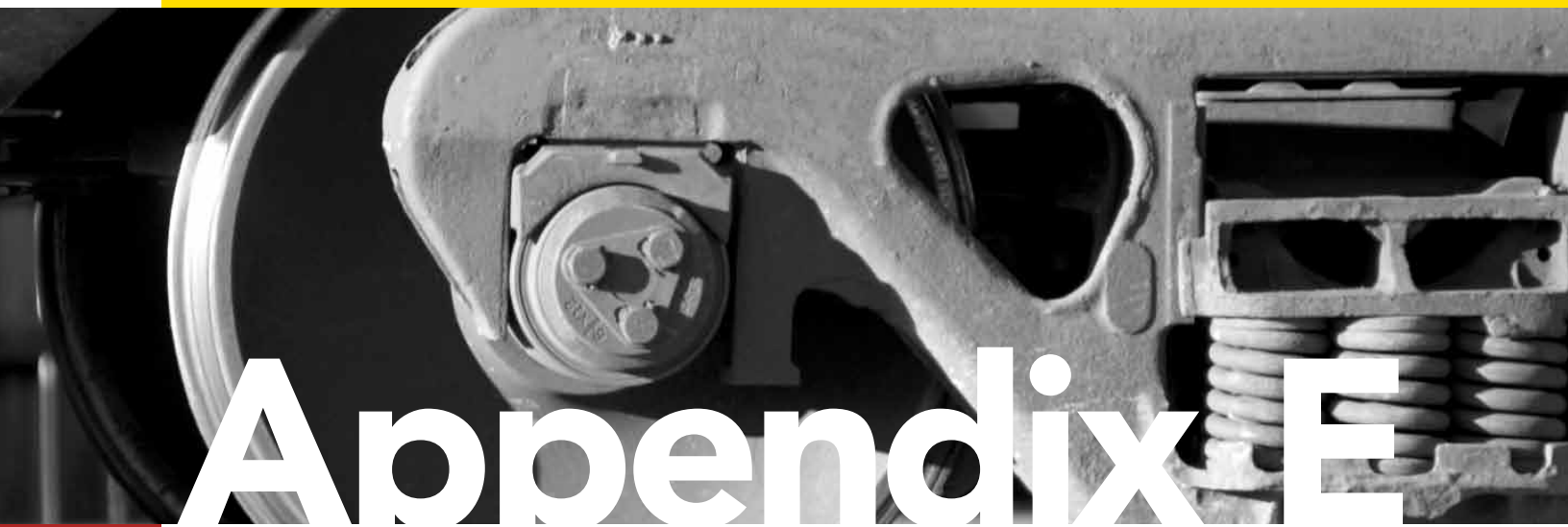
Federal Agency	24-hour Number	Mandatory Reporting	Also Gets Reports on / from	Attends Accident to...
<p>1) <i>Transportation of Dangerous Goods Act</i></p> <p>Transport Canada Headquarters: Dangerous Goods Directorate</p> <p>Region: Surface Group Dangerous Goods Section</p> <p>(TC Remedial Measures Specialist or TC Dangerous Goods Inspector)</p>	Canutec (613) 996-6666	Dangerous goods accidents and spills	<ul style="list-style-type: none"> • Fire and Police Departments • Environment Canada and the Provincial Ministry of the Environment • Transportation Safety Board 	<ul style="list-style-type: none"> • Protect public safety under sections 17 and 19 of the Act • Analyze container failures or imminent releases • Assist in the provision of emergency response resources from industry mutual aid groups (TEAP, LPERC CHLOREP, COMPGEAP, etc.) • Monitor the effectiveness of federally registered emergency response assistance plans • Gather evidence

Federal Agency	24-hour Number	Mandatory Reporting	Also Gets Reports on / from	Attends Accident to...
<p>2) Canada Labour Code</p> <p>Transport Canada Headquarters: Railway Safety Directorate</p> <p>Region: Surface Group Operations Section</p> <p>(TC Operations or Equipment Officer)</p>	<p>Refusals to Work:</p> <p>Ontario (613) 990-4544</p> <p>Other Provinces:</p> <p>TC regional office during working hours (off hours: 613-990-4544, which will be forwarded to Canutec)</p>	<p>Refusals to work must be reported to a Safety Officer after the unsafe condition has been investigated by the employer with a member of the Health and Safety Committee present and a refusal still exists</p>	<ul style="list-style-type: none"> • Reports of employee deaths and serious injuries are passed through from the TSB • Jurisdiction over all on-board crews and over Maintenance of Way employees while operating equipment TRAVELLING on rail but not at a work site 	<ul style="list-style-type: none"> • Investigate the cause and circumstances of accidents involving employee death or serious injury • Issue directions or seek assurances of voluntary compliance • Gather evidence
<p>3) <i>Railway Safety Act</i></p> <p>Transport Canada Headquarters: Railway Safety Directorate</p> <p>Region: Surface Group Engineering, Operations or Equipment Sections</p> <p>(A TC Railway Safety Officer from the relevant discipline)</p>	<p>None, reports are currently received through the Transportation Safety Board</p>		<p>A criteria for serious railway accidents has been provided to the TSB, which notifies the Rail Safety Directorate or Canutec during off hours</p>	<ul style="list-style-type: none"> • Review the circumstances surrounding accidents • Gather information to be used in issuing Notices or Orders under Section 31 of the RSA • Act as a Minister's observer to the Transportation Safety Board investigation of the accident • Gather evidence

Federal Agency	24-hour Number	Mandatory Reporting	Also Gets Reports on / from	Attends Accident to...
Transportation Safety Board	(819) 997-7887	All railway accidents and incidents, as per TSB regulations		<ul style="list-style-type: none"> Investigate the cause and circumstances of the accident and make recommendations to prevent a recurrence
Human Resources Development Canada (the old Labour Canada)	Closest regional office Toronto West (905) 542-2385 Toronto East (416) 973-4498 Toronto North to Sudbury (416) 954-5902 London (519) 645-4406 Ottawa (613) 998-9803 Northwestern Ontario (807) 345-5474 Manitoba Region (204) 983-6375 Quebec Region (514) 283-1385 evngs 283-6250	All refusals to work and employee accidents causing a death or serious injury other than to a train crew member (T&E employee) performing any of his duties related to train movement, switching etc., or a Maintenance of Way employee operating his equipment and TRAVELLING on rail to and from a work site (these are covered by Transport Canada under an agreement)		<ul style="list-style-type: none"> Investigate the cause and circumstances of accidents involving employee death or serious injury Issue directions or seek assurances of voluntary compliance to prevent a recurrence Monitor the work at the accident site for compliance with Canada Labour Code requirements Gather evidence

Federal Agency	24-hour Number	Mandatory Reporting	Also Gets Reports on / from	Attends Accident to...
Environment Canada Ontario Ministry of the Environment	Spills Action Centre (800) 268-6060	All spills (chemical and fuel) affecting the environment	Environment Canada Emergencies Centre (819) 997- 3742	<ul style="list-style-type: none"> • Protect the environment (representatives could be federal, provincial or both) • Investigate spills (can prosecute) • Assist provincial authorities (primarily air monitoring)
Local Police, Ontario Provincial Police, Fire Department	911 or local numbers, as appropriate	<ul style="list-style-type: none"> • All dangerous occurrences under the <i>Transportation of Dangerous Goods Act</i> • Accidents with community impact 	Canutec	<ul style="list-style-type: none"> • Protect life • Control the scene • Coordinate evacuations • Fight fires • Contain spills
Mayor or Head of Local Municipality	Advised as accident escalates from a police/fire issue to a community threat	<ul style="list-style-type: none"> • Emergencies affecting the community 		<ul style="list-style-type: none"> • Take charge under the authority of the <i>Emergency Plans Act</i>, Ontario





Appendix E

References and Information Sources

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13. Transport Canada, Atlantic Region, *Helping Build a “True Safety Culture” Through the Development of a “Safety Management System,”* 2005.
14. United States Military Standard 882(C), *System Safety Program Requirements*

Transport Canada Surface Offices

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Quebec Region 800 René-Levesque Blvd. West Suite 638 Montreal, Quebec H3B 1X9 Tel: (514) 283-1774 Fax: (514) 283-8234	Prairie and Northern Region 344 Edmonton Street Winnipeg, Manitoba R3C 0P6 Tel: (204) 983-2991 Fax: (204) 983-8992
Pacific Region 225-625 Agnes Street New Westminster, B.C. V3M 5Y4 Tel: (604) 666-0012 Fax: (604) 666-7747	Atlantic Region 95 Foundry Street, Suite 418 Moncton, New Brunswick E1C 5H7 Tel: (506) 851-2298 Fax: (506) 851-7042





