



# Railway Safety Management System Guide

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Transport Canada Transports Canada

Canada

## Table of Contents

- [HOW THIS DOCUMENT IS STRUCTURED](#)
- 1 [INTRODUCTION](#)
- 2 [SAFETY MGMT SYSTEM COMPONENTS](#)
  - [Safety Policy, Annual Safety Targets & Associated Safety Initiatives](#)
  - [Safety Authorities, Responsibilities & Accountabilities](#)
  - [Employee & Representative Involvement](#)
  - [Compliance with Rules, Standards & Orders](#)
  - [Risk Mgmt Process](#)
  - [Risk Control Strategies](#)
  - [Accident & Incident Reporting, Investigation & Analysis](#)
  - [Skills, Training & Supervision](#)
  - [Safety Performance Data Collection & Analysis](#)
  - [Safety Audit & Evaluation](#)
  - [Corrective Action Development, Approval & Monitoring](#)
  - [Documentation](#)
- 3 [RECORD-KEEPING REQUIREMENTS](#)
- 4 [INITIAL SUBMISSION REQUIREMENTS](#)
- 5 [ANNUAL SUBMISSIONS REQUIREMENTS](#)
- 6 [PRODUCTION OF DOCUMENTS](#)
- APPENDICES**
- A [Railway Safety Mgmt System Regulations](#)
- B [Definitions](#)
- C [List of Rail Safety Rules, Regulations and Orders](#)
- D [Sample](#)
- E [References & Information Sources \(List of Transport Canada - Surface Offices\)](#)

## HOW THIS DOCUMENT IS STRUCTURED

Section 1 outlines the necessary background information on the Railway Safety Management System regulations and Section 2 details the specifics of each System component. Section 3 discusses the record-keeping requirements of the regulations, while initial submission requirements and annual submission requirements are addressed in Sections 4 and 5. The final section outlines the documentation requirements of the regulations.

Appendix A provides the full text of the Safety Management System Regulations for ease of reference while using the Guide. Appendix B provides a list of relevant definitions. Appendix C contains a sample listing of rail safety regulations, rules and general orders as of January 8, 2001. A sample Emergency/Accident Contact List, using telephone numbers for Transport Canada's Ontario region as an example, is provided in Appendix D.

In addition, a list of references and information sources is included at the end of this document. Correspondence can be addressed to:

**Rail Safety  
Transport Canada  
Place de Ville  
Tower C, 10th Floor  
330 Sparks Street  
Ottawa, Ontario  
K1A 0N5**

The guide and related publications are available on the Rail Safety web site.

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## 1. INTRODUCTION

This Guide is a companion to the Railway Safety Management System Regulations (Appendix A) pursuant to section 37 and subsection 47.1(1) of the Railway Safety Act. The Guide is intended to assist railways in developing Safety Management Systems that meet the requirements of the regulations. The following sections provide practical advice and suggestions as well as specific examples of methods and approaches that have been adopted by various railways. The Railway Safety Act defines a Safety Management System to be

*"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."*

See [Appendix B](#) for additional definitions.

The objectives of the Safety Management System Regulations are to ensure that safety is given management time and corporate resources and that it is subject to performance measurement and monitoring on par with corporate financial and production goals. A Safety Management System will provide a more directed and focused approach to safety. It is anticipated that both increased management attention to safety and an enhanced safety culture within the industry will reduce public and employee fatalities and injuries, reduce property damage resulting from railway accidents, and reduce the impact of accidents on the environment. In addition, a Safety Management System will enable railways to demonstrate – in a concrete and visible manner – their commitment to safety to employees, customers and the public, and will help railways ensure compliance to regulatory requirements.

## AN OVERVIEW

The Safety Management System Regulations do not replace any existing rules, regulations or standards. Rather, the requirement for a new systemic approach to managing safety is an addition to the current framework.

An effective Safety Management System will include both management and employee participation. As a result, it is highly desirable to involve employees and their representatives in developing the Safety Management System, 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), could provide a forum for employee involvement, provided that these committees are not diverted from their intended purpose. Alternatively, customized consultation processes could be developed.

The mandate of the Railway Safety Act includes "not only [ to] the safety of persons and property transported by railways but also [ to] the safety of other persons and other property". While this mandate is relatively broad in scope, typically Safety Management Systems are even broader. A comprehensive Safety Management System 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)).

The inclusion of programs to meet the requirements of other legislation in a Safety Management System should help railway companies avoid duplication, meet their regulatory obligations and improve safety. However, this should not be taken to mean that the jurisdiction of the Railway Safety Act extends into these areas or that compliance with the Safety Management System Regulations in any way lessens a railway company's obligation to comply with other legislation. Compliance with the Safety Management System Regulations will be assessed through Transport Canada's compliance monitoring program, which is designed to verify that

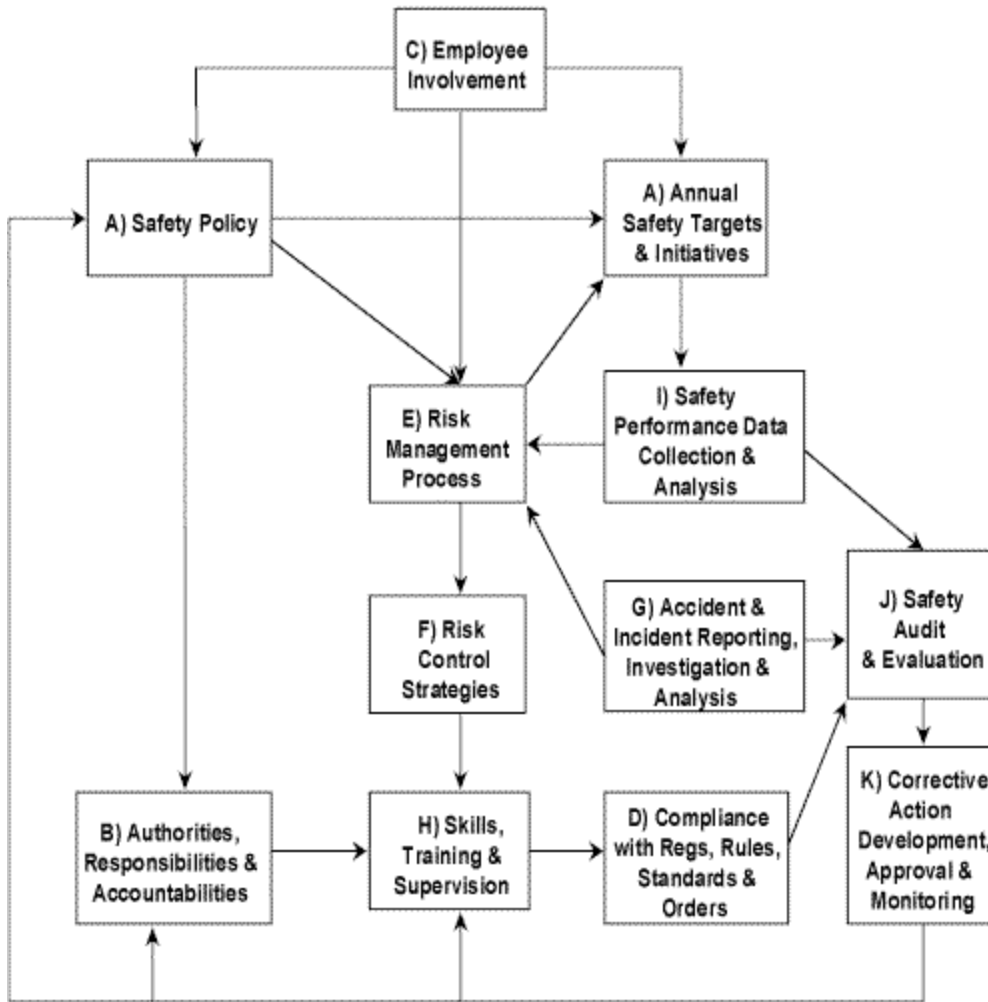
- a railway's Safety Management System is in compliance with the minimum regulatory requirements;
- the railway is operating in accordance with the commitments, processes and procedures outlined in its Safety Management System; and
- the Safety Management System is effective in improving safety.

## **2. SAFETY MANAGEMENT SYSTEM COMPONENTS**

This section of the Guide outlines the required components of a Safety Management System. The box at the beginning of each section contains the statement of the requirement from the regulations. The rest of the section contains suggestions on how to meet the requirement and examples of methods and approaches that have been adopted by various railway companies as well as excerpts from relevant standards and guidelines. Figure 1 shows the key components of a Safety Management System, the relationships between them and the corrective action feedback loops.

Figure 1

## SAFETY MANAGEMENT SYSTEM COMPONENTS



### A) Safety Policy, Annual Safety Targets and Associated Safety Initiatives

**2. (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.

See below for an example of a company's safety policy.

Experience has shown that there is a strong correlation between companies with low accident rates and companies whose senior management are seen to be concerned with safety and who

communicate this concern to employees. To maximize this effect, the safety policy should be approved at the highest possible level within the company.

The safety policy 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.

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### **Example 1 – Safety Policy**

#### **POLICY**

It is company policy to take all appropriate measures to ensure the protection of passengers, employees and the public in general while traveling in railway equipment or while on company property.

In following this policy the company will comply with all existing legislative requirements and will strive to eliminate any foreseeable hazards that may result in fires, damage to property and the environment, security losses, and personal injuries/illnesses.

It is also company policy to sustain continuing programs designed to promote the health and safety of all employees and to co-operate with organizations and associations devoted to safety research and education.

Safety shall be regarded by everyone as a prime consideration in the successful performance of their duties. Management is specifically responsible for the development and implementation of safe practices and procedures.

Managers at all levels will continually monitor situations to identify any sub-standard practices and conditions that may exist so as to provide prompt and adequate corrective action. Health and Safety/Loss Control will be one of the criteria used in assessing management effectiveness.

Employees have the responsibility to perform their duties in a manner that will not jeopardize the safety of customers or adversely affect their own health, safety or physical well-being or that of their fellow workers. Reasonable precaution is also expected from each employee to protect the property and equipment of the company that is under their care.

The company firmly believes that health and safety in the workplace can only be achieved through total commitment on the part of everyone. It is therefore company policy to establish well-organized joint health and safety committees where required throughout the system. This applied philosophy of sharing safety responsibilities will further the foregoing objectives and contribute to a safer work environment.

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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. See Example 2 below for 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.

### Example 2 – Safety Performance Targets

	1999	2000	2001	2002
<b>Personal injuries per 200,000 hours</b>				
FRA* personal injuries	3.80	3.50	3.20	3.00
Non-FRA personal injuries	6.10	5.50	5.20	4.80
<b>Train accidents per million train miles</b>				
FRA train accidents (excl. at crossings)	2.50	2.30	2.10	2.00
Road train accidents	1.25	1.15	1.05	1.00
Yard train accidents	1.25	1.15	1.05	1.00
Non-FRA train accidents (excl. crossings)	38.0	36.0	32.0	30.0
Crossing accidents	4.15	4.01	3.89	3.77

\* Federal Railroad Administration

### B) Safety Authorities, Responsibilities and Accountabilities

#### 2. (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 manager 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 responsibilities;
- procedures for ensuring accountability for these responsibilities; 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.

Example 3 on the following page illustrates some of the circumstances that may contribute to the decreased effectiveness of a Safety Department.

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### Example 3 – "How Not to Treat Your Safety Department"

A review of safety and operational issues at an American rail transit system was recently conducted by the safety oversight authority subsequent to a series of fatal accidents. The review found that the organization had not kept abreast with recent developments in system safety. The review also observed that the organization's safety efforts had been weakened by

- frequent changes in the reporting level of the Safety Department,
- staff and budget reductions, and
- a de-emphasis on safety awareness in public and corporate communications.

The Safety Department was moved from place to place in the organization, making its work difficult, its priorities uncertain and its status in the organization marginal. The review found little evidence of the Department's participation in decision making (as required by the organization's own System Safety Program Plan), in the conduct of safety audits and reviews, or in the implementation of public and employee safety awareness programs.

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From 1992 to 1996, the Safety Department staff was reduced from 17 to 12 positions. However, at the time of the review, only 8 of the 12 positions were filled. Furthermore, as a result of the Department's movement through the organization, it became responsible for other functions, further reducing its ability to meet its safety responsibilities. These limitations are reflected in, among other things, the absence of strong public and employee safety awareness programs.

### **C) Employee and Representative Involvement**

#### **2. (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 will help ensure that significant employee concerns are addressed in the policy and will provide 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.

Employees and their representatives should also be consulted in setting annual safety targets and identifying the associated safety initiatives. Consulting with employees 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 2(e)). The risk management process should include mechanisms for employees to identify safety issues and concerns on a routine and ongoing basis. These mechanisms should have a high level of visibility and participation to ensure that all risks are captured. Experienced employees may also be 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 should be involved in the development of risk control strategies, particularly for risks that they have identified.



Employees should 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.

## **D) Compliance with Applicable Regulations, Rules, Standards and Orders**

### **2. (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;**

None of the current railway safety framework of rules, regulations and standards is being replaced by the Safety Management System Regulations, and the existing railway safety requirements will continue to apply in their current form. The Safety Management System will 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 listing of rail safety regulations, rules and general orders as of October 15, 1999. Information on new and amended regulations, rules and standards is available from:

- Transport Canada Web site ([www.tc.gc.ca](http://www.tc.gc.ca))
- Railway Association of Canada Web site ([www.railcan.ca](http://www.railcan.ca))
- Human Resources Development Canada Web site (<http://www.rhdsc.gc.ca/>)
- Justice Canada Web site ([www.canada.justice.gc.ca](http://www.canada.justice.gc.ca))
- Government of Canada general Web site ([www.canada.gc.ca](http://www.canada.gc.ca))

## **E) Risk Management Process**

### **2. (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 it means 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

- Mechanisms for employees to identify safety issues and concerns on a routine, ongoing basis that have high levels of visibility and participation
- 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, safety data collection and analysis, proficiency testing, and internal audit
- 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 2 on the following page). 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.

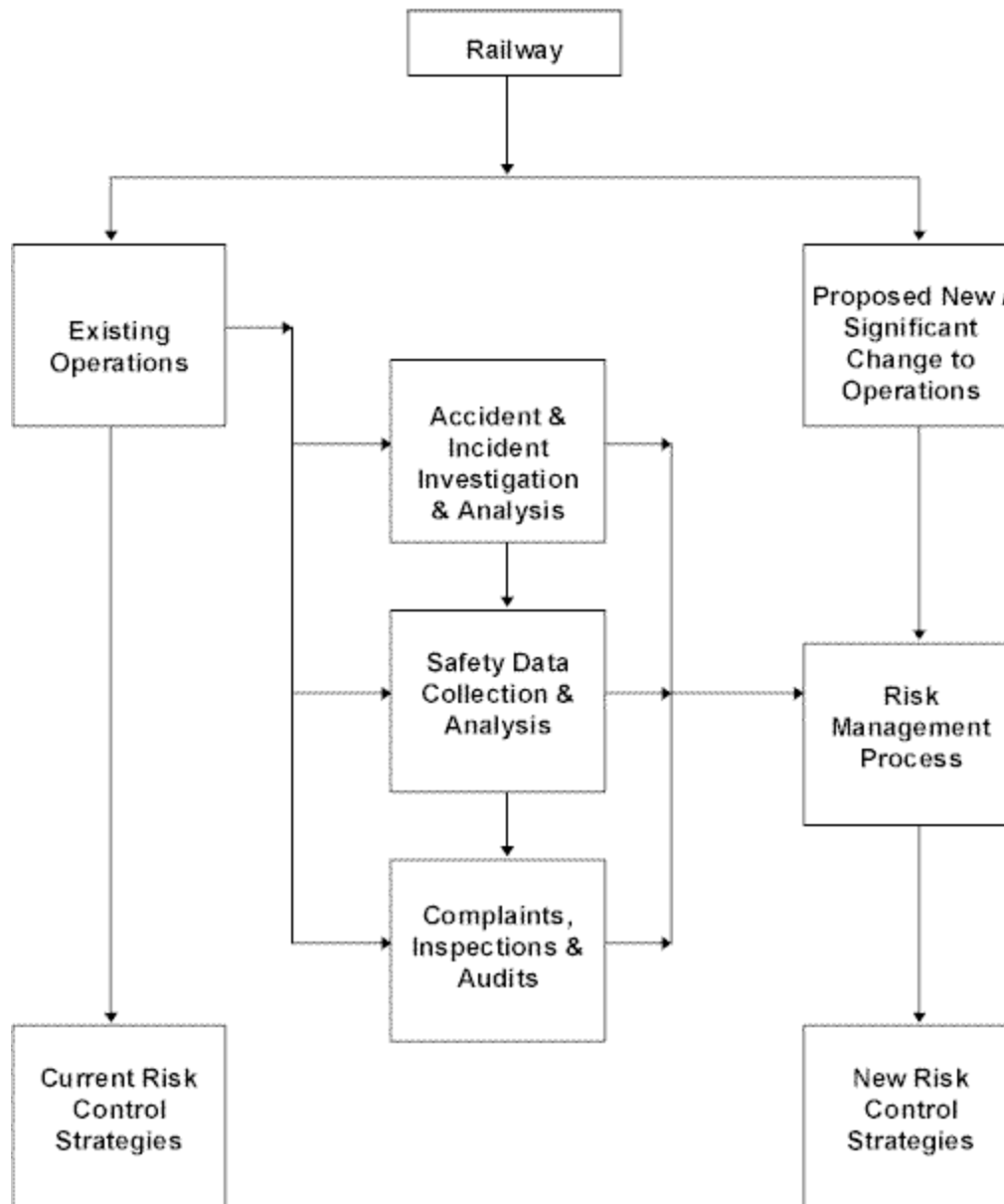
Examples of significant changes requiring a risk assessment process include

- 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 2(f)). 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.

Figure 2

**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 (see Example 4), which is adapted from the *Manual for the Development of System Safety Program Plans for Commuter Railroads*, American Public Transit Association.

**Example 4 - Risk Resolution Matrix**

	SEVERITY			
PROBABILITY	Catastrophic	Critical	Marginal	Negligible
Frequent	unacceptable	unacceptable	unacceptable	tolerable with mitigation
Probable	unacceptable	unacceptable	tolerable with mitigation	tolerable with mitigation
Occasional	unacceptable	tolerable with mitigation	tolerable with mitigation	tolerable
Remote	tolerable with mitigation	tolerable with mitigation	tolerable with mitigation	tolerable
Improbable	tolerable with mitigation	tolerable with mitigation	tolerable with mitigation	tolerable

**SEVERITY CATEGORIES**

- **Catastrophic** = Death or permanent total disability, major property damage, or system loss
- **Critical** = Permanent partial disability, temporary total disability in excess of 3 months, significant property damage or major system damage
- **Marginal** = Minor injury, minor occupational illness, lost workday accident, minor property damage or minor system damage
- **Negligible** = First aid or minor medical treatment, or minor system impairment

**PROBABILITY CATEGORIES**

- **Frequent** = Likely to occur frequently (individual), Continuously experienced (fleet/inventory)
- **Probable** = Will occur several times in the life of an item, Will occur frequently in fleet/inventory
- **Occasional** = Likely to occur sometime in the life of an item, Will occur several times in fleet/inventory
- **Remote** = Unlikely, but possible to occur in the life of an item, Unlikely, but can be expected to occur in fleet/inventory
- **Improbable** = So unlikely it can be assumed that an occurrence may not be experienced, Unlikely to occur, but possible in fleet

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 on the next page (see Example 5). In this case, 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.

**Example 5 - Risk Category Definitions**

	SEVERITY CATEGORIES					
	Minimal	Minor	Marginal	Serious	Critical	Catastrophic
<b>Fatalities</b>					single	multiple
<b>Disabling Injuries (Lost Time)</b>				single	multiple	
<b>Minor Injuries</b>			single	multiple		
<b>Major Yard/Track Disruptions</b>		20 to 60 minutes	1 to 6 hours	6 to 24 hours	24 to 72 hours	1 week
<b>Minor Yard/Track Disruption</b>			6 hours	6 to 48 hours	1 week	1 month
<b>Main Line Disruption</b>		20 to 60 minutes	1 to 6 hours	6 to 24 hours	24 to 72 hours	1 week
<b>Terminal Disruption</b>	20 minutes	a few hours	1 day	2 to 3 days	1 week	1 month
<b>Dangerous Comodities Incident</b>		1 wheel off	derailed, no breach of car	derailed car(s), breached, small quantity of product lost	derailed car(s), breached, large product loss, personal injuries, envir. damage, major evacuation	derailed car(s), breached, large product loss, personal injuries, envir. damage, major evacuation
<b>Damage to Property</b>	>\$100	>\$1K	>\$10K	>\$100K	\$1M	\$10M

Probability Categories	How Frequently Does the Event Occur?	Probability of Recurrence
A	Happens often	High
B	Has happened before	High
C	Can happen	Medium
D	Has happened somewhere before	Medium
E	Hasn't happened before (first time)	Low

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); and
- periodic review of the analysis by senior management.

## F) Risk Control Strategies

### 2. (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.

It is expected that railways will identify some or all of the risks included in the table on the following pages as unacceptable or tolerable with mitigation. This list is not exhaustive, but it 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 2(e) 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.

### Risks and Risk Control Strategies

Area	Risks	Risk Control Strategies
<b>Train and Equipment Operations</b>	<ul style="list-style-type: none"> <li>-derailments</li> <li>-collisions</li> <li>-human reliability (alertness, ability to use equipment and follow procedures)</li> <li>-unintended movements (runaways)</li> <li>-missed or misunderstood communications</li> <li>-failure to follow rules or procedures</li> <li>-failure to see/obey signals</li> <li>-changes in timetable speeds</li> </ul>	<ul style="list-style-type: none"> <li>-uniform, coordinated development and implementation of operating rules and procedures</li> <li>-periodic review and revision of operating rules and procedures</li> <li>-training programs</li> <li>-monitoring of employees and supervisors</li> <li>-rules violation monitoring</li> <li>-human factors analysis</li> <li>-work process mapping</li> </ul>

	-changes in frequency or times of operation	
<b>Equipment, Infrastructure and Facilities</b>	<ul style="list-style-type: none"> <li>-equipment failures leading to collisions, derailments and/or employee injuries</li> <li>-unsafe equipment</li> <li>-safety appliances</li> <li>-passenger cars</li> <li>-infrastructure failures</li> <li>-rail failures (broken, spread)</li> <li>-track condition (ties, ballast, cross -level, spirals, tight rail) areas of recent work</li> <li>-bridge failures</li> <li>-slope failures</li> <li>-washouts</li> <li>-flooding</li> <li>-avalanches</li> <li>-impact of significant changes to operations (type of service, speed, frequency, weight)</li> <li>-signal system failures</li> <li>-crossing automatic protection failures</li> <li>-unsafe facilities</li> <li>-passenger stations</li> <li>-shops</li> <li>-bulk storage facilities for dangerous goods (diesel fuel, methanol, propane, etc.)</li> <li>-pipelines and pipe crossings</li> </ul>	<ul style="list-style-type: none"> <li>-inspection and maintenance standards and procedures, including cycles, record-keeping procedures, and corrective action and implementation monitoring procedures</li> <li>-design and construction standards and procedures</li> <li>-modification review and approval process</li> <li>-procedures for the review and approval of modifications to equipment, systems, infrastructure, etc.</li> <li>-procedures to document changes to equipment and systems, including on as-built drawings</li> <li>-procurement procedures to prevent the introduction of defective or deficient materials and supplies or unauthorized hazardous materials</li> <li>-relevant safety policies, requirements and standards communicated to suppliers through purchasing documents or specifications</li> <li>facility inspection procedures, including a hazard identification and elimination process, cycles, record-keeping procedures, and corrective action and implementation tracking procedures</li> <li>-safety technology</li> <li>-devices on the right-of-way (hot box detectors, wheel impact load detectors, acoustic detectors, thermal imaging detectors, transponders for use in Advanced Train Control Systems, washout and slide detectors)</li> <li>-devices on railway equipment (suspension bearing, detectors (locomotives), wheel and bearing detectors (railway cars), train information braking systems (TIBS), proximity detection devices, voice data recordings, locomotive event recorders, reset safety control devices)</li> <li>-rail traffic control boards and computer systems</li> <li>-signal and traffic control systems</li> </ul>
<b>Grade Crossings</b>	<ul style="list-style-type: none"> <li>-collisions with vehicles (deaths, injuries, derailments, equipment damage)</li> <li>-pedestrian deaths and injuries</li> <li>-near misses causing emergency brake application</li> <li>-crossing blockages impeding emergency services</li> <li>-condition of crossing causing accidents not involving trains</li> <li>-risk to personnel such as flagmen</li> </ul>	<ul style="list-style-type: none"> <li>-grade crossing construction and maintenance standards</li> <li>-inspection frequencies and procedures</li> <li>-crossing safety assessments, including assessment frequencies (traffic volumes, traffic types, sight lines, crossing surface, frequency of obstruction, protection of pedestrians)</li> <li>-application of the risk management process to crossing hazards and the development of appropriate location-specific controls</li> <li>-a public awareness/education program with respect to crossing safety that involves road authorities and other affected parties</li> <li>-number posted at crossings</li> </ul>

	<ul style="list-style-type: none"> <li>-impact of noise from crossings on local residents</li> <li>-impact of anti-whistling prohibitions</li> <li>-changes in train or roadway speeds</li> <li>-changes in frequency or time of operation</li> </ul>	
<b>Trespassing</b>	<ul style="list-style-type: none"> <li>-deaths and injuries to trespassers</li> <li>-trauma to train crews involved in accidents and near misses</li> <li>-equipment damage and runaway equipment from vandalism</li> <li>-objects on track</li> <li>-changes in train speed</li> <li>-changes in frequency or time of operation</li> </ul>	<ul style="list-style-type: none"> <li>-a process for identifying problem locations</li> <li>-application of the risk management process to trespassing hazards and development of appropriate location-specific risk controls</li> <li>-a public awareness/education program with respect to trespassing</li> <li>-involvement of local authorities</li> <li>-fencing and physical barriers</li> <li>-provision of alternatives crossings</li> <li>-keeping right-of-way free of debris</li> </ul>
<b>Interface with Other Railways and Customers</b>	<ul style="list-style-type: none"> <li>-collisions</li> <li>-unauthorized track/yard occupancy</li> <li>-equipment left foul</li> <li>-failure to be qualified in or to follow standard rules and procedures</li> <li>-receiving or delivering defective equipment</li> <li>-operation on infrastructure not maintained to minimum standards</li> <li>-restricted clearances</li> </ul>	<ul style="list-style-type: none"> <li>-a process to ensure safe interface between railways and between the railway and customers</li> <li>-methods of ensuring that other railways and customers are aware of their safety responsibilities</li> <li>-procedures to assess the training and qualifications of customers and other parties whose activities may directly affect railway safety</li> <li>-supervision and proficiency testing</li> </ul>
<b>Contractors</b>	<ul style="list-style-type: none"> <li>-failure to understand or follow company rules and procedures</li> <li>-failure to provide or use safety equipment</li> <li>-failure to coordinate activities with company personnel/train operations</li> <li>-failure to use specified materials, equipment or procedures</li> </ul>	<ul style="list-style-type: none"> <li>-a process to ensure that contractors are trained in the organization's safety procedures and are familiar with safety equipment requirements and their safety responsibilities</li> <li>-ensuring that safety requirements are included in contractors' statements of work and competency requirements</li> <li>-selection, control and performance review of contractors, taking into account contractor ability to meet safety requirements and follow safety procedures</li> <li>-taking action when contractors do not comply with the organization's safety procedures</li> </ul>
<b>Employee Safety</b>	<ul style="list-style-type: none"> <li>-deaths</li> <li>-injuries</li> <li>-incidents (near misses)</li> <li>-fitness for duty</li> <li>-unsafe conditions not</li> </ul>	<ul style="list-style-type: none"> <li>-an employee safety program and health controls that meet the requirements of the Canada Labour Code (Part II)</li> <li>-a process for feedback on risk control actions, safety performance and safety audit results to</li> </ul>



	<p>identified or corrected</p> <ul style="list-style-type: none"> <li>-failure to identify, provide or use safety equipment</li> <li>-hazardous materials in workplace</li> </ul>	<p>employees</p> <ul style="list-style-type: none"> <li>-formal job briefings</li> <li>-safety awareness and promotion programs</li> <li>-a workplace hazardous materials program meeting the Workplace Hazardous Materials Information System (WHIMIS) requirements</li> <li>-safety training, particularly with respect to new equipment, processes and procedures</li> <li>-a recognition and rewards system that recognizes the right behaviours and safe working practices</li> <li>-a safety ombudsman</li> </ul>
<b>Dangerous Goods and Hazardous Materials Transportation</b>	<ul style="list-style-type: none"> <li>-risk to employees from spills, leaks and container failures</li> <li>-risk to the public and communities from large-scale accidents and incidents</li> <li>-receiving or delivering defective or leaking tank cars or containers</li> <li>-negative public perceptions adversely affecting operations</li> </ul>	<ul style="list-style-type: none"> <li>-knowledge of and compliance with the applicable standards, rules and regulations</li> <li>-procedures for identifying and feeding back containment failure data and maintenance deficiencies to the shippers of the dangerous goods</li> <li>-procedures for integrating the organization into industry and community awareness and emergency response (CAER) programs</li> <li>-criteria for identifying and activating external resources for dangerous occurrences</li> <li>-procedures for liaison with and management of external resources at dangerous occurrences</li> <li>-participation in the Canadian Chemical Producers Association "Responsible Care" initiative</li> </ul>
<b>Environmental Impact</b>	<ul style="list-style-type: none"> <li>-damage to the environment from ongoing operations</li> <li>-damage to the environment from accidents, including dangerous goods and fuel spills</li> <li>-noise and fumes</li> </ul>	<ul style="list-style-type: none"> <li>-knowledge of and compliance with the applicable standards, rules and regulations</li> </ul>
<b>Vandalism, Terrorism and Sabotage</b>	<ul style="list-style-type: none"> <li>-risk to employees and operations from deliberate malicious acts</li> <li>-objects on right-of-way</li> <li>-misaligned switches</li> <li>-disabled signals and crossing protection</li> <li>-thrown objects</li> <li>-runaway equipment</li> <li>-sabotaged equipment</li> <li>-bomb/sabotage threats</li> </ul>	<ul style="list-style-type: none"> <li>-identification of risks (threat assessments) and development of security plans and procedures (with the appropriate confidentiality)</li> <li>-staff training and familiarity with security risks and procedures</li> <li>security exercises</li> <li>links with security agencies</li> </ul>
<b>Emergencies</b>	derailments	emergency preparedness and response

### **G) Accident and Incident Reporting, Investigation and Analysis**

#### **2. (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.

See Example 6 below for a list of the elements to be included in a comprehensive railway accident investigation process. Example 7 (on the following page) details the role of accident cause finding and corrective actions in accident prevention.

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.

## **Example 6 – Elements of a Comprehensive Railway**

### **Accident Investigation Process**

- Introduction
- Investigation and Reporting Process
  - investigating team
  - forms and materials
  - preliminary data gathering
  - weather information
  - arriving at site
  - dealing with government agencies
- Cause-finding Process
- Inspecting Cars
- Inspecting Locomotives
- Inspecting Track
- Operational and Human Factors
- Track Car Dynamics
- Train Dynamics
- Billable Accidents
- Appendices
  - Train Accident Investigation and Reporting Process
  - Train Accident Costing Policies
  - Fact Finding and Accident Forms
  - Train Accident Cause
  - Explanation of Selected Train Accident Causes
  - Track Standards

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### **Example 7 – The Role of Accident Cause Finding and Corrective Actions in Accident Prevention**

Most (train) accidents can be prevented. Finding the cause of each accident, regardless of how minor, is critical to preventing a recurrence. The Investigating Team must recommend a cause (or causes) as well as preventative actions to the Train Accident Prevention Chairperson, who is responsible for implementing the required corrective actions. There are two categories of preventive actions: immediate protection and long-term correction.

The purpose of immediate protection is to reduce the immediate risk of another similar train accident. Examples are a 10 mph temporary speed restriction at the site when the cause was a track geometry defect or a 40 mph speed restriction on a type of car that appears to be unstable at

higher speeds. The immediate protective actions, when required, must be implemented by the Investigating Team before operations are resumed.

Once the cause of an accident is known and all relevant conditions and failures have been identified, long-term corrections may be appropriate. The purpose of these actions is to reduce the likelihood of a similar train accident recurring in the future. Examples of long-term corrective actions would be the accelerated removal of straight plate wheels and the overhaul of trucks on a specific class of car.

Source: Train Accident Cause Finding Manual (Train Accident Prevention and Testing)

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## **H) Skills, Training and Supervision**

### **2. (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.

Example 8 details the importance of supervision in preventing accidents due to "operational and human factors".

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#### **Example 8 – The Role of Supervision in Preventing Accidents Due to Operational and Human Factors**

Inappropriate operating practices, judgment errors and failure to comply with rules may cause an accident. A rules violation, while serious, is not necessarily the cause of the accident. Similarly, compliance with rules or accepted operating practices does not automatically remove the cause from the "operational and human factors" group of train accident causes. The other two groups are "equipment" and "track".

Supervisors and employees must accept the principle that most accidents can be prevented. Supervisors must properly manage their people in order to prevent these causes. The employee must be educated on how to do the job and clearly instructed on what to do. Formal rules examinations, efficiency tests and observations during daily contact must be used to verify job

knowledge and compliance. The employee must be given additional education after a deficiency is detected.

Source: Train Accident Cause Finding Manual (Train Accident Prevention and Testing)

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## **I) Safety Performance Data Collection and Analysis**

### **2. (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 (see Example 9 on the following page for a sample listing of activity measures). 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.

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.

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### **Example 9 - Activity Measures for Rail Safety Analysis**

- **Million Train Miles (Canada)** - Monthly, Annually
  - **Million Train Miles (Provincial)** - Monthly, Annually
  - **Train Miles by Service Corridor** - Quarterly
  - **Miles of Track** - Annually - Canada, Annually - Provincial
  - **Density Reports (gross tons per subdivision)** - Annually
  - **Yard Lead Locomotive Switching Miles** - Monthly by Yard, Annually by Yard
  - **Fuel Consumption** - Monthly, Annually
  - **Employee Hours (per 200,000)** - Annually
  - **Employees Employed by Occupation Category** - Annually
  - **Subdivisions** - Annually (Listing of subdivisions sold and active subdivisions with start and end mileage)
  - **Accidents/Incidents** - Causes related to each accident/incident, Monthly, Annually
- 

## **J) Safety Audit and Evaluation**

### **2. (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 Safety Management 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.

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 senior railways with which they interchange, consultants and professional auditors.

## **K) Corrective Action Development, Approval and Monitoring**

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

The key to the effectiveness of a Safety Management System is 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 2(d));
- the risk management process (component 2(e)), particularly step 1 – identification of safety issues and concerns;
- risk control strategies (component 2(f));
- accident and incident investigation (component 2(g));
- reviews of skills and training requirements and the results of supervision and proficiency testing (component 2(h));
- safety performance data analysis (component 2(i)); and
- safety audits and evaluations of the Safety Management System (component 2(j)).

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.

#### **L) Documentation**

##### **2. (1) 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 document 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.

### **3. RECORD-KEEPING REQUIREMENTS**

#### **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 (see Definitions); and**
- b. accident rates expressed as follows:**
  - 1. employee deaths, disabling injuries and minor injuries, per 200,000 hours worked by the employees of the railway company, and**
  - 2. 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. INITIAL SUBMISSION REQUIREMENTS**

#### **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 Safety Management System documentation required by component 2(1) should be much more comprehensive. Transport Canada audits will scrutinize the system and its documentation in detail to verify adequacy and effectiveness.

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 sub-divisions (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.

## **5. ANNUAL SUBMISSION REQUIREMENTS**

**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 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 on the continuing state of railway safety in Canada.

## **6. PRODUCTION OF DOCUMENTS**

**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 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.

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### **APPENDIX A: RAILWAY SAFETY MANAGEMENT SYSTEM REGULATIONS**

[http://www.tc.gc.ca/railway/SMS\\_Regulations.htm](http://www.tc.gc.ca/railway/SMS_Regulations.htm)

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### **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 du facteur humain*)

**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*)

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**APPENDIX C**  
**LIST OF RAIL SAFETY REGULATIONS, RULES AND ORDERS\***

TITLE/SUBJECT	NUMBER	TYPE	DISCIPLINE	EXE MPTI ON
Air Reservoir Rule	TC 0-10	Rules	Equipment	
Bulk Storage, Ammonium Nitrate	GO 0-36	Regulations	Equipment	
Bulk Storage, Anhydrous Ammonium	GO 0-33	Regulations	Equipment	
Bulk Storage, Chlorine Tank Car	GO 0-35	Regulations	Equipment	
Bulk Storage, Flammable Liquids	GO 0-32	Regulations	Equipment	
Bulk Storage, Liquefied Petroleum Gases	GO 0-31	Regulations	Equipment	
Cabooseless Ore Trains Operations	R-40691	Order	Operations	
Caboose, Marshalling of Occupied	R-40809	Order	Operations	
Canada Labour Code - Part 2	OSH 2CLC	Regulation	Supplementar y	
Canadian Rail Operating Rules	TC 0-01	Rules	Operations	Yes
Clearance Standards - Minimum	TC E-05	Standards	Engineering	
Control and Prevention of Fires on Railway Rights-of-Way	TC E-06	Rules	Engineering	
Crossing, Highway at Grade	CTC 1980-8 RAIL	Regulations	Engineering	
Crossing, Highway Protective Devices	GO E-06	Regulations	Engineering	
Crossing, Pipe Under Railways	GO E-10	Regulations	Engineering	
Crossing, Wire and Proximities	GO E-11	Regulations	Engineering	
Ditch Lights Installation (amending R-38525)	R-39613	Order	Operations	
Ditch Lights Installation - CN & AMTRAK	R-39244	Order	Operations	
Ditch Lights Installation - CN & VIA (amended by R-38525)	R-39243	Order	Operations	
Ditch Lights Installation - CN & VIA (amending R-39243)	R-39398	Order	Operations	

Ditch Lights Installation - CN (amending R-38525)	R-39245	Order	Operations	
Electric Sparks, Prevention of	CTC 1982-8 RAIL	Regulations	Engineering	
Employee Minimum Qualification Standards	CTC 1987-3 RAIL	Regulations	Operations	
Event Recorders Installation - CN	R-40614	Order	Operations	
Event Recorders Installation - CP	R-40340	Order	Operations	Yes
Event Recorders Installation - VIA	R-39921	Order	Operations	
Freight Car Safety Rules (revised 94/10/25)	TC O-06.1	Rules	Equipment	
Gateway Inspection	R-31780, R-41089(112R)	Order	Operations	
Hours of Work, Maximum, for Railway Operating Employees	MO 93-01	Ministerial Order	Operations	
Locomotive Inspection and Safety	TC 0-13	Rules	Equipment	Yes
Locomotive Lights and Lamps	GO 0-14	Regulations	Equipment	
Locomotive, Engine Bell and Whistle	GO 0-25	Regulations	Equipment	Yes
Mandatory Off-duty Time for Railway Operating Employees	TC 0-04	Rules	Operations	Yes
Mining Near Lines of Railway	TC E-03	Regulations	Engineering	
Non-Smoker's Health Act and Smokers Regulations		Regulations	Supplementary	
Notice of Railworks (revised 94/11/01)	TC E-02	Regulations	Engineering	
Occupational Safety and Health, Committees and Representatives Regulations	OSH 86	Regulations	Supplementary	
Occupational Safety and Health, MOU - Labour Canada and TC	OSH-MOU	MOU	Supplementary	
Occupational Safety and Health, On Board Train Regulations	OSH 95	Regulations	Supplementary	
Passenger Car Inspection & Safety Rules	TC 0-12.1	Rules	Equipment	
Radio Communication Rule	TC 0-09	Rules	Operations	Yes
Rail Grinding Equipment Operations	R-37621	Order	Operations	
Rail Service Equipment Cars	CTC 1986-9 RAIL	Regulations	Operations	Yes
Relevant Associations and Organizations	MO 97-01	Ministerial Order	General	
Reset Safety Control System - CN	R-40950	Order	Equipment	Yes
Reset Safety Control System - CP	R-40951	Order	Equipment	Yes
Reset Safety Control System - VIA	R-40537	Order	Equipment	
Safe Containers Convention Act and Regulations	SCCAR	Regulations	Supplementary	
Safety Appliance Standards	GO 0-10	Regulations	Equipment	Yes
Safety Critical Positions	MO 92-03	Ministerial Order	Operations	
Signal and Traffic Control System Standards	TC E-07/08	Standards	Engineering	Yes
Switch Locks Installation - CN	R-39612	Order	Operations	

Switch Locks Installation - CP	R-39910	Order	Operations	
Switch Locks Installation - VIA	R-39611	Order	Operations	
Track Safety Rules (revised 97/12)	TC E-04.1 TC E-04.2	Rules	Engineering	Yes
Track Units and Track Work Protection (revised 95/11/01)	TC 0-02	Rules	Operations	
Train Brake Rules (revised 94/10/25)	TC 0-07.1	Rules	Equipment	Yes
Train Speed on CN's Weston and York Subs. (for DC)	NTA 1988-R-915	Order	Operations	
Train Speed on CP's MacTier, Galt, North York and Bellville Subs. (for DC)	NTA 1988-R-916	Order	Operations	
Train Speeds on Smith Falls and Brockville Subs. (amended by R-36977)	R-36883	Order	Operations	
Train Speeds on Smith Falls and Brockville Subs. (amending R-36883)	R-36977	Order	Operations	
Train Speed Restriction - Show Cause	R-36550	Order	Operations	
Train Speed, CN Rail (amended by R-39611)	R-38525	Order	Operations	
Train Speed, CP Rail (amended by R-39611)	R-38524	Order	Operations	
Vision and Hearing Examination (amended by CTC 1985-3 RAIL)	GO O-09	Regulations	Operations	Yes

\* Railway Safety Handbook, Transport Canada - Revised October 15, 1999

## APPENDIX D SAMPLE EMERGENCY/ACCIDENT CONTACT LIST

This matrix was developed for use in Ontario to assist railways in understanding the role and reporting requirements of government agencies that may be involved in train accidents. There will be differences in roles and reporting numbers in other provinces, but this list should provide a guide as to who to contact.

<b>Federal Agency</b>	<b>24-hour Number</b>	<b>Mandatory Reporting</b>	<b>Also Gets Reports on/from</b>	<b>Attends Accident to...</b>
1) <i>Transportation of Dangerous Goods Act</i> <b>Transport Canada</b> <b>Headquarters: Dangerous Goods Directorate</b> <b>Region: Surface Group</b> <b>Dangerous Goods Section</b> (TC Remedial Measures)	Canutec 613-996-666	Dangerous goods accidents and spills	Fire and Police Departments Environment Canada and the Provincial Ministry of the Environment Transportation Safety Board	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

Specialist or TC Dangerous Goods Inspector)				federally registered emergency response assistance plans Gather evidence
2) <i>Canada Labour Code</i> <b>Transport Canada Headquarters: Railway Safety Directorate Region: Surface Group Operations Section</b> (TC Operations or Equipment Officer)	Refusals to Work: Ontario 613-990-4544 Other Provinces: TC regional office during working hours (off hours: 613-990-4544, which will be forwarded to Canutec)	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	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 TRAVELING on rail but not at a work site	Investigate the cause and circumstances of accidents involving employee death or serious injury Issue directions or seek assurances of voluntary compliance Gather evidence
3) <i>Railway Safety Act</i> <b>Transport Canada Headquarters: Railway Safety Directorate Region: Surface Group Engineering, Operations or Equipment Sections</b> (A TC Railway Safety Officer from the relevant discipline)	None, reports are currently received through the Transportation Safety Board		A criteria for serious railway accidents has been provided to the TSB, which notifies the Rail Safety Directorate or Canutec during off hours	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
<b>Transportation Safety Board</b>	819-997-7887	All railway accidents and incidents, as per TSB regulations		Investigate the cause and circumstances of the accident and make recommendations to prevent a recurrence

<b>Human Resources Development Canada</b> (the old Labour Canada)	Closest regional office <b>Toronto West</b> 905-542-2385 <b>Toronto East</b> 416-973-4498 <b>Toronto North to Sudbury</b> 416-954-5902 London 519-645-4406 <b>Ottawa</b> 613-998-9803 <b>Northwestern Ontario</b> 807-345-5474 <b>Manitoba Region</b> 204-983-6375 <b>Quebec Region</b> 514-283-1385 514-283-6250	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 TRAVELING on rail to and from a work site (these are covered by Transport Canada under an agreement)		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
<b>Environment Canada Ontario Ministry of the Environment</b>	Spills Action Centre (800) 268-6060	All spills (chemical and fuel) affecting the environment	Environment Canada Emergencies Centre 819-997-3742	Protect the environment (representatives could be federal, provincial or both) Investigate spills (can prosecute) Assist provincial authorities (primarily air monitoring)
<b>Local Police, Ontario Provincial Police, Fire Department</b>	911 or local numbers, as appropriate	All dangerous occurrences under the <i>Transportation of Dangerous Goods Act</i> Accidents with community impact	Canutec	Protect life Control the scene Coordinate evacuations Fight fires Contain spills

<b>Mayor or Head of Local Municipality</b>	Advised as accident escalates from a police/fire issue to a community threat	Emergencies affecting the community		Take charge under the authority of the <i>Emergency Plans Act</i> , Ontario
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## REFERENCES AND INFORMATION SOURCES

- Risk Management: Guideline for Decision-Makers, CAN/CSA-Q850-97, Canadian Standards Association, October 1997.
- Risk Analysis Requirements and Guidelines, CAN/CSA-Q634-M91, Canadian Standards Association, November 1991.
- CSA Web site: [www.csa-international.org](http://www.csa-international.org)
- Manual for the Development of System Safety Program Plans for Commuter Railroads, American Public Transit Association, December 1997.
- United States Military Standard 882(C).
- Probabilistic Risk Assessment; Reliability Engineering, Design, and Analysis, Ernest J. Henley / Paperback / Published 1994.
- Risk Assessment and Management Handbook : For Environmental, Health, and Safety Professionals, Rao V. Kolluru (Editor) et al / Hardcover / Published 1996.
- Risk Assessment and Risk Control, J. Clarence Davies, Edwin H. Clark / Paperback/ Published 1985.

## LIST OF TRANSPORT CANADA - SURFACE OFFICES

### National Capital Region:

#### **Transport Canada Rail Safety Branch**

Mailstop: ASR  
427 Laurier Street,  
Ottawa, Ontario  
K1A 0N5

Email: [railsafety@tc.gc.ca](mailto:railsafety@tc.gc.ca)  
Phone: **1-888-267-7704 / 613-998-2985**  
Fax: **613-990-7767**

### Regional offices

<http://www.tc.gc.ca/rail/offices.htm>