Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

铁路与城市轨道交通安全管理系统
Safety Management System (SMS) for Railway and Rail Transit

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Canada

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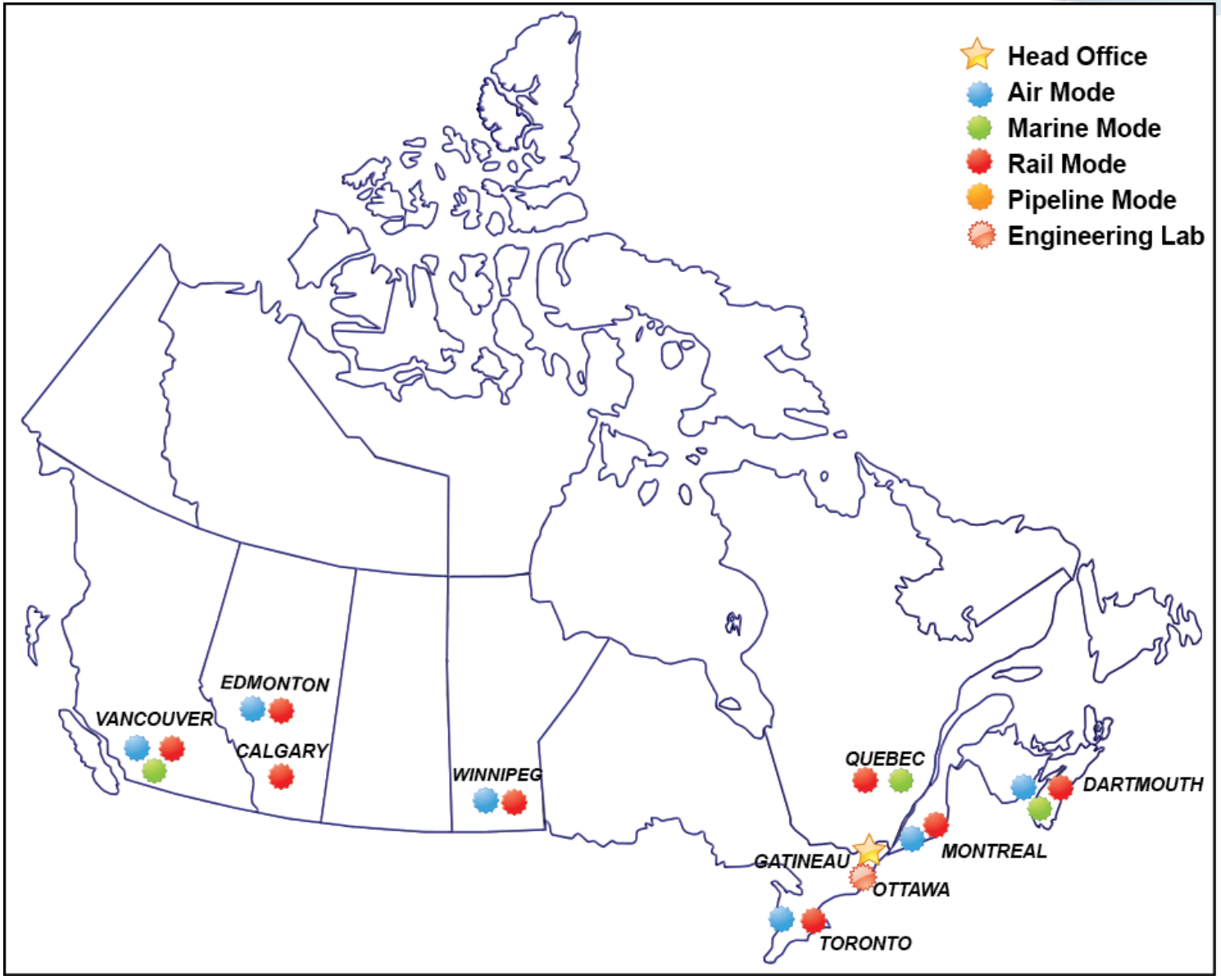
TSB Mandate

TSB mandate is to advance transportation safety in the marine, pipeline, rail and air modes of transportation by:

- Conducting independent investigations
- Identifying safety deficiencies
- Identifying causes and contributing factors
- Making Recommendations
- Reporting publicly
- It is not the function of the TSB to assign fault or determine civil or criminal liability.


Head Office
Air Mode
Marine Mode
Rail Mode
Pipeline Mode
Engineering Lab
VANCOUVER
EDMONTON
CALGARY
WINNIPEG
QUEBEC
DARTMOUTH
MONTREAL
GATINEAU
OTTAWA
TORONTO

TSB Rail Investigation Work

- About 1300 rail occurrences reported per year
- Mandatory data & cause codes recorded
- 25 to 30 deployments per year
- 15-25 formal rail investigations per year following TSB methodology
- Statistical analysis for trends and annually submit a report to the Parliament of Canada

What is a SMS

- 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.
- 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.

Introduction of SMS

- Based on System Science
- First applied in air/aerospace safety management
- A system to manage safety risk
- Well studied issues to watch
- Developed procedures to follow
- Multiply protections
- Continuously self-learning and improvement
- Mandatory application
- Interaction between TC-TSB-Operators
- Training and Feedback

Introduction

- Required by Transport Canada (TC) 's *Railway Safety Management System Regulations, into effect in 2001,* pursuant to section 37 and subsection 47.1(1) of the *Railway Safety Act*.
- 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.

Introduction

- A guide for implementation has been updated by the SMS Working Group formed in 2008
- 12 components required by section 2 of the *Railway SMS Regulations*.
- Integration of the 12 components in the SMS process.
- The other requirements of the regulations.
- Definition of the key concept of safety culture.
- How to achieve a strong safety culture.
- Examples of SMS methods and approaches.
- Best practices to implement each required component.
- Best practices for small railways.

Four Ps for SMS

- *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.

Four Ps for SMS

- *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.

Compliance

- 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.

Myths about Railway SMS

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 railway companies proactively demonstrate their management of safety, it is Transport Canada that oversees compliance with the regulations.

Myths about Railway SMS

SMS does not mean:

- 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.

Regulatory 12 Core Components

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;

b) clear authorities, responsibilities and accountabilities for safety at all levels in the railway company;

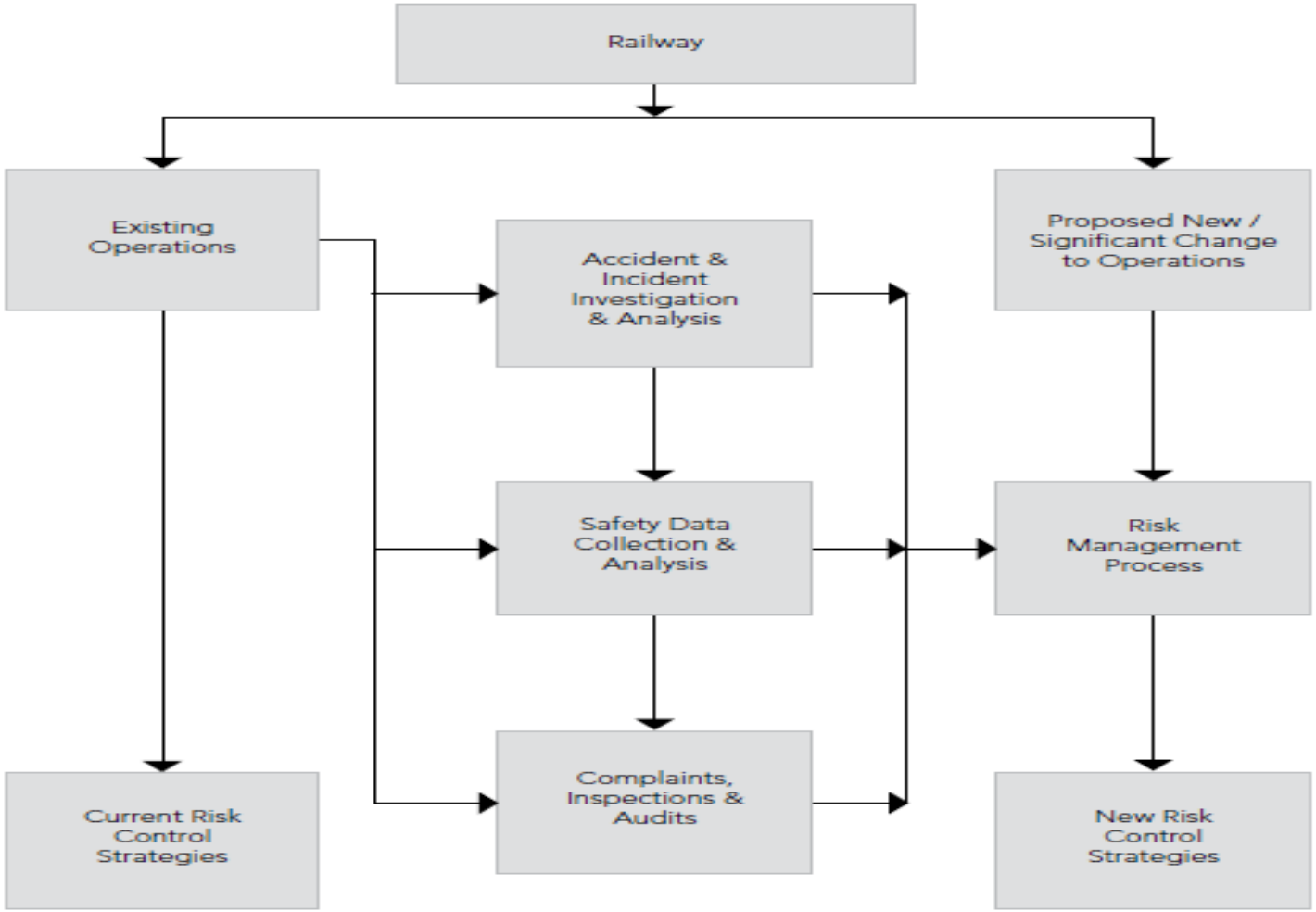
c) a system for involving employees and their representatives in the development and implementation of the railway company's safety management system;

Regulatory 12 Core Components

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.

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



Regulatory 12 Core Components

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

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;

Regulatory 12 Core Components

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;

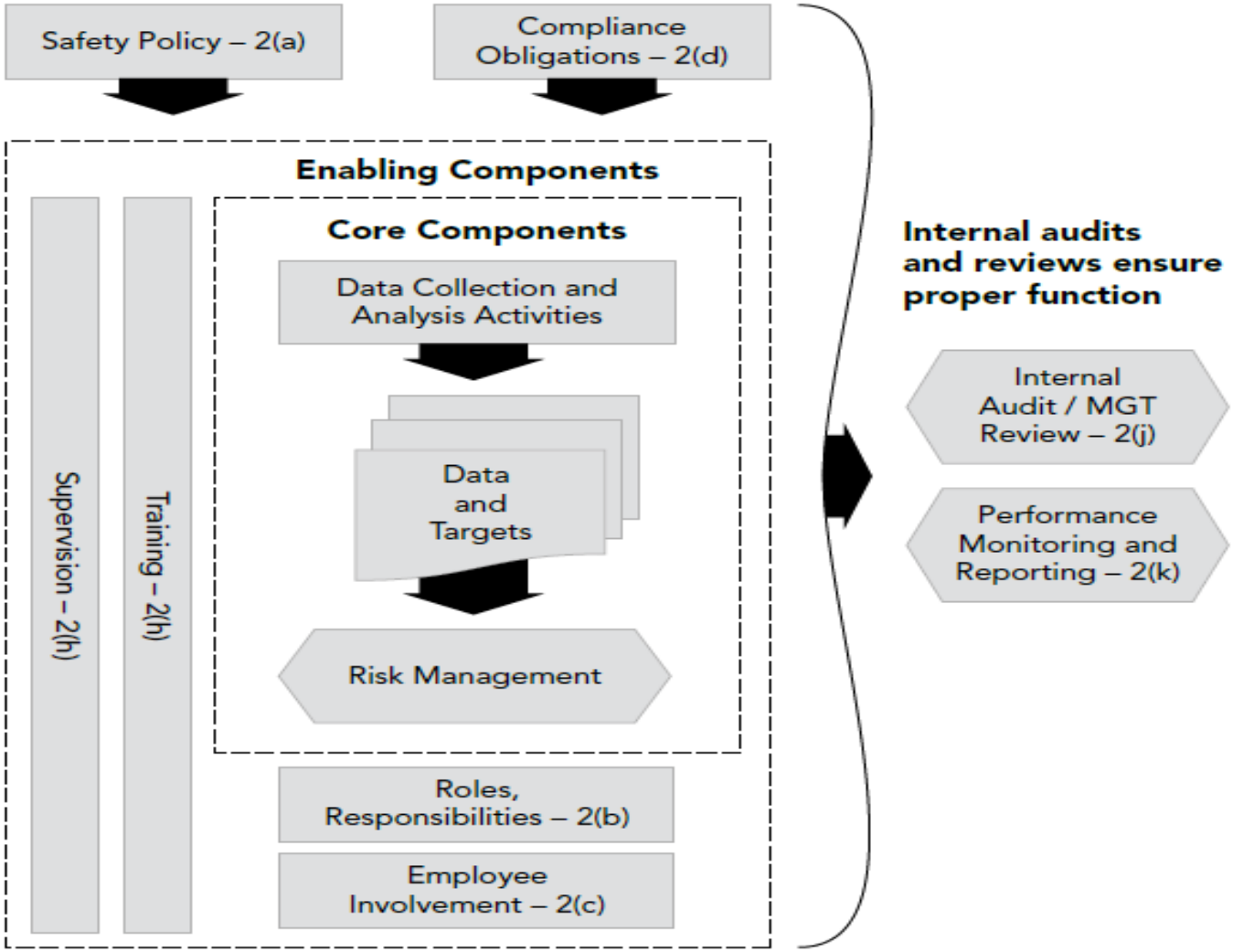
k) systems for monitoring management-approved corrective actions resulting from the systems and processes required under paragraphs d) to j);

l) consolidated documentation describing the systems for each component of the safety management system.

Implementation of SMS

- The 12 components and break- down show how they are linked and integrated, through successive layers of defenses, barriers and safeguards, in the process that drives a safety management system.
- Risk management is the central goal of this process.
- Next figure shows the relationships between the core, enabling, safety policy and compliance, and evaluation components of a safety management system.
- When all the components of an SMS process are in place, the entire process must be evaluated and its performance monitored.

Safety Management System – Safety Evaluation



Other Requirements – 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.

Other Requirements – 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.*

Other Requirements - Annual Submission and Production of Documents

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.*

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.*

Achieving A Strong Safety Culture

- *The safety culture of an organization is the result of individual and group values, attitudes, perceptions, competencies and patterns of behavior 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.*

Achieving A Strong Safety Culture

The 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*

Non-Punitive Reporting

- In its review of best practices of safety culture, it became clear 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 labor, must clearly understand the circumstances which will result in discipline.

Experiences and Lessons in Canada

- Very successful in air mode
- Started in railway in 2001
- Gradual but uneven progress in different railways
- TC Railway SMS Guide developed in 2007
- TSB pushed implementation of railway SMS on its Watchlist 2010
- Satisfactory progress made and removed from TSB Watchlist 2012
- SMS is an essential part of rail accident investigations
- Correct understanding and strong leadership are the key to the success of Railway SMS.
- Search TSB investigation reports at www.tsb.gc.ca

Lac-Megantic Accident

- On 6 July, 2013 at Quebec Town Lac-Megatic
- One crew oil train consisted of 5 locomotives and 73 loaded cars (72 tank cars loaded with oil)
- Parked on main track of 0.8-1.2% grade
- Handbrakes applied on locomotive consist and buff car and IND brakes on locomotives, Engine on first locomotive left running
- A fire occurred and was put out, firefighters turned off the running engine.
- BP and BC started to drop some time later
- Train ran away and accelerated to 65 mph, derailed, fire and explosions, 47 fatalities, 32 buildings destroyed.

Lac-Megantic Accident

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Lac-Megantic Accident

Lac-Megantic Accident

- Investigation covers all aspects including SMS
- 12 components being examined
- SMS implementation and records
- Organizational and human factors
- Operation procedure
- Mechanical and engineering test
- Safety culture
- Media and community relationship
- Insurance coverage
- Safety communications
- Technical and investigation reports expected in 2014


Canada