Safety Culture Progress in the Canadian Railway Industry

Background

Railways recognize that a strong safety culture is essential for their success because it is people that operate trains, maintain track and equipment, and deliver shipments to customers. Further, railways are generally large, with decentralized operations, where employees work mostly unsupervised, and must therefore be committed and motivated to independently make the right decisions to service customers safely while protecting the public and the environment.

Railways therefore have a prime vested interest in fostering a strong safety culture since it is the right and responsible thing to do, and also because it makes good business sense by supporting service, efficiency and cost control.

The Canadian Regulatory framework consists of numerous safety regulations and rules in effect under the Railway Safety Act (RSA), the Transportation of Dangerous Goods (TDG) Act, and other legislation. In addition to these rules and regulations, Transport Canada added a requirement under the Railway Safety Act in 2001, for railways to implement *Safety Management Systems (SMS)* which exist in parallel and add to the robust regulatory regime.

SMS Regulations are a modern approach to safety used worldwide in safety critical industries to promote continuous improvement and an effective internal responsibility system. SMS Regulations have enabled railways to advance beyond minimum compliance, by instituting processes and a corporate culture focused on risk identification and mitigation, whether or not they are covered by Act, rule, or regulation.

SMS Regulations added momentum for safety culture because of key elements such as training and employee involvement - both important components of a strong safety culture. The Railway Safety Act (RSA) review of 2007 brought further advancement in safety culture because it was followed with a common roadmap and a more elaborate structure for safety culture, thereby providing the opportunity for railways to advance further through a cohesive approach while sharing best practices and learnings.

This report provides a summary of how the 2007 RSA review set in motion collaborative efforts between regulators, railways and labour unions to define, develop and strengthen safety culture – a commitment and effort which continues to move forward today.

2007 Railway Safety Act Review – Findings on Safety Culture

Safety culture was a key area of focus for the 2007 RSA review because its far-reaching significance was recognized from the onset. In the design of this review, the RSA review panel[1] noted:

> *"In commencing the review, we considered carefully its objective of further improving railway safety in Canada and, ultimately promoting a better safety culture within the railway industry."*

In their research, analysis and consultations, the 2007 RSA review panel further recognized the important role that safety culture can play in the effective implementation of SMS, noting in Section 5.3 of the report that:

> *"The cornerstone of a truly functioning SMS is an effective safety culture. The Panel views such a culture as one in which safety values are firmly entrenched in the minds of managers and employees at all operational levels, and respected on a daily basis in the performance of their duties. It is demonstrated by the decisions, actions and behaviour of individuals….*
> *SMS requires drastic cultural change for both the regulator and the regulated. The Panel recognizes that culture change is a long-term endeavour and no easy task."*

Recommendations 18 and 24 of the 2007 RSA report aimed to bring stakeholders together to measure and achieve an effective safety culture:

Recommendation 18
> *"Transport Canada, Rail Safety Directorate and the railway industry must take **specific measures to attain an effective safety culture**."*

Recommendation 24
> *Transport Canada and industry should work together to develop the tools to assist railway companies in improving their safety management systems, including:*
> *-- proactive safety performance measures;*
> *-- identification of the company data needed to support these measures;*
> *-- **measurement of safety culture;***
> *-- guidance on company safety-risk profiles and risk assessments of ongoing activities;*
> *-- user-friendly safety management system tools for small railway companies;*
> *-- evaluation techniques to supplement existing audits and inspections; and*
> *-- a means of involving railway employees at all levels and, where possible, through health and safety committees and representatives.*

These recommendations provided clear direction; however, much groundwork was required because at that time there was no common understanding of safety culture or the initiatives required to measure and strengthen it. Stakeholders therefore recognized that it was necessary to first develop a definition of safety culture acceptable to all parties, which in turn would allow for the development of a practical approach to assess and proactively strengthen safety culture in the Canadian railway industry.

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1. Refer to page 3 of: *'Stronger Ties – A Shared Commitment to Railway Safety – A Review of the Railway Safety Act, November 2007'.* https://www.tc.gc.ca/media/documents/railsafety/TRANSPORT_Stronger_Ties_Report_FINAL_e.pdf

Progress since the 2007 RSA Review

The 2007 RSA recommendations set in motion consultations and the formation of work groups that engaged regulators, railways, the Railway Association of Canada, and unions. Overall, six work groups were established to achieve implementation of the recommendations under the guidance of a Steering Committee[2], with regular updates also provided to the Advisory Council on Railway Safety (ACRS).

Under this initiative, a key work group was formed in 2008 to advance the RSA recommendations on Safety Management Systems and Safety Culture. This work group set out to build a foundation for safety culture and develop a practical roadmap to strengthen it. The driving force behind this effort was the recognition by all parties that safety, as well as safety culture, were critically important and a common objective for all parties.

The work group embarked on a multifaceted research strategy that included a review of safety culture in other safety-sensitive industries in various countries. The purpose of this research was to explore the literal definition of safety culture with the aim to find appropriate building blocks for developing a definition for the Canadian railway industry. The research identified a great deal of commonality in the definition of safety culture elsewhere, and enabled the work group to develop, review and formally approve a formal definition for safety culture, as follows:

> *"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."*

This was followed by the identification of five dimensions which characterize a strong safety culture:

1. Leadership and commitment to safety culture
2. Two-way communication
3. Stakeholder / employee / employee representative involvement
4. A learning culture
5. A just culture

In order to provide a practical meaning for the 5 safety culture dimensions, the work group identified expectations for each dimension[3], some of which are listed below:

1. Leadership and commitment to safety culture:
   - ✓ *Clear leadership commitment to safety at the executive/senior level, as well as by line management.*
   - ✓ *Safety is a core value at all levels of the company.*
   - ✓ *Safety is integrated into all levels of the company through policies, processes, procedures, objectives and initiatives.*

2. Two-Way Communication:
   - ✓ *Many ways to promote management–employee communications (e.g., safety meetings, town hall meetings, safety forums, briefings, mentoring, performance reviews).*
   - ✓ *Many ways to raise employee awareness and knowledge of safety (e.g., newsletters, communiqués, brochures, safety flashes, training).*

3. Stakeholder / Employee / Employee representative involvement:
   - ✓ *Involvement in risk assessments and investigations.*
   - ✓ *Participation in safety site visits, walkabouts, audits, etc.*
   - ✓ *Empowered and proactive health and safety committees (e.g., annual action plans for top causes).*

4. A Learning Culture
   - ✓ *Continuous improvement through internal and external reviews.*
   - ✓ *Processes for monitoring safety trends (e.g., trend analysis).*
   - ✓ *Use of leading indicators (e.g., near-misses, audit results, rule violations, health and safety effectiveness).*

5. A Just Culture:
   - ✓ *Company policies that encourage and recognize employees.*
   - ✓ *Internal escalation process for unresolved health and safety issues.*
   - ✓ *Internal recourse for employees to deal with safety issues (e.g., safety ombudsman).*
   - ✓ *Complete and objective investigations.*

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3. Transport Canada 'Safety Culture Checklist' – Publication TP 15062, 2010
http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2010/tc/T33-23-2-2010-eng.pdf

With a formal definition established for the railway sector, the working group was well placed to develop meaningful tools and guidance material to improve safety culture. Transport Canada demonstrated leadership and worked with stakeholders to create a website and publish two key documents:

- A 'Safety Culture Checklist'[3] which contained the definition, five dimensions, as well as expectations and desirable practices for each dimension.
- A Safety Management System Guide[4] with a specific part (section 5) entitled 'Achieving an Effective Safety Culture' which provides pertinent guidance and practices. This guide mentions that *"achieving an effective safety culture is the ultimate goal of SMS"*, and "*the tools described in this guide are building blocks for railways to achieve this goal"*.

The 'Safety Culture Checklist' set the stage for developing a methodology for assessing safety culture by identifying specific practices for each of the five safety culture dimensions, and by suggesting to railways to "*Use this checklist to assess your company's safety culture."*

On the basis of this work, a methodology for assessing safety culture was developed by a railway jointly with its unions in 2010, and then shared with the industry. In essence, this consisted of a perception survey which assessed each of the five safety culture dimensions, and asked respondents to suggest improvement opportunities. Early assessments identified key opportunities which were followed by significant railway-specific initiatives such as training modernization, leadership development and peer-engagement programs.

In order to sustain and enhance the safety culture assessment process, Transport Canada formed a project team with the mandate to 'develop a tool to measure and improve safety culture[5]'. This project team engaged Transport Canada, including the Transportation Development Center, railways, RAC and external experts who researched methodologies across different industries and regulators in North America, Europe and Australia. This effort enabled further enhancements to the safety culture assessment process, and was followed with a field pilot to validate the process.

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4. '*Transport Canada 'Railway Safety Management Systems Guide'– Publication TP 15058E, 2010*
http://publications.gc.ca/site/archivee-
archived.html?url=http://publications.gc.ca/collections/collection_2010/tc/T33-23-2010-A-eng.pdf
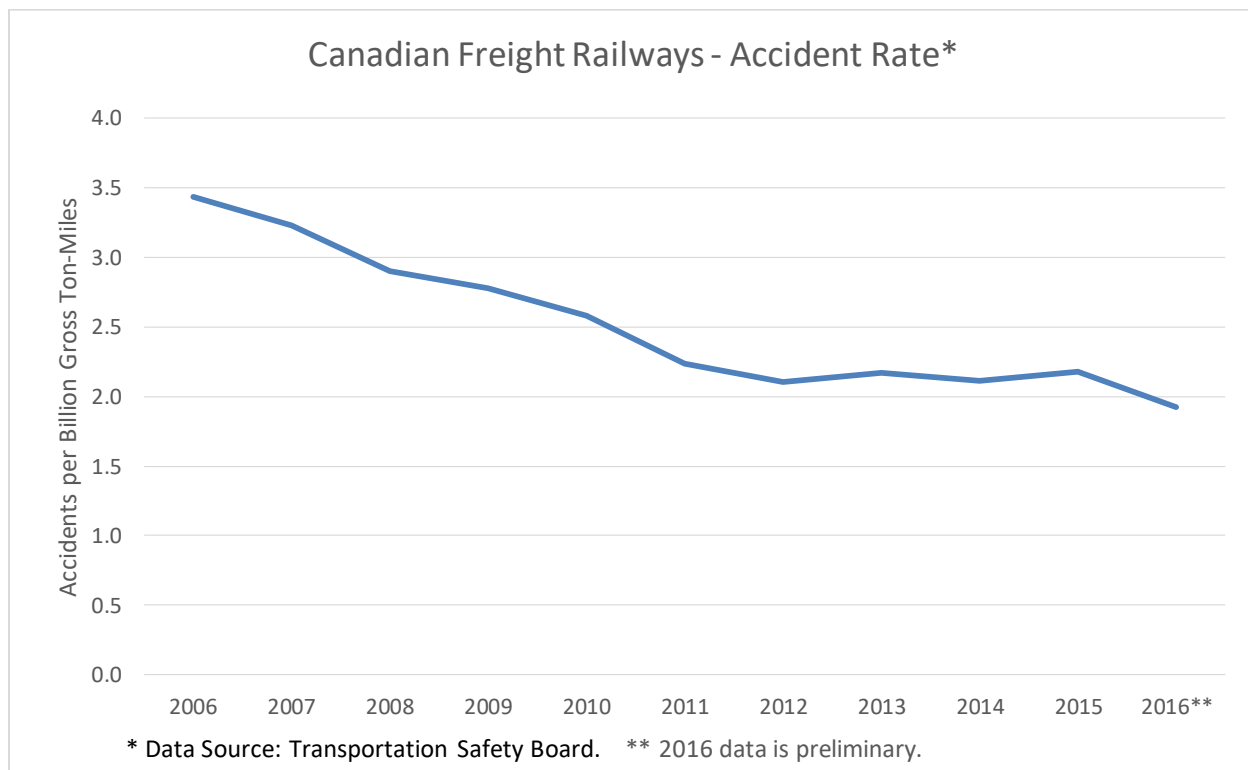
5. 'Developing a Tool to Measure and Improve the Safety Culture of Canada's Railway Industry" RDIMS 9923454.
http://www.safetyculturesymposium.ca/uploads/2/6/7/3/26734471/presentation_safety_culture_halifax.pdf

As the work groups completed their mandate, several efforts continued for the industry as a whole, as well as for specific railway companies. The following are specific examples:

➢ CN invested over $60M to modernize its training curriculum and build two state-of-the art training facilities to deliver enhanced classroom and field training while strengthening safety culture. The 'CN Campus' training program was developed in collaboration with senior labour representatives, employees and external experts.

➢ CP implemented an employee engagement program, entitled 'HomeSafe', to train employees on looking out for their coworkers to create a supportive environment which upholds safety and strengthens culture. This program is delivered with the engagement of senior leaders as well as health and safety committees.

➢ VIA implemented, with its unions, an employee safety/security phone line called 'Securitel' to enable employees to anonymously report safety issues or concerns. This line increases visibility of safety issues which may not have otherwise been identified, thereby increasing prevention and safety culture.

Such efforts in safety culture, along with other initiatives targeting plant and equipment issues, contributed to improved safety performance following the 2007 Railway Safety Act review, with a substantial improvement in accident rates, as shown in the figure below. Improvements were widespread across both main track and non-main track accidents. This can be attributed, at least in part to the railways' SMS processes, which led to targeted investments to address top causes with initiatives relating to People, Process, Technology and Investment. This included increasing investments in the plant and the deployment of advanced technologies to address main track causes, while non-main track causes being predominantly human factors related, were being addressed through employee-based safety culture initiatives such as peer to peer monitoring and communication, safety committee development, and training modernization.

Canadian Freight Railways - Accident Rate*

* Data Source: Transportation Safety Board.   ** 2016 data is preliminary.

On July 6, 2013, the tragic accident at Lac-Mégantic further raised awareness about the importance of safety culture, with the Transportation Safety Board Report[6] noting that a *"…weak safety culture contributed to the continuation of unsafe conditions and unsafe practices…"* at the Montreal, Maine and Atlantic Railway.

Although several efforts had been introduced and promoted by Transport Canada and railway companies to strengthen safety culture, this unfortunate accident showed that prevention and culture require a widespread consolidation effort reaching all railways, large and small. Indeed, the nature of railways involves interchanges between carriers, where a strong safety culture requires every link of the chain to be strong. This further raised the resolve and efforts by railways and their association to advance safety culture.

To this effect, The Railway Association of Canada (RAC) took specific measures to pursue the advancement of safety culture by encouraging member railways to be proactive in maintaining effective safety management systems and by supporting them in strengthening their safety culture. This included the nomination of a Chief Safety Culture Officer, the delivery of safety culture training to short line railways, and the formation of a steering committee to continue advancing safety culture with the engagement of its members, including class 1 railways, short lines and passenger railways, as well as safety culture experts (e.g. Dr. Mark Fleming). This effort continues today with the ongoing refinement of safety culture assessments, the implementation of surveys, and the development and sharing of tools, guidance material, best practices and other initiatives to strengthen culture. Since 2013, the RAC's safety culture improvement initiative has exclusively financed safety culture assessments for two short line railways as well as one commuter railway.

In parallel, industry efforts continue to advance with a notable collaboration taking place with Saint Mary's University, which has a strong reputation for its expertise in safety culture, its 'CN Centre for Occupational Health and Safety', as well as the 'CN professorship in safety culture' created in 2013. This culminated in the organization of an international safety culture symposium in 2014 bringing together railways and broad industry, regulators, union representatives and academics from across North America and Europe. The symposium was very successful, selling out several months ahead of the event, enabling productive exchanges between stakeholders, and setting in motion additional initiatives which consolidated the progress made, while setting the stage for further progress in safety culture.

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6. *Railway Investigation Report R13D0054 - Runaway and main-track derailment - Montreal, Maine & Atlantic Railway - Freight train MMA-002 Mile 0.23, Sherbrooke Subdivision Lac-Mégantic, Quebec 06 July 2013*
http://www.tsb.gc.ca/eng/rapports-reports/rail/2013/r13d0054/r13d0054.asp

Of note, is the planning of an even larger scale international safety culture summit to be held in October 2017 in Saint Mary's University, a joint effort engaging the American Petroleum institute, CN and Saint Mary's University[7], once again bringing together a diverse group of stakeholders from North America and Europe.

As evidenced by the ongoing initiatives, the drive to continue developing and strengthening safety culture is alive and well, and the commitment to this long term endeavour is entrenched for the long haul.

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7. International Safety Culture Summit – 2014 and 2017; *http://www.safetyculturesymposium.ca/*

Safety Culture Progress in the U.S.

Although US Regulators have not implemented a *Safety Management Systems Regulation*, they have been supporting safety culture research and working with railways and unions for many years in this domain.

In 2001, the Federal Railroad Administration (FRA) developed a research and evaluation strategy to *"identify, develop, and implement innovative safety culture pilot projects in the U.S. railroad industry"*[8]. This resulted in significant initiatives piloted in collaboration with railways, labour and Regulators, such as '*Clear Signal for Action (CSA)' and 'Confidential close call reporting system (C3RS)';* programs aiming to strengthen peer-engagement and augmenting near miss data to support prevention.

In 2012, the FRA held a 'Research Review Conference'[9] encompassing a safety culture panel engaging Regulators, railways, unions and the Volpe Center[10]. This conference increased interest in FRA safety programs, while promoting open sharing and exchange on safety culture. Recognizing the value of sharing safety culture information and engaging multiple stakeholders, Canadian railways used this model to organize the '2014 International Safety Culture Symposium', which brought together a broader group of stakeholders from several industries and countries.

The Volpe National Transportation Center[10], a U.S. Department of Transport Agency, has been a key FRA partner and has done much research on Human Factors and safety culture, has piloted initiatives with FRA and railways, and published numerous research papers[11].

Similarly to the Railway Association of Canada, the 'American Shortline and Regional Railroad Association'[12] (ASLRRA) recognized the importance of safety culture as well as the value of supporting smaller railroads who do not have the staff or wherewithal of class 1 railroads. Their web site states that *"ASLRRA provides the framework and support for our members to ensure compliance and a strong safety culture through our programming, and the Safety Institute respectively"*.

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8. ' A Federal R&D Evaluation Framework Influencing Safety Culture Change in the U.S. Rail Industry', M.Coplen (FRA), J. Ranney (Volpe National Transportation Systems Center).
http://www.safetyculturesymposium.ca/uploads/2/6/7/3/26734471/a_federal_r_d_evaluation_framework_for_influencing_safety_cutlrue_change_in_the_u.s_rail_industry.pdf
9. 2012 FRA Research Review Conference – Safety Culture Panel Discussion
https://www.fra.dot.gov/Page/P0486
10. *Volpe National Transportation center*
https://www.volpe.dot.gov/our-work
11. Volpe Reseach Papers on Safety Culture
https://search.usa.gov/search?affiliate=volpe&query=safety%20culture
12. American Shortline and Regional Railroad Association (ASLRRA)
https://www.aslrra.org/

In 2014, the ASLRRA engaged FRA and government to propose the concept of a 'Safety Institute'[13] which would support short line railroads with safety culture. The mandate[14] of the Safety Institute would be to:

- *"Assess the operations and safety programs of short line railroads;*
- *Develop best practices and work with short lines and regionals to implement these practices; and*
- *Help improve safety culture and safety knowledge across the short line industry."*

The FRA funded US$250,000 towards a pilot project to conduct safety culture assessments of short line railroads. This enabled the ASLRRA to advance this initiative with FRA, the Volpe Center, and University of Connecticut, to develop a comprehensive safety culture assessment program with surveys, an evaluation process and follow-up processes.

After a successful pilot in March 2015 focusing on short lines transporting crude oil, the US Congress appropriated US$2 million for additional assessments and the development of materials and processes. Following this phase and an assessment of the effectiveness of the initiative, the Safety Institute was established in late 2015, and continues to operate successfully today with annual funding of US$2 million. Recent discussions with the ASLRRA indicate that the Safety Institute is a making a significant positive impact on the safety culture of US short lines by actively performing safety culture assessments, supporting safety action plans, and providing training.

13. ASLRRA Safety Institute
http://shortlinesafety.org/

14. ASLRRA Safety Institute Mandate
http://shortlinesafety.org/SLSI/About/About/SLSI/About/About.aspx?hkey=ea3ee0f5-4d08-40c9-b8ef-4ecc7607fe2f

Opportunities to Further Strengthen Safety Culture in Canada

Recognizing the critical role played by short lines in Canada, with nearly a quarter of shipments originating or terminating from these railways, the notion of providing funding to further strengthen safety culture would be valuable considering the large number of short lines, their small size, decentralized nature, light density and limited resources.

The following opportunities are identified to further strengthen safety culture in Canada:
1. Increase capability for performing safety culture assessments; these set the stage for cultural change by collecting perceptions which in turn identify opportunities for improvement.
2. Increase capability for supporting short lines to implement cultural change initiatives; this can take the form of field support for implementing initiatives, providing safety culture training, and delivering impartial interventions.
3. Increase research and development in safety culture improvement; this is valuable considering ongoing advancements in this domain; and
4. Continue to collaborate and partner with academia; this leverages external expertise to ensure that assessments, initiatives and training are consistent with ongoing study and research.

Further, there may be value in pursuing collaborative efforts with class 1 railways or academic institutions, to leverage existing facilities and expertise, and leverage the work completed by industry and government following the 2007 RSA review.

The above would align favourably with efforts already undertaken by the Railway Association of Canada, which made a commitment to promote safety culture improvement and create a common structure for completing safety culture assessments at railway companies, sharing information and best practices, supporting improvement, and collaborating with practitioners and other expert advisors. Although these are significant steps forward, augmenting capacity with funding would allow greater reach to support a larger proportion of the numerous short line railways in Canada, by increasing assessments and supporting cultural change.

Augmenting the capacity to assess and strengthen safety culture in Canada would come at an opportune time considering the significant effort required to achieve and sustain cultural change for each railway. To exemplify this point, the 2007 RSA report mentions: '*The Panel recognizes that culture change is a long-term endeavour and no easy task'*.

This would bring the following benefits:
- Achieving a coordinated approach with planning, implementation and monitoring of interventions designed to strengthen culture.
- Leveraging the safety culture processes developed since the 2007 RSA review with the engagement of Regulators, railways and unions; these have been developed and accepted by all stakeholders.

- Increase cultural change momentum with the capability to concurrently reach a greater number of short lines, and to provide support to bolster their safety culture in a sustainable manner. Using an approach similar to the ASLRRA Safety Institute, where individual short lines are assessed and supported in cycles of 3-5 years, would imply performing at least 10 assessments per year in Canada – this would require a significant increase in capacity and resources relative to the current program.
- Broaden the current breadth and capability to effect cultural change with an increase in training and support.
- Systematic and consistent approach.

It stands to reason that the allocation of funding to increase capacity for cultural change in Canada would come at the right time to build on current efforts and initiatives, and would multiply the benefits being realized.