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Safety Management Systems: A Better Approach for Transportation?

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(In Brief)

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SAFETY MANAGEMENT SYSTEMS: A BETTER APPROACH FOR TRANSPORTATION?

1 INTRODUCTION

A safety management system (SMS) is a formal plan designed to foster a culture of safety within an organization by assigning responsibility and accountability for safety at all levels. It is also designed to increase employees' safety awareness in their daily activities and to establish formal lines of communication within the organization to share information about hazards. Through enhanced awareness, accountability and communication, an SMS is intended to identify risks before they escalate into safety problems.

Furthermore, the measurable safety objectives and periodic internal audits included in an SMS promote continuous learning within the organization as well as improvements to the SMS. An SMS usually requires senior management to commit to and be involved in safety by endorsing and monitoring an organization's safety policies and goals. The introduction of an effective SMS is challenging for an organization, but the reward is accident avoidance, which reduces costs and increases competitiveness.

While the SMS approach is used voluntarily or by law in various industries in Canada, such as offshore drilling, nuclear energy, food processing, chemical processing and health care, this paper focuses on federal SMS requirements in the Canadian transportation sector. It begins with an overview of the emergence of SMS as a different approach to industrial safety and then outlines Transport Canada's introduction of SMSs in federally regulated modes of transportation. This section is followed by a discussion of some of the problems that have arisen during SMS implementation.

2 THE EVOLUTION OF APPROACHES TO INDUSTRIAL SAFETY

Before the 1960s, safety approaches in high-risk industries were based on the field of reliability engineering, which studies and evaluates the probability of equipment failure, among other things.¹ Improvements in safety were primarily informed by accident investigations, which generated information about the likelihood of such events. Safety regulation during this period is often described as "prescriptive."

Increased public awareness of industrial hazards in the United States throughout the 1960s motivated work towards a scientific approach to accident *prevention*.² The study of accident prevention identified some key factors in industrial safety, namely, the causes of accidents, the interface between humans and machines, the role of management, and the economics and efficiency of safety.

In addition to accident prevention, the SMS approach is also based on a systematic process for identifying and controlling hazards that came out of what is called "process safety" in the chemical industry. Process safety has its roots in a business

ethic developed by the Canadian chemical industry following the 1984 chemical plant disaster in Bhopal, India. Responsible Care, which is the industry's commitment to both safety and environmental protection, was introduced in 1985 and has been adopted by chemical companies in 50 countries around the world.³

With respect to transportation, rapid traffic growth and technological change in the sector, the limited resources of regulators, and constraints on infrastructure investment have jointly driven the need for a more effective approach to safety. Another driver of change was research demonstrating that organizations could be compliant with the regulations yet fail to manage risks to acceptable levels.⁴ The SMS approach is considered a better way to motivate companies to manage their own risks, by shifting accountability and responsibility for the human, organizational, technical and environmental factors that lead to accidents to the companies.⁵

During the past decade, the federal government has increasingly used the principles of risk management to allocate limited public resources more efficiently. The SMS approach is Transport Canada's strategy to maintain and improve the safety of the transportation system with the resources available. In a 2007 policy document, Transport Canada stated that the transportation industry would henceforth be accountable for proactively and systematically addressing risks within transportation activities and that the primary tool for doing so, where possible and practicable, would be SMSs.⁶

3 SAFETY MANAGEMENT SYSTEMS IN FEDERALLY REGULATED TRANSPORTATION INDUSTRIES IN CANADA

There are federal SMS requirements in the air and marine transport modes as well as the federally regulated portion of the rail transport mode. SMS principles, if not specific provisions, also form part of the federal regulations that apply to the transportation of dangerous goods and to road transportation safety.

3.1 AIR TRANSPORT

The International Civil Aviation Organization (ICAO) first recommended that member states adopt SMSs for aviation in 2000. Transport Canada was the first civil aviation authority in the world to bring in regulations requiring aviation companies to use SMSs.

The SMS requirements for air transport are contained in the *Canadian Aviation Regulations* under the *Aeronautics Act*.⁷ Passenger air carriers that carry more than 20 passengers (and companies that maintain their aircraft) were the first air transportation companies required to operate with SMS policies, processes and procedures in place. While SMS regulations for these companies were introduced in 2005, compliance was not required until 2008. SMS regulations for airports and providers of air navigation services came into force in 2008 and 2009, respectively, and their compliance with the regulations was to be assessed in 2012 and 2013, respectively.⁸ Transport Canada is reportedly conducting an assessment of extending SMS to other aviation sectors.⁹ Potential sectors to which SMS requirements could be extended include:

- small operators (including air taxi and commuter operators) and companies that maintain their aircraft;
- airplane and helicopter flight training units;
- companies delegated by Transport Canada to certify aircraft; and
- aircraft manufacturers, heliports and water airports.¹⁰

3.2 MARINE TRANSPORT

The International Maritime Organization first developed SMS guidelines in 1989. Experience with these guidelines formed the basis of the *International Management Code for the Safe Operation of Ships and for Pollution Prevention* (ISM Code), introduced in 1993 and made mandatory in 1998.¹¹

Transport Canada introduced *Safety Management Regulations*¹² under the *Canada Shipping Act* in 1998 in order to meet the requirements of the ISM Code, and the regulations continue to be in effect under the *Canada Shipping Act, 2001*. The *Safety Management Regulations* apply to Canadian passenger and cargo vessels that are subject to the *International Convention for the Safety of Life at Sea* (SOLAS) and came into force in 2002.¹³

Transport Canada is working on safety management regulations for other Canadian vessels not covered by SOLAS (e.g., domestic passenger and cargo vessels). The most recent consultations on the issue were in fall 2012. In the meantime, Transport Canada encourages Canadian non-SOLAS vessel owners and operators to voluntarily develop an SMS in compliance with the ISM Code.

3.3 RAIL TRANSPORT

Transport Canada has required federally regulated railway companies to have SMSs in place since 2001. The SMS requirements for railways are contained in the *Railway Safety Management System Regulations* under the *Railway Safety Act*.¹⁴

In a 2007 report, an independent advisory panel reviewed the *Railway Safety Act*, discussed the implementation of SMSs and made recommendations.¹⁵ In response, Transport Canada established a Safety Management System Working Group, which includes representatives from the industry, unions and the department. To date, the Working Group has established a definition of “safety culture” for the industry, a list of key practices that support a safety culture and a checklist for industry to assess its safety culture.¹⁶

Amendments to the *Railway Safety Act* that received Royal Assent in 2012 and came into force in May 2013 gave the Governor in Council power to make additional regulations respecting the SMS requirements for railway companies. The Governor in Council can now make regulations that require corporate SMSs to include:

- a non-punitive reporting system for employees who raise safety concerns about rail practices;
- continuous monitoring and assessment of the level of safety achieved by the railway company;

- involvement of railway company employees and their collective bargaining agents in the development and implementation of the SMS; and
- identification of an executive who is accountable for meeting the requirements of the company's SMS.¹⁷

Railway safety and SMSs will likely receive increased public scrutiny as a result of the accident on the Montreal, Maine & Atlantic Railway in Lac-Mégantic, Quebec, in July 2013, which killed 47 people and destroyed part of the town's downtown area. There have been allegations in the media that Transport Canada's railway inspection program has been inadequate since the introduction of SMSs in the sector.¹⁸ At an emergency meeting convened in July 2013, the House of Commons Standing Committee on Transport, Infrastructure and Communities agreed to "conduct a study of rail safety when more findings of the Transportation Safety Board investigation into the disaster at Lac-Mégantic are available."¹⁹

3.4 ROAD TRANSPORT

While most aspects of motor vehicle operations are under provincial and territorial jurisdiction, the federal government has two roles with respect to road safety. Transport Canada regulates:

- the safety performance of new and imported vehicles under the *Motor Vehicle Safety Act* (MVSA); and
- the safety of interprovincial truck and bus operations under the *Motor Vehicle Transportation Act* (MVTA).

The provincial and territorial governments have jurisdiction over traffic signage, driver licensing, vehicle registration, commercial vehicle inspection, traffic laws and enforcement.

Transport Canada commissioned a study to assess the feasibility of SMSs in the interprovincial motor carrier industry, completed in 2006.²⁰ The consultant's report indicated that truck and bus organizations in Canada are generally small or, in the case of owner-operators, lacking. The consultants also found that there is very little experience anywhere in applying an SMS regime to small operators and suggested that it may not be practicable to do so. To date, Transport Canada has not required or encouraged the adoption of SMSs by companies providing interprovincial and international truck and bus services.

In its 2007 policy document on transportation safety, Transport Canada states that there are no specific SMS requirements in the MVSA or the MVTA. However, Transport Canada notes that SMS principles are included in the manufacture and certification of vehicles under the MVSA, and the department tests vehicles and audits manufacturer's records. There are also SMS principles in the performance criteria set out in the National Safety Code, "a code of minimum performance standards, applying to all persons responsible for the safe operation of commercial vehicles," under the MVTA. Responsibility for enforcement of the National Safety Code rests with provincial and territorial governments.²¹

3.5 TRANSPORTATION OF DANGEROUS GOODS

The federal *Transportation of Dangerous Goods Act, 1992* (TDG Act) and the *Transportation of Dangerous Goods Regulations* under the Act govern the containment and marking of dangerous goods as well as the emergency response to accidents involving dangerous goods, whereas the regulations that apply to the mode used (air, marine, rail or road) govern the operation of a vehicle while shipping dangerous goods.

There are no specific SMS provisions in either the TDG Act or the regulations; however, other factors have mitigated risk and reduced the need for SMS provisions.²² First, there is a very low accident rate in the transportation of dangerous goods, and many SMS strategies are already found in the Act, regulations and standards.²³ Therefore, risk in this sector may be adequately managed through the existing provisions concerning risk management, emergency response plans and industry accountability through legal enforcement, among others.²⁴ Second, amendments to the TDG Act in 2009 strengthened provisions related to an organization's documentation, the powers of federal inspectors and other processes for assuring safety in the transportation of dangerous goods.²⁵ Third, when dangerous goods are shipped by air, marine or rail transportation, the SMS provisions contained in the federal legislation for these modes apply to the movement.

4 ISSUES WITH SAFETY MANAGEMENT SYSTEMS IN CANADA

Since the introduction of SMS requirements in Canada, the House of Commons Standing Committee on Transport, Infrastructure and Communities has heard testimony concerning the effectiveness of SMSs in the air and rail sectors from a wide range of interveners with varying views.²⁶ The industry associations representing the rail companies and air operators are of the view that SMSs have had a positive impact on safety in their sector, whereas individual employees and representatives of the transportation labour unions generally hold the opposite view.

The Office of the Auditor General of Canada (OAG) has reported on SMSs in civil aviation in Canada twice since their introduction and each time identified challenges with the transition to the SMS approach. In its 2008 May Report, the OAG reported that, during the transition, Transport Canada had underestimated the risks of the transition as well as the impact of moving resources away from traditional oversight activities.²⁷ In 2012, the OAG again reviewed Transport Canada's oversight of civil aviation and reported that the department was behind on inspections, was not sure how many inspectors and engineers were needed, and had not yet established a minimum acceptable level of surveillance.²⁸

The Transportation Safety Board of Canada (TSB) has also highlighted problems that have arisen during the transition from traditional safety regulation to SMSs in other modes of transportation. The TSB added air and marine SMSs to its *Watchlist 2012*, which "identifies the transportation safety issues that pose the greatest risk to Canadians."²⁹ In the marine mode, the TSB observed that

“Transport Canada does not always provide effective oversight of marine transportation companies transitioning to safety management systems.” In Canadian air transport, the TSB noted that air operators have had difficulty shifting to the SMS approach and recommended that Transport Canada increase its oversight of companies making the transition. Despite the transition issues, the TSB has urged Transport Canada to further implement SMS requirements for domestic commercial marine vessels as well as smaller aviation businesses, such as air taxis and commuter air operators. A representative of the TSB found that “[n]othing will always guarantee that all hazardous conditions in day-to-day operations will be found, analysed and acted upon” but concluded that an SMS is a benefit when it is implemented effectively.³⁰

Finally, independent research by the *Railway Safety Act* Review Advisory Panel led it to conclude that railways’ implementation of SMSs and Transport Canada’s oversight of these systems had been inconsistent. The Panel nonetheless concluded that “SMS offers a significant advantage over traditional, exclusively prescriptive regulatory models” and recommended that “both the railway companies and Transport Canada focus their efforts to improve its implementation.”³¹

5 CONCLUSION

Because of the high cost of industrial accidents to organizations and to society generally, multidisciplinary research and public policy development concerning safety and accident prevention are continuing. From the mid-20th century, the popular approach to industrial safety took a philosophical turn as the focus shifted from investigating accidents to preventing them through hazard control actions. SMSs, which are formal plans that require safety awareness and accountability at every level of an organization, are widely considered the most effective approach to reducing the risk of industrial accidents. International organizations governing aviation, maritime transportation and nuclear energy have compelled member states to require the implementation of SMSs in those industries.

While there appears to be scant research to date on the impact of SMSs on safety – either in Canada or globally – many jurisdictions, including Canada, have made a substantial commitment to the SMS approach and are willing to make adjustments to SMS requirements over time as necessary. Transport Canada monitors the effectiveness of SMSs in the transportation sector through its enforcement activities and safety performance indicators. Because of the cost and complexity of implementing SMSs, the approach may not be practicable in industries in which the majority of companies have minimal organizational structure, such as the motor carrier industry in Canada.

Federally regulated industries in the Canadian transportation sector are currently at different stages of evaluating, adopting and implementing SMSs. Complex operations are now obliged by regulation to have SMSs, whereas smaller, less regulated operations, and those in other jurisdictions, are simply encouraged to adopt SMSs.

Reviews of Transport Canada’s implementation of SMSs by the OAG, the TSB and the *Railway Safety Act* Review Advisory Panel indicate that the transition to SMSs has

been challenging for the transportation sector as well as the regulator. Nonetheless, these independent bodies all recognize that effective SMSs are a benefit to transportation safety. Because of their benefit and because Transport Canada's resources cannot keep pace with industry growth, Transport Canada is committed to using SMS strategies to reduce the accident rate and the absolute number of accidents in transportation going forward.

NOTES

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24. Ibid., p. 31.
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