



SAFETY MANAGEMENT

Some transportation operators in the air, marine, and rail sectors are not managing their safety risks effectively, and many are still not required to have formal safety management processes in place. Moreover, those operators that have implemented a formal safety management system (SMS) are not always able to demonstrate that it is working and producing the expected safety improvements.

The situation

SMS is an internationally recognized framework that allows companies to identify hazards, manage risks, and make operations safer—ideally before an accident occurs. Although the issue of safety management has been on the Watchlist since 2010 and industry awareness about SMS has slowly increased since that time, Transportation Safety Board of Canada (TSB) investigation reports continue to note deficiencies and concerns in three sectors of transportation:

Air

There has been little progress to extend the application of SMS beyond *Canadian Aviation Regulations* (CARs) Subpart 705 operators. SMS requirements still do not apply to CARs subpart 702, 703, and 704 operators; flight training units (which operate under CARs subpart 406); or non-certified aerodrome operators. Combined, CARs subpart 702, 703, and 704 operators make up over 90% of all Canadian commercial air operators.

Marine

To date, only Canadian vessels that operate on international voyages and are subject to Chapter IX of the *International Convention for the Safety of Life at Sea* (SOLAS) must comply with the existing *Safety Management Regulations*. These regulations do *not* apply to over 99% of domestic commercial vessels (referred to as “non-convention” vessels), although a recent “tiered” proposal by Transport Canada (TC) would expand their applicability.¹ However, even when operators do have safety management processes in place, they are not always able to demonstrate that hazards are being identified nor that effective risk-mitigation measures are being implemented.

¹ The proposed *Marine Safety Management System Regulations* were pre-published in the *Canada Gazette*, Part I on 25 June 2022, at <https://canadagazette.gc.ca/rp-pr/p1/2022/2022-06-25/html/reg1-eng.html> (last accessed 27 July 2022).





Rail

Federally regulated railways have been required to have an SMS since 2001, and regulatory requirements were significantly enhanced in 2015. However, the expected changes in safety culture and safety improvements with the implementation of SMS have not yet been demonstrated by industry. Since Watchlist 2020, TSB investigations continue to identify hazards that are not always recognized and subsequently risk-assessed by operators so that effective risk-mitigations can be taken.² As a result, the TSB has determined that railway companies' SMS are not yet effectively identifying hazards and mitigating risks in rail transportation.

The risks to people, property, and the environment

Air

Currently, over 90% of commercial aviation operators in Canada are not required to have an SMS. Without the benefit of an SMS, these operators, many of which are smaller, continue to miss opportunities to improve safety. Therefore, the likelihood of more fatalities and serious injuries remains high.³

Marine

The problem is twofold: First, without a regulatory requirement, the majority of commercial domestic marine companies and vessels may not implement formal safety management processes. Second, as TSB investigations have found, even when formal processes are present, they are often not effective in identifying hazards or reducing the risks.⁴ This leaves many commercial vessels and operators—notably passenger vessels—without the benefit of an effective system for managing safety.

² From July 2020 through June 2022, the TSB published six Class 2 and 3 safety investigation reports with 10 findings relating to safety management (TSB rail transportation safety investigation reports R19C0002, R19C0015, R19T0147, R19W0050, R18H0039, and R17W0267).

³ From January 2010 through June 2022, commercial air operators that were required to have an SMS (those operating under CARs Subpart 705) were involved in 69 accidents, resulting in 14 fatalities. In contrast, commercial air operators that were not required to have an SMS (those operating under CARs subparts 702, 703, and 704) were involved in 638 accidents, resulting in 183 fatalities. Moreover, of the 28 investigations since 2010 in which the Board made findings relating to safety management, 19 involved operators that were not required to have an SMS. These operators also represent 34 of the 36 fatalities in those investigations.

⁴ From January 2015 through June 2022, the TSB published 21 Class 2 and 3 investigation reports with findings related to safety management (TSB marine transportation safety investigation reports M20P0230, M20C0145, M20C0101, M19P0057, M19P0029, M19A0025, M18P0014, M18A0001, M18P0257, M17C0179, M16A0141, M16C0036, M16P0062, M16A0115, M16C0137, M16P0162, M16P0241, M15P0347, M15C0094, M15P0037, and M15A0009). In 10 of these 21 occurrences, the operators did not have any SMS processes in place. In 4 of these occurrences, the vessels had a voluntary SMS that had not been externally audited. In 5 of the occurrences, the vessel had a voluntary SMS that had been externally audited and certified. In only 2 of the occurrences did the vessel have a mandatory SMS that had been externally audited.



Rail

More than 20 years since railway SMS regulations were first implemented in Canada, operators still have not demonstrated that their SMS is reducing risk to people, property, and the environment. For example, the 2021 main-track accident rate⁵ was 2.8 accidents per million main-track train-miles (MMTTM), which is above the previous 5-year accident rate of 2.5 accidents per MMTM. To date, freight railway operators have not demonstrated their SMS is reliably identifying safety concerns and driving safety improvements, or that SMS effectiveness is being measured. TC audits have broadly documented regulatory compliance, but TC does not yet routinely measure the effectiveness of a railway's SMS. So even if a railway is compliant with regulations, that does not mean its SMS is managing safety effectively.

Active TSB recommendations

There are nine active recommendations supporting this issue (Table 1).⁶

Table 1. TSB recommendations relevant to the Watchlist 2020 issue of safety management, and their 2022 assessments

Transportation sector	Recommendation number	The TSB has recommended that	Assessment in 2022
Air	A16-12	"the Department of Transport require all commercial aviation operators in Canada to implement a formal safety management system."	Unable to assess
Air	A16-13	"the Department of Transport conduct regular SMS assessments to evaluate the capability of operators to effectively manage safety."	Satisfactory in Part
Air	A19-03	"industry associations (e.g., ATAC, HAC, AQTA, FOA, NATA) promote proactive safety management processes and safety culture with air-taxi operators to address the safety deficiencies identified in this safety issue investigation through training and sharing of best practices, tools, and safety data specific to air-taxi operations."	Unable to assess
Marine	M04-01	"the Department of Transport take steps to ensure that small passenger vessel enterprises have a safety management system."	Satisfactory Intent

⁵ Excluding right-of-way fires.

⁶ In 2021, TSB Recommendation R17-01 was assessed to be Fully Satisfactory and was closed.



Transportation sector	Recommendation number	The TSB has recommended that	Assessment in 2022
Marine	M17-01	"the Department of Transport ensure that commercial passenger vessel operators on the west coast of Vancouver Island identify areas and conditions conducive to the formation of hazardous waves and adopt practical risk mitigation strategies to reduce the likelihood that a passenger vessel will encounter such conditions."	Satisfactory Intent
Marine	M17-02	"the Department of Transport require commercial passenger vessel operators to adopt explicit risk management processes, and develop comprehensive guidelines to be used by vessel operators and Transport Canada inspectors to assist them in the implementation and oversight of those processes."	Satisfactory Intent
Rail	R14-05	"the Department of Transport audit the safety management systems of railways in sufficient depth and frequency to confirm that the required processes are effective and that corrective actions are implemented to improve safety."	Satisfactory Intent
Rail	R20-01	"the Department of Transport work with the railway industry and its labour representatives to identify the underlying causes of uncontrolled movements that occur while switching without air, and develop and implement strategies and/or regulatory requirements to reduce their frequency."	Satisfactory in Part
Rail	R22-03	"the Department of Transport require Canadian Pacific Railway Company to demonstrate that its safety management system can effectively identify hazards arising from operations using all available information, including employee hazard reports and data trends; assess the associated risks; and implement mitigation measures and validate that they are effective."	Satisfactory Intent



Action taken

Air

Issues on the Watchlist are complex and difficult to solve, requiring action from many stakeholders, including operators and the regulator. Although some initial steps may have been taken, more needs to be done. Some of the initial steps taken are listed here.

Although there has been some progress in responding to the three TSB recommendations on this issue, the work done by both the regulator and industry has been piecemeal. TC is conducting an SMS policy review that will assist in developing recommendations to modernize and expand SMS requirements. These could, for example, include requirements for aircraft designers and manufacturers. Until this review is complete and TC implements changes to the SMS requirements, it remains unknown whether these efforts will address the issue of safety management in the air industry.

Meanwhile, some industry associations are promoting and providing tools for the development of SMS to their members. Additionally, industry feedback to the TSB indicates that those operators that are not required to have an SMS are nonetheless making efforts to implement scaled versions of SMS; however, TC does not monitor the effectiveness of these operators' SMS, and operators' efforts are sometimes hindered by insufficient human resources or expertise, cost, and complexity.

Marine

TC began the process of amending the regulations to include some classes of non-convention vessels in 2010. The proposed *Marine Safety Management System Regulations* will apply to a greater number of domestic commercial vessels that will be divided into five classes, each with a corresponding level of SMS and oversight requirements. Under this proposal, vessels less than 24 m in length, those less than 500 gross tonnage, and those carrying fewer than 50 passengers would require an SMS. However, these vessels would not require external review or audit of their SMS, and their effectiveness would only be enforced through targeted risk-based inspections by marine safety inspectors. While TC works on amending the regulations, many small vessel operators may not be aware of the risks associated with the operation of their vessels, nor possess the tools and expertise needed to manage those risks effectively.

A small number of commercial operators have voluntarily adopted SMS; however, TC does not monitor the effectiveness of these operators' SMS, and these systems may or may not be externally audited or verified. Without external audit or verification, it is not known how accurately and effectively these systems are identifying and mitigating risks.

Rail

In September 2021, TC launched its first round of audits to measure SMS effectiveness, which was to be completed by March 2022. TC is actively addressing all the TSB recommendations that support the Watchlist issue of safety management; specifically, in responding to Recommendation R22-03, TC stated that, in fall 2022, it would launch consultations on potential amendments to the *Railway Safety*



Management Systems Regulations, 2015. These consultations will ensure that the lessons learned from TC's SMS effectiveness audits will contribute to the development of robust, modernized requirements that will ensure that SMSs are effective and support an improved railway safety culture.

In early 2022, the Railway Association of Canada and select freight, passenger, and shortline railways updated the TSB on their SMSs. Though some operators provided details consistent with those of a mature SMS, none included sufficient data to determine whether they have implemented continuous improvement practices that track either individual safety actions or the effectiveness of their SMSs.

Once TC has completed its SMS effectiveness audits, sufficient data should exist to determine the extent to which railway operators have undertaken the actions required to address this Watchlist issue.

Action required

This issue will remain on the Watchlist for the **air** and **marine** transportation sectors until

- TC implements regulations requiring all commercial operators to have formal safety management processes; and
- operators that do have an SMS demonstrate to TC that it is working—that hazards are being identified and effective risk-mitigation measures are being implemented.

This issue will remain on the Watchlist for the **rail** transportation sector until operators demonstrate to TC that their SMS is effective.