Transportation Safety Board of Canada
Bureau de la sécurité des transports du Canada

Canada

TSB Recommendation R25-01

Additional interim measures to mitigate the risks associated with train crews not complying with railway signal indications

The Transportation Safety Board of Canada recommends that the Department of Transport immediately implement additional interim measures to mitigate the risks associated with train crews not complying with railway signal indications, such as collisions between trains, until adequate and permanent physical fail-safe defences are implemented.

Rail transportation safety investigation report	R23D0108
Date the recommendation was issued	16 September 2025
Date of the latest response	December 2025
Date of the latest assessment	January 2026
Rating of the latest response	Unable to assess
File status	Active

All responses are those of the stakeholders to the TSB in written communications and are reproduced in full. The TSB corrects typographical errors and accessibility issues in the material it reproduces without indication, but it uses brackets [ ] to show other changes or to show that part of the response was omitted because it was not pertinent.

Summary of the occurrence

On 21 November 2023, at approximately 1827 Eastern Standard Time, Canadian National Railway Company (CN) train X37621-20 (CN 376), a light engine movement, was travelling southward on the east track of the St-Laurent Subdivision when it collided at 32 mph with the tail end of a stationary Réseau de transport métropolitain commuter train (EXO 1212). At the time of impact, the train EXO 1212 was stopped at Saint-Léonard–Montréal-Nord station (Mile 135.89) in Montréal, Quebec. The 2 crew members and 4 of the 8 passengers on board train EXO 1212 received minor injuries. The 2 crew members of train CN 376 were not injured. Locomotive EXO 1346 and passenger car EXO 3062 were damaged, as were the 2 locomotives on train CN 376.

The Board concluded its investigation and released report R23D0108 on 16 September 2025.

Rationale for the recommendation

In response to Recommendation R22-04 and other TSB recommendations regarding fail-safe physical defences, Transport Canada (TC) developed the enhanced train control (ETC) concept and reported that it had begun working with industry partners on several measures to advance its implementation. In February 2022, TC published a notice of intent outlining the next steps for implementing ETC technologies in Canada.

In 2023, a risk assessment methodology to guide the implementation of ETC in Canada was developed, and consultations on this issue were undertaken. This methodology assesses various factors, including passenger service, annual gross tonnage, and the status of key routes. The same year, guidelines for the interoperability of ETC applications were published by the Canadian Standards Association (CSA).

According to TC, draft regulations for the implementation of ETC technologies in Canada are expected to be pre-published in the *Canada Gazette*, Part I in 2026. TC also stated that the ETC implementation schedule will depend on the development of regulations.

Current administrative defences rely solely on train crews recognizing and complying with signal indications. However, numerous TSB investigations have identified various circumstances in which these administrative defences have failed. As highlighted in the TSB's Rail Safety Advisory 01/24 and its letter to the Minister of Transport, the risks associated with failure to comply with signal indications remain high, and it is unlikely that the level of risk will be significantly reduced before physical fail-safe defences are implemented.

However, in recent years, several railway companies operating in Canada have, on their own initiative, introduced measures to partially compensate for the absence of such regulations by TC. Some companies have added additional administrative defences, while at least one other has integrated satellite geolocation technology (GPS).

For example, in order to reduce and eliminate distractions when a movement approaches a safety-critical situation, VIA Rail Canada Inc. and Canadian National Railway Company (CN) have each implemented the critical focus zone (CFZ). This is a set of special procedures to be applied when crew vigilance is of the utmost importance. When a CFZ is in effect, employees in the cab of a controlling locomotive must cease all communication and other tasks not related to the immediate operation of the train.

Following this occurrence, CN extended CFZ conditions to include situations where trains are required to operate at restricted speed. To be effective, however, CFZs require team members to recognize the conditions that place them in these situations. CFZs are therefore subject to the same limitations as other administrative defences in place.

CN also introduced a new special instruction under *Canadian Rail Operating Rules* (CROR) Rule 411. As of 19 October 2023, freight trains must reduce their speed by 10 mph below the

maximum allowable speed when approaching a Clear to Stop signal, starting before passing the signal.

For its part, Quebec North Shore and Labrador Railway (QNS&L) has implemented a combined administrative and physical defence system, introducing proximity detection devices (PDDs) in 1997. PDDs are equipped with GPS to determine the position, direction, and speed of locomotives and maintenance vehicles equipped with these devices. They are configured to receive alerts of approaching movements. The conductors of both movements must confirm on a screen that they have acknowledged the alert and must communicate with each other by radio to verify their respective positions. A penalty brake is automatically applied to the locomotive of a train whose crew has not acknowledged receipt of the alert. Despite this technology, a PDD will not prevent a collision if the train crew acknowledges receiving an alert without reducing speed or stopping the train in time.

These examples of initiatives implemented by some railway companies are a step in the right direction pending the implementation of ETC, which TC has stated it intends to implement in accordance with the objectives of its Transportation 2030 strategic plan.

As of the release of this report, TC had not yet completed many of the necessary steps to implement ETC in Canada, including corridor risk assessments. Given the scope and complexity of some of these critical actions, it is unlikely that such a system will be developed and implemented within the next few years. If train control systems rely solely on administrative defences, there will be no automatic intervention to stop trains if train crews fail to follow signals or misinterpret them, increasing the risk of accidents.

Pending the implementation of ETC in Canada, no interim measures are required or planned by TC to reduce the risk of train collisions. Consequently, in the coming years, there will be few or no regulatory physical defences to stop a train when a crew fails to follow a signal indication.

Therefore, the Board recommended that

> the Department of Transport immediately implement additional interim measures to mitigate the risks associated with train crews not complying with railway signal indications, such as collisions between trains, until adequate and permanent physical fail-safe defences are implemented.
>
> **TSB Recommendation R25-01**

Previous responses and assessments

N/A

Latest response and assessment

December 2025: response from Transport Canada

Transport Canada agrees with the safety recommendation (R25-01).

The department is committed to advancing the enhanced train control (ETC) initiative, which will leverage driver assist technologies to mitigate and prevent accidents related to compliance with signal indications by train crews. Signal adherence is a complex and multi-dimensional challenge comprising a broad range of risk factors including human error, fatigue, and signal misinterpretation.

As an interim approach until ETC is operational, Transport Canada will work with industry and other stakeholders to advance a multi-pronged action plan to mitigate risks, anchored to three key streams of action: rule revisions to strengthen compliance, addressing human factors through enhanced oversight and fatigue management practices, and exploring short-term, available technological solutions that could provide signal safety alerts to operating crews.

January 2026: TSB assessment of the response (Unable to Assess)

The Board notes that Recommendation R25-01 is linked to previously issued Recommendation R22-04,[1] which was reiterated on 16 September 2025.[2]

The Board notes that Transport Canada (TC) agreed with Recommendation R25-01 and is committed to advancing the enhanced train control (ETC) initiative. TC also submitted that, since signal adherence involves multiple risks such as human error, fatigue, and misinterpretation, it intends to advance an interim action plan until ETC is fully operational. TC will focus on revising rules to strengthen compliance, improve oversight and fatigue management to address human factors, and explore short-term technological solutions that can provide signal safety alerts to operating crews.

The Board acknowledges TC's stated commitment to advance ETC. However, the Board notes that TC did not commit to any specific solutions or timelines to mitigate the risks associated with train crews not complying with railway signal indications until the implementation of physical fail-safe train controls in Canada.

Until TC provides details of itsaction plan, including timelines for the implementation of additional interim measures to mitigate the risks associated with crews not following signal indications, the Board is **unable to assess** the response to Recommendation R25-01.

File status

This deficiency file is **Active**.

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1 This recommendation stated that "the Department of Transport require major Canadian railways to expedite the implementation of physical fail-safe train controls on Canada's high-speed rail corridors and on all key routes."

2 TSB Recommendation R22-04: Enhanced train control for key routes, at https://www.tsb.gc.ca/eng/recommandations-recommendations/rail/2022/rec-r2204.html (last accessed on 13 January 2026).