TRANSPORTATION SAFETY BOARD OF CANADA

ANNUAL REPORT TO PARLIAMENT 2024–25

Canada

Transportation Safety Board of Canada
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Annual Report to Parliament 2024–25

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Table of contents

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Transportation Safety Board of Canada

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August 13, 2025

The Honourable Dominic LeBlanc, P.C., M.P.

President of the King's Privy Council for Canada
House of Commons
Ottawa ON K1A 0A3

Dear Minister,

In accordance with subsection 13(3) of the *Canadian Transportation Accident Investigation and Safety Board Act*, the Board is resubmitting, through you, its Annual Report to Parliament for the period 1 April 2024 to 31 March 2025. We identified some minor statistical errors in the previous version that was submitted. This revised version corrects these errors.

Yours sincerely,

Original signed by

Yoan Marier

Chair

Canada

Message from the Chair

The close of the 2024–25 fiscal year marked not only an opportunity to celebrate our significant achievements, but it also marked an important milestone for the organization: 35 years of working to improve safety, reduce risks, and help ensure a more secure transportation system for all Canadians.

Since its inception in 1990, the TSB has completed more than 2000 investigations, made more than 630 recommendations, and issued hundreds of safety communications. We learn new lessons from every investigation, which fuels our commitment to improving transportation safety in Canada. Over the years, more than 84% of the responses to the Board's recommendations have been assessed as Fully Satisfactory, demonstrating the TSB's concrete impact on the improvement of safety.

This fiscal year, we released **55** investigation reports, made **three** safety recommendations, and issued **two** safety concerns on changes needed in the industry.

In July 2024, the TSB released its report into the 2021 occurrence involving the container vessel *ZIM Kingston* (M21P0297), which experienced parametric rolling, resulting in the loss of 109 containers overboard and a subsequent fire that broke out in a damaged container that held dangerous goods. The Board issued **two** safety concerns regarding the need for comprehensive guidance for managing the risk of parametric rolling, and gaps in Canada's preparedness for marine emergencies that exceed the response capacity of a vessel's crew, posing a risk to vessels, the environment, and the health and safety of the public.

In August, the Board issued **three** recommendations to Transport Canada following the 2022 dock collision of the passenger ferry *Sam McBride* (M22C0231) in Toronto, Ontario, that resulted in numerous injuries. The recommendations focus on the importance of having crew members complete appropriate training in passenger safety management, ensuring a formal validation and approval process for passenger vessel evacuation procedures, and implementing a process to keep an accurate count of all passengers, including a separate count of the number of children and infants on all voyages.

In mid-October, we released our report into a near-collision between a Canadian National Railway Company freight train and a VIA Rail passenger train (R23H0006) near Cornwall, Ontario, involving 167 passengers. This occurrence highlighted, once again, the need for Transport Canada and the railway industry to accelerate the implementation of physical fail-safe train controls on high-speed rail corridors and key routes in Canada.

Later in October, we published the investigation report on an in-flight breakup of a helicopter rotor system and a fatal collision with water (A21P0107) in Jervis Inlet, British Columbia. The investigation determined that the accident was ultimately caused by a fracture in the bond joint of a

servo flap on the left rotor blade, leading to fatigue cracking, in-flight separation, severe vibrations, and rotor system failure. Consequently, the TSB issued an Air Safety Advisory to Transport Canada regarding servo flap fractures in K-1200 helicopters.

On February 17, 2025, we launched an investigation (A25O0021) into the accident involving a Bombardier CRJ-900 LR aircraft operated by Endeavor Air (dba Delta Connection) at the Toronto/Lester B. Pearson International Airport, Ontario. Upon landing, the aircraft impacted the runway, and following the initial impact, parts of the aircraft separated, notably a wing and the tail section, and a fire ensued. The fuselage came to rest slightly off the right side of the runway upside down facing the other direction. On March 20, 2025, we released a preliminary report that provided information on the progress of the investigation in compliance with the International Civil Aviation Organization's Annex 13 on Aircraft Accident and Incident Investigation.

In preparation for the next edition of the TSB Watchlist, we conducted a series of industry consultations to gather data on industry progress, challenges, and emerging safety issues that need to be addressed to make Canada's transportation system even safer.

This year was also marked by significant changes in the composition of the Board. After a decade of leading the TSB, we bid a fond farewell to Kathy Fox as she retired from her role as Chair. Her leadership and commitment to advancing transportation safety in Canada have left a lasting legacy. As the new Chair, I am honoured to carry that legacy forward and ensure our agency continues to serve Canadians as a global leader in transportation safety. We were also pleased to welcome Louise Smolska to the Board. With over 30 years of experience in the transportation industry—particularly in railway safety, operations, and government affairs—Louise brings valuable insight and expertise that will further strengthen our work.

As we reflect on a year of meaningful progress, the TSB remains steadfast in its commitment to advancing transportation safety across Canada. Every investigation, recommendation, and safety communication we deliver is driven by a singular purpose: to reduce risks and prevent future accidents. Our dedicated team continues to push for change, collaborate with industry and government partners, and advocate for improvements that make a real difference. As we look ahead, we do so with confidence and resolve—knowing that the work we do today helps create a safer tomorrow for all Canadians.

Yoan Marier
Chair

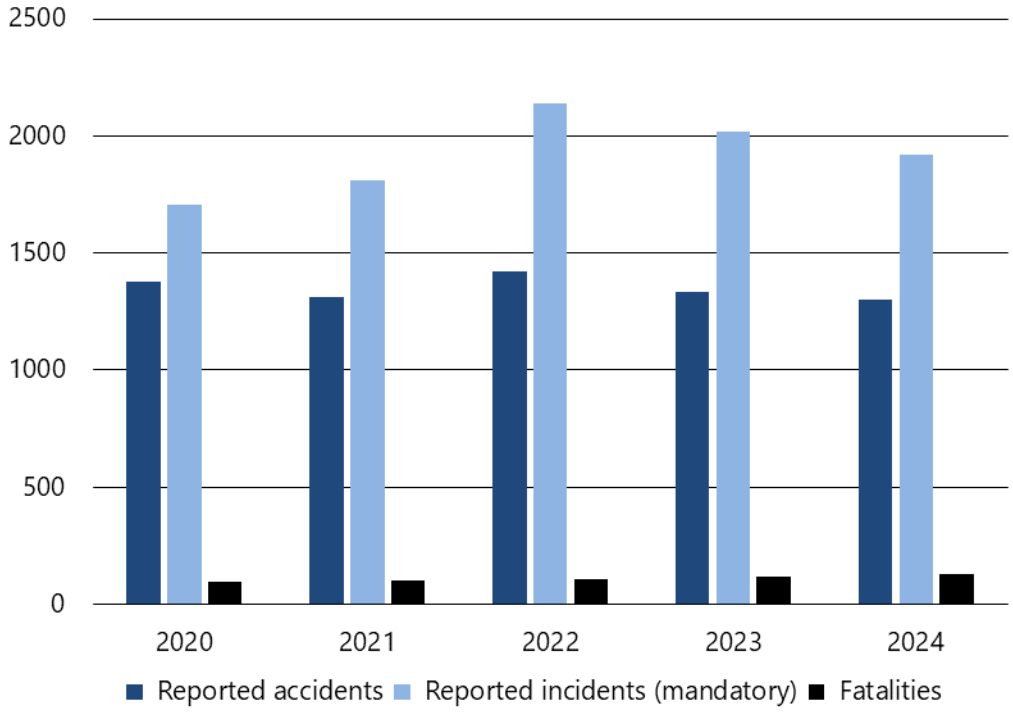
The year in results

In 2024, the Transportation Safety Board of Canada (TSB) assessed and classified 3222 reported occurrences[1] across Canada in the air, marine, pipeline, and rail transportation sectors (see the definitions in the Policy on Occurrence Classification).

TSB investigators deployed to 60 occurrence sites to collect data in an effort to identify what happened and why, and to highlight known and emerging safety issues—all in keeping with our mandate to improve transportation safety in Canada.

The 3222 occurrences reported to the TSB (as required under the *Transportation Safety Board Regulations*) in 2024 were 4% lower than the 3356 occurrences reported in 2023 (Figure 1).

Figure 1. Transportation occurrences reported to the TSB, 2020 to 2024



[1] Occurrence statistics are for the 2024 calendar year, unless otherwise indicated. Note that in a live database, the occurrence data are constantly being updated. As a result, the statistics can change slightly over time. Comparisons are generally for the last 5 or 10 years.

Of the 3222 reported occurrences, 1303 were **accidents**, which is 3% below the 2023 total of 1342, and 14% below the 10-year average of 1507; and 1919 were **incidents**, which is a 5% decrease from the 2023 total of 2014, and 5% less than the 10-year average of 2014.

There were 8% more fatalities (127) across all transportation sectors in 2024 than there were in 2023 (118). The 2024 total represents a 12% increase in fatalities over the 10-year average of 114.

The TSB at work

Deployments

TSB investigators deployed to 60 occurrence sites during FY2024–25 in response to occurrences in the air, marine, pipeline, and rail sectors. These deployments took staff from the TSB regional offices and head office to locations across the country, the United States, and internationally.

Investigations

In FY2024–25, the TSB launched 43 new investigations and completed 55 across all four transportation sectors (air, marine, pipeline, rail) (Table 1).

Table 1. TSB investigations, 2023–24 and 2024–25

Investigations	FY2023–24	FY2024–25
Started during year	68	43
Completed during year	43	55
In progress on 31 March	87	75

Safety communications products

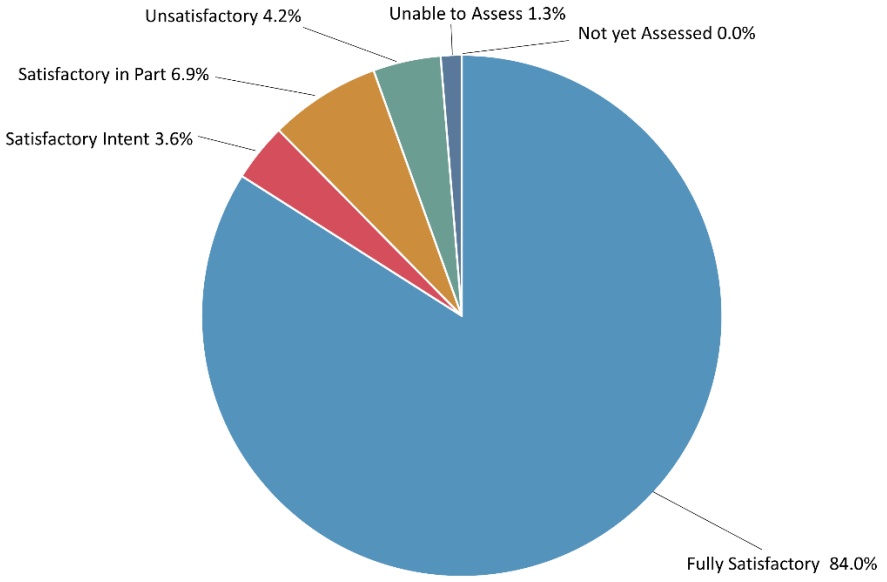
Each year, the TSB issues a number of safety communications products (Table 2). The TSB also reassesses outstanding recommendations as part of ongoing efforts to urge stakeholders to act on the safety issues that TSB investigations have identified. In 2024–25, the Board reassessed and closed nine outstanding recommendations as Fully Satisfactory: one in air transportation safety (A17-02), seven in marine transportation safety (M04-01, M17-01, M17-02, M17-04, M23-03, M23-04, M23-05), and one in rail transportation safety (R20-01). The Board also reassessed 13 outstanding recommendations as Satisfactory in Part: six in air transportation safety, five in marine transportation safety, and two in rail transportation safety.

Table 2. Safety communications products issued, 2024–25

Safety advisories	Safety information letters	Safety concerns	Recommendations
9	4	2	3

Since 1990, the Board has made 637 recommendations. By the end of 2024–25, it had rated 84% as Fully Satisfactory, the TSB's highest rating. This indicates that stakeholders, including Transport Canada, have taken action to substantially reduce or eliminate the safety deficiencies the Board has identified (Figure 2).

Figure 2. Board assessments of responses to recommendations from 29 March 1990 to 31 March 2025



At March 31, 2025, there were 81 outstanding recommendations, more than half of which date from less than 10 years ago (Table 3).

Table 3. Age of outstanding recommendations on March 31, 2025

Age of recommendations	Air transportation safety	Marine transportation safety	Rail transportation safety	Total (%)
Less than 1 year	0	3	0	3 (3.70%)
1 year to less than 7 years	16	10	5	31 (38.27%)
7 years to less than 10 years	8	4	5	17 (20.99%)
Sub-total	24	17	10	51 (62.96%)
10 years to less than 15 years	5	2	1	8 (9.87%)
15 years to less than 20 years	9	2	0	11 (13.58%)
20 years or more	6	2	3	11 (13.58%)
Sub-total	20	6	4	30 (37.04%)
Total	44	23	14	81 (100%)

SECURITAS

Through the TSB's SECURITAS program, transportation industry employees and the public can report unsafe acts and conditions they observe.

The TSB received 328 SECURITAS reports in 2024–25 (Table 4), a 21% increase from the 271 reports received the previous year.

Table 4. SECURITAS reports received and closed in 2024–25

	Air transportation safety	Marine transportation safety	Pipeline transportation safety	Rail transportation safety
Reports received	178	75	0	75
Reports closed	151	74	0	74

Of the total reports received, 178 were concerning air transportation safety. A portion of these reports concerned low-flying aircraft, including drones, aircraft maintenance, and foreign airlines operating in Canada.

The TSB received 75 SECURITAS reports concerning marine transportation safety, a noticeable increase from the previous year (55), resulting in 19 notices sent to Transport Canada or vessel owners and operators. These reports covered a wide range of topics on commercial fishing, passenger, and cargo vessels.

The TSB also received 75 SECURITAS reports concerning rail transportation safety. These included reports about the application of the *Duty and Rest Period Rules for Railway Operating Employees*.

Communications and outreach

Regular communications and outreach are important aspects of the TSB's efforts to advance transportation safety. Through its website, digital communications, social media channels, and participation at industry events, the TSB reaches industry and government stakeholders as well as media and members of the public across Canada and around the world (tables 5, 6, and 7).

Table 5. TSB media and stakeholder outreach activities, 2024–25

Media requests	Interviews	News conferences	Industry outreach events
620	29	2	65

Table 6. TSB communications products, 2024–25

Investigation webpages	Media advisories	News releases	Investigation reports
46	2	56	58

Table 7. TSB social media presence, 2024–25

YouTube followers	Flickr followers	X (Twitter) followers	LinkedIn followers	Facebook followers
6739	567	27 596	11 682	1924

Outreach activities

The TSB took part in 65 industry events and meetings during the year to discuss matters in transportation safety. These events included the following:

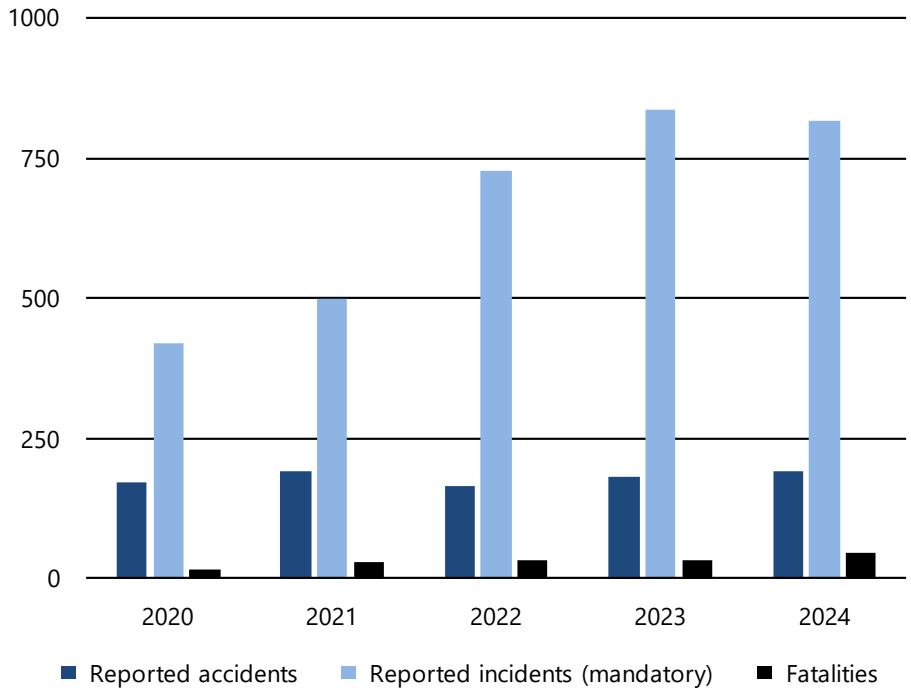
- Association québécoise du transport aérien annual conference
- Air Transport Association of Canada annual conference
- International Civil Aviation Organization's accident investigation panel
- Atlantic Railway conference
- Canadian Business Aviation Association annual convention
- International Pipeline Conference annual conference
- American Railway Engineering and Maintenance-of-Way Association annual conference
- Air Line Pilots Association international annual safety forum
- Canadian Ferry Association annual conference
- Canadian Maritime Advisory Council national and regional meetings
- Helicopter Association of Canada annual conference

Air transportation safety

The year in review

The TSB received 1010 reports of air occurrences under the TSB Regulations in 2024 (193 accidents and 817 incidents), including 46 fatalities (Figure 3).

Figure 3. Air transportation accidents, incidents, and fatalities, 2020 to 2024



A total of 193 accidents were reported in 2024. This number is 7% higher than the previous year's total of 181 accidents but 9% below the yearly average of 211 accidents reported in the prior 10 years (2014 to 2023). Most (178) of the accidents took place in Canada and involved Canadian-registered aircraft. Despite an increase in the past two years, the number of air transportation accidents has decreased in the last decade.

The TSB recorded 27 fatal air transportation accidents involving 46 fatalities in 2024. This is an increase from the 19 fatal accidents involving 33 fatalities in 2023 and is 19% higher than the average of 23 fatal accidents involving 37 fatalities over the 10-year period between 2014 and 2023. Twenty-two of the 46 air transportation fatalities involved commercial operations. There were six fatalities involving commuter operations (CARs 704), 10 involving air taxi operations (CARs 703), and six involving aerial work (CARs 702). There were no fatalities involving airline operations (CARs 705), or flight training units (CARs 406). The remaining 24 (of 46) fatalities were

linked to privately registered aircraft, with 21 of these involving recreational operators. Four accidents involved a release of dangerous goods. This is below the average of six per year over the previous 10 years.

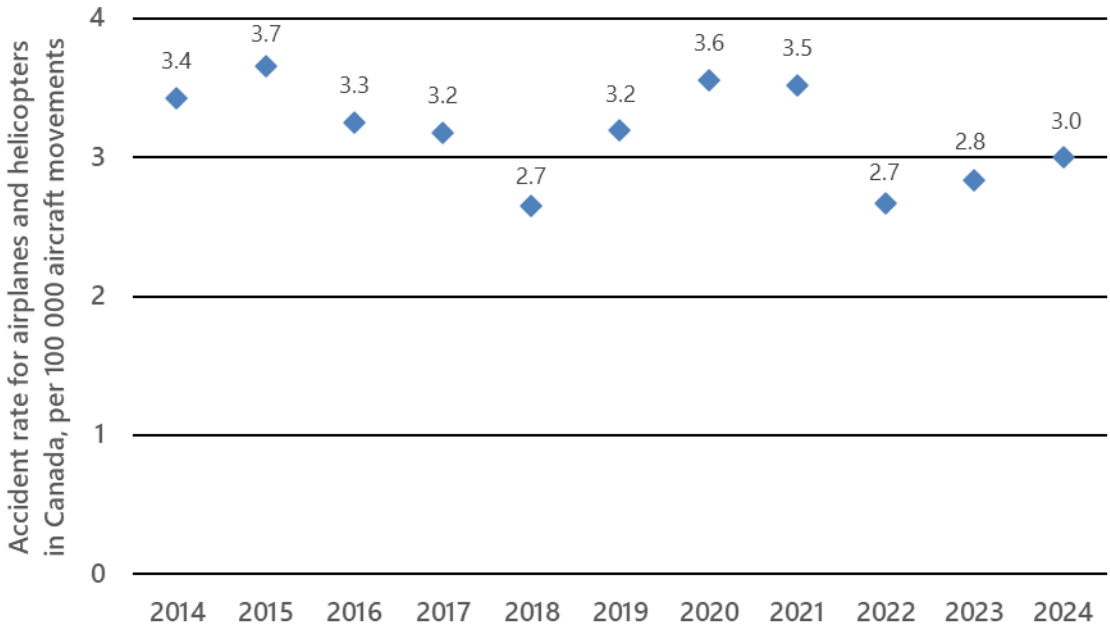
In addition, 817 air transportation incidents were reported under the TSB Regulations. This represents a decrease of 3% from the 839 that were reported in 2023 and is 8% above the average of 756 incidents per year between 2014 and 2023. Most incidents in 2024 (583 or 71%) occurred in Canada and involved Canadian-registered aircraft.

Accident rate: A measure of air transportation safety

The overall air transportation accident rate of 3.0 accidents per 100 000 aircraft movements in 2024 is based on 168 accidents in Canada involving Canadian- and foreign-registered airplanes and helicopters (ultralights, gyroplanes, gliders, and unmanned air vehicles are excluded) and the estimated 5.650 million movements at Canadian airports.[2] The accident rate decreased from 3.4 accidents per 100 000 aircraft movements in 2014 to a low of 2.7 in both 2018 and 2022 before rising again in 2024. While the decrease in this period is not statistically significant, the accident rate is among the lowest recorded by the TSB since it began measuring an accident rate by movements in 2004 (Figure 4).

2 Statistics Canada. Table 23-10-0296-01 Aircraft movements, by class of operation, airports with NAV CANADA services and other selected airports, monthly. DOI: https://doi.org/10.25318/2310029601-eng

Figure 4. Accident rate for Canadian-registered airplanes and helicopters in Canada, per 100 000 aircraft movements, 2014 to 2024



Air transportation investigations

TSB investigators deployed to 37 air transportation occurrences in FY2024–25, launched 31 investigations, and completed 35 (tables 8 and 9).

Table 8. TSB air transportation safety investigation activities, FY2023–24 and FY2024–25

Activities	FY2023–24	FY2024–25
Deployments	42	37
Investigations started	49	31
Investigations completed	26	35
Investigations in progress on 31 March of each year	53	49

Table 9. Air transportation safety investigations completed, FY2023–24 and FY2024–25

Class (investigation type)	Completed investigations		Completion target (days)	Average duration (days)	
	FY2023–24	FY2024–25		FY2023–24	FY2024–25
2 (complex)	1	3	600	1026	961
3 (detailed)	8	14	450	552	637
4 (limited scope)	17	18	220	230	298

Here are a few reports that highlight this past calendar year's most significant air safety investigations.

Major investigation into the Bombardier CRJ-900 LR aircraft collision with terrain during landing at Toronto Pearson Airport, Ontario

On March 20, 2025, the TSB released its preliminary report (A25O0021) into the February 17, 2025 accident involving an Endeavour Air CRJ-900 LR aircraft, manufactured by Bombardier, that was conducting a flight from Minneapolis–Saint Paul International Airport, Minnesota, United States (U.S.), to Toronto/Lester B. Pearson International Airport, Ontario.

Upon landing, the aircraft impacted the runway, parts of the aircraft separated, notably a wing and the tail section, and a fire ensued. The fuselage came to rest slightly off the right side of the runway upside down facing the other direction. Once the aircraft came to rest, the occupants began to evacuate. The passengers and cabin crew evacuated out the right forward door and one of the two right emergency exit windows. The cockpit door was unusable, so the flight crew exited out of the emergency hatch in the cockpit ceiling. Twenty-one passengers and crew were injured during the accident, many of whom were hospitalized. There were no fatalities.

The preliminary report shares the factual information gathered to date, including data captured by the aircraft's flight data recorder during the approach and landing phase of the flight, and information about weather reports issued before and after the occurrence. It also includes details about post-impact aircraft damage, the state of the aircraft controls and engines as found post-occurrence, and information about the emergency response and evacuation. This investigation is ongoing.

In-flight breakup of helicopter rotor system led to fatal collision with water in British Columbia

The TSB issued Safety Advisory Letter A21P0107-D1-A1 suggesting remedial action to reduce risks to safety in helicopter operations following its investigation (A21P0107) into a fatal occurrence where a helicopter collided with water in Jervis Inlet, British Columbia (BC).

On October 4, 2021, a Kaman K-1200 was conducting logging operations when it initiated a climb after having dropped off a load of logs. Soon after, the helicopter entered a rapid descent and impacted the water and sank, fatally injuring the pilot, who was the sole occupant.

The wreckage and portions of all four main rotor blades were recovered. The investigation found that the accident resulted from an in-flight breakup of the helicopter's rotor system when a blade on the left rotor collided with a blade on the right rotor before impacting the water. This was triggered by a fracture in the bond joint of a servo flap on the left rotor blade, leading to fatigue cracking, in-flight separation, severe vibrations, and rotor system failure.

Our Safety Advisory letter informed Transport Canada of the need for further examination of servo flap fractures on Kaman K-1200 helicopters. In response, Transport Canada stated that it was satisfied with the current manufacturer instructions for continued airworthiness, and deferred responsibility to the United States Federal Aviation Administration as these helicopters are under U.S. jurisdiction. Kaman Aerospace Corporation, the manufacturer, has since performed various tests on the servo flaps and plans to continue testing.

Runway excursion on takeoff and emergency landing of Canadian air carrier in California, United States

In its investigation report (A21F0210), the TSB found that an in-flight fuel imbalance led to the diversion and emergency landing of a Jazz Aviation Mitsubishi CL-600-2D24 aircraft at Los Angeles International Airport in California, United States (U.S.).

On the evening of November 29, 2021, during its departure from San Diego International Airport, U.S., to Vancouver International Airport, BC, the aircraft took off to the left of the centreline on the runway, striking three runway edge lights and causing damage to the aircraft's tires and flaps. Debris from the damaged lights remained undetected for hours due to the airport's lack of a foreign object debris detection system, posing a potential hazard. Also, the crew did not notice the impact, mistaking the noise and vibrations for normal runway contact. Soon after, while the aircraft was climbing, the flight crew detected a fuel imbalance. They subsequently shut down the right engine and declared an emergency before diverting back to Los Angeles International Airport where they landed safely.

The investigation determined that the misaligned takeoff and the fuel imbalance were two unrelated events. Because of the degraded visual conditions at night, there were limited visual cues available to the flight crew to identify and verify the aircraft's position on the runway, resulting in the misalignment. In addition, the high airport traffic created a time pressure, which contributed to the misalignment.

The fuel imbalance was likely caused by the flight crew inadvertently activating the wrong fuel panel switch during the completion of take-off checklists. This resulted in the fuel periodically transferring between the aircraft's wing tanks as it banked left to right. It was also determined that

the guidance provided to flight crews by the operator and the manufacturer to address fuel imbalances was inconsistent and unclear, adding complexity to the situation.

Following this occurrence, Jazz Aviation updated the aircraft operating manual and issued a company memo informing flight crews of the threats that exist during departures from runway areas other than the threshold, and the mitigations in place to minimize these threats. The operator also revised its fuel imbalance procedures for the aircraft to contain clearer guidance for crews.

Runway overrun of Boeing 737 in Kitchener, Ontario

The TSB investigation report (A22O0161) into the 2022 occurrence involving a Flair Airlines Boeing 737-800 at the Kitchener/Waterloo Airport, Ontario, underscores the pressing need to address runway overruns, an issue that has been on the TSB Watchlist since 2010.

On November 25, 2022, with a crew of six and 134 passengers on board, the aircraft departed from Vancouver, BC, with an inoperative left engine thrust reverser. During the landing approach, the captain left the engine autothrottle engaged after disengaging the autopilot. Shortly before landing, the captain intended to disengage the autothrottle, but he inadvertently pressed the takeoff/go-around (TO/GA) switch, causing the autothrottle to command an increase in engine thrust. The TO/GA cockpit indications went unnoticed as the flight crew's primary focus was outside the flight deck.

Upon touchdown, the captain activated the right engine thrust reverser. With the aircraft still in go-around mode, the right engine produced reverse thrust while the left engine advanced toward maximum thrust, overriding automatic braking system and creating control challenges. The captain managed to stay on the runway and used manual braking to slow down; however, there was insufficient runway remaining on which to stop, and the aircraft overran the runway by approximately 500 feet.

The investigation found that there were several factors that contributed to the inadvertent press of the TO/GA switch and the undetected flight mode change. These include pilot fatigue, both pilots focusing outside the aircraft during the flare and landing, and insufficient visual and aural cues from the aircraft systems to indicate the inadvertent mode change during that phase of flight to the crew.

It should also be noted that a defect with the aircraft's left thrust reverser was first reported in May 2022, over six months before the occurrence, and 22 subsequent reports provided an opportunity to troubleshoot the problem. Despite this, the defect did not meet the regulatory definition of a recurring defect, thus, Flair's maintenance control software did not identify it as such. If the underlying issue behind a persistent maintenance defect is not addressed in a timely manner, there is a risk that it may compound, resulting in a serious consequence.

Following the occurrence, Flair Airlines modified its operating procedures to better support the existing requirement to disengage both the autopilot and autothrottle at the same time.

Aircraft fuselage runway strike in Ontario

The TSB investigation report (A22C0093) into a 2022 occurrence in which the rear fuselage of an aircraft made contact with the runway during landing highlights the importance of having a robust and effective a safety management system in place.

A safety management system (SMS) is an internationally recognized framework that allows companies to identify hazards, manage risks, and make operations safer—ideally before an accident occurs. The operators that have implemented an SMS are not always able to demonstrate that they are working and producing the expected safety improvements. The issue of safety management has been on the TSB Watchlist since 2010.

On October 19, 2022, a De Havilland DHC-8-314 departed on a night flight from Pikangikum Airport, Ontario, to Sandy Lake Airport, Ontario, with three crew members and 28 passengers on board. The first officer was piloting the aircraft while the captain was performing the duties of pilot monitoring.

On approach, the first officer significantly varied the power settings to manage the aircraft's speed in an attempt to maintain the appropriate approach path for landing, resulting in an unstable approach. The aircraft landed hard, causing the rear of the fuselage to strike the runway. The captain took control of the aircraft to complete the landing and then proceeded to taxi normally. There was significant damage to the lower aft fuselage structure of the aircraft.

The investigation determined that the first officer was relatively inexperienced on the DHC-8 and had received limited guidance on pitch awareness. Further, due to insufficient detail in the airline's standard operating procedures and the absence of awareness training on stabilized approach criteria, the pilots did not recognize that significant variations in the power setting had made the approach unstable, and they continued the approach.

Following the occurrence, the operator took many steps to address the identified issues, including updating its pilot scheduling procedures to prevent inexperienced pairings, improving training procedures, and implementing a restricted crew status list.

Fatal plane crash near Calgary, Alberta

The TSB investigation report (A23W0091) into the fatal collision with terrain involving a Piper PA-32R aircraft near Calgary, Alberta, emphasized the importance of routinely applying instrument flying skills as well being prepared for variability in terrain and weather conditions.

On July 28, 2023, the privately registered aircraft departed Calgary/Springbank Airport, Alberta, on a visual flight rules flight to Salmon Arm, BC, with one pilot and five passengers on board. Approximately 15 minutes into the flight, the aircraft collided with a mountain and was destroyed, fatally injuring all those on board.

Weather analysis conducted during the investigation indicated that clouds near the occurrence site were likely low, reducing visibility. The pilot's decision to proceed with the flight was influenced by an incomplete understanding of the weather, familiarity with the route, time pressure, and a

personal desire to complete the flight. When the pilot encountered clouds and reduced visibility, for unknown reasons, he decided to continue the flight toward the destination, and, subsequently, the aircraft collided with terrain in the cruise attitude.

If pilots don't practise instrument flying skills regularly, there is a risk that they may not be able to maintain aircraft control and navigate accurately should they inadvertently encounter weather conditions requiring reference to their instruments. Also, if pilots do not complete mountain flying training, there is a risk that they will not be adequately prepared for the conditions encountered when flying over mountainous terrain.

Air transportation safety advisories and safety information letters

The TSB issued one air transportation safety advisory letter as part of its investigations in FY2024–25.

Broadcast of manufacturer's maintenance test code in an emergency activation of Kannad 406 AF-Compact emergency locator transmitters

As part of its completed investigation (A24A0019) into the 2024 helicopter collision with terrain in the vicinity of Goose Bay, Newfoundland and Labrador, the TSB issued the Air Transportation Safety Advisory Letter A24A0019-D1-A1.

When an emergency locator transmitter (ELT) is activated, it broadcasts a hexcode that transmits information about the aircraft. In the occurrence, when the helicopter's ELT activated upon impact, the initial hexcode received by the Canadian Mission Control Centre (CMCC) was the ELT manufacturer's maintenance test code, instead of any known aircraft's. According to the CMCC, this discrepancy has occurred on multiple different occasions with other operators using similar ELT models. If an ELT broadcasts the incorrect hexcode, it may result in delays in the start of search and rescue operations for a missing aircraft, which reduces the occupants' chances of survival.

The safety advisory letter informed Transport Canada and Safran, an international group that produces the Kannad 406 AF-Compact ELT, that if an ELT broadcasts a maintenance hexcode, the Geographic Information System at CMCC does not provide an alert notification. The letter also advised them that, when an unregistered hexcode detection is noticed by a CMCC specialist, they must investigate to determine the validity of the signal to reduce the risks to safety.

Progress on outstanding Board recommendations

Of the 28 air transportation safety recommendations that the Board assessed in 2024–25, five were closed: one after being assessed as Fully Satisfactory (A17-02) and four as Satisfactory in Part (A91-21, A00-13, A08-01, A18-05).

The remaining 23 recommendations reassessed by the Board in 2024–25 obtained the following ratings: Satisfactory Intent (10), Satisfactory in Part (4), Unable to Assess (3), and Unsatisfactory (6).

Following the release of investigation report (A21C0038) into the Griffith Island occurrence in February 2024, the Board issued four recommendations urging Transport Canada to improve commercial helicopter safety by enhancing risk mitigation for reduced-visibility operations in uncontrolled airspace (A24-04), and by requiring that pilots have the necessary skills (A24-01) and technology (A24-02), and that they are equipped with clear standard operating procedures (A24-03), to help them in the avoidance of and, more importantly, recovery from an inadvertent flight into instrument meteorological conditions encounter. All recommendations were assessed by the Board in August 2024 following Transport Canada's response:

- A24-01 and A24-04 were rated as Satisfactory Intent as the Board believes that, once implemented in the regulations, the changes suggested by Transport Canada will substantially reduce or eliminate the safety deficiency associated with these recommendations.

- A24-02 was rated as Satisfactory in Part because the Board remains concerned by the absence of timelines to publish the proposed regulatory changes.

- A24-03 was rated as Satisfactory in Part since Transport Canada only plans to mandate SOPs for single-pilot operations conducted under the *Canadian Aviation Regulations*' subparts 703 and 704, which will reduce, but not significantly reduce or eliminate the safety deficiency.

Additionally, two of the four recommendations made to Transport Canada following the release of investigation report (A17O0038) on 27 runway incursions that occurred between June 2012 and November 2017 at Toronto/Lester B. Pearson International Airport were still active last year, and have been reassessed by the Board in March 2025. While the response to A18-07 was assessed with a Satisfactory Intent rating since much progress and risk mitigation have been made by the Greater Toronto Airports Authority to make physical changes to certain taxiway layouts to address the risk of incursions between the parallel runways, Recommendation A18-05 was closed with a Satisfactory in Part rating because Transport Canada's response does not provide any planned actions or measurable outcomes to meaningfully assess a reduction in risk.

The TSB closed its Recommendation A17-02, which was issued following the 2017 investigation into a fatal in-flight breakup (A15P0081). This investigation determined that alcohol intoxication was at play in the aircraft's high-speed descent, which exceeded its structural limits. The Board is pleased with Transport Canada's effort to develop and implement requirements for a comprehensive substance use program to reduce the risk of impairment of persons while engaged in safety-sensitive functions, and marked it as Fully Satisfactory.

As part of the release of investigation report (A99W0061), the Board made its Recommendation A00-13 to Transport Canada, which aimed to ensure that air operators store aircraft survival gear on aircraft in flame-resistant material and package emergency pyrotechnics and other highly flammable survival equipment at least to the standards required by International Air Transport Association *Dangerous Goods Regulations*. The Board closed the recommendation with only a Satisfactory in Part rating in March 2025, as it remains concerned that no regulatory requirement has been established to ensure that aircraft survival gear is stored in flame-resistant material.

Following its investigation into the hard landing, fuel leak, and fire of a hot air balloon (A07C0151), the Board issued Recommendation A08-01 in March 2008 calling on Transport Canada to ensure that passenger-carrying commercial balloon operations provide a level of safety equivalent to that established for other aircraft of equal passenger-carrying capacity. This recommendation was recently closed as Satisfactory in Part, given that future safety improvements specific to commercial balloon operations are unlikely in the near future.

Almost 24 years ago, along with the release of the investigation report A88H0011, the Board called for Transport Canada to clarify the operator compliance requirements with respect to Letters to Operators (A91-21). This recommendation was closed with a Satisfactory in Part rating, although the Board remains concerned and is disappointed with the extraordinary delays in addressing the safety deficiency.

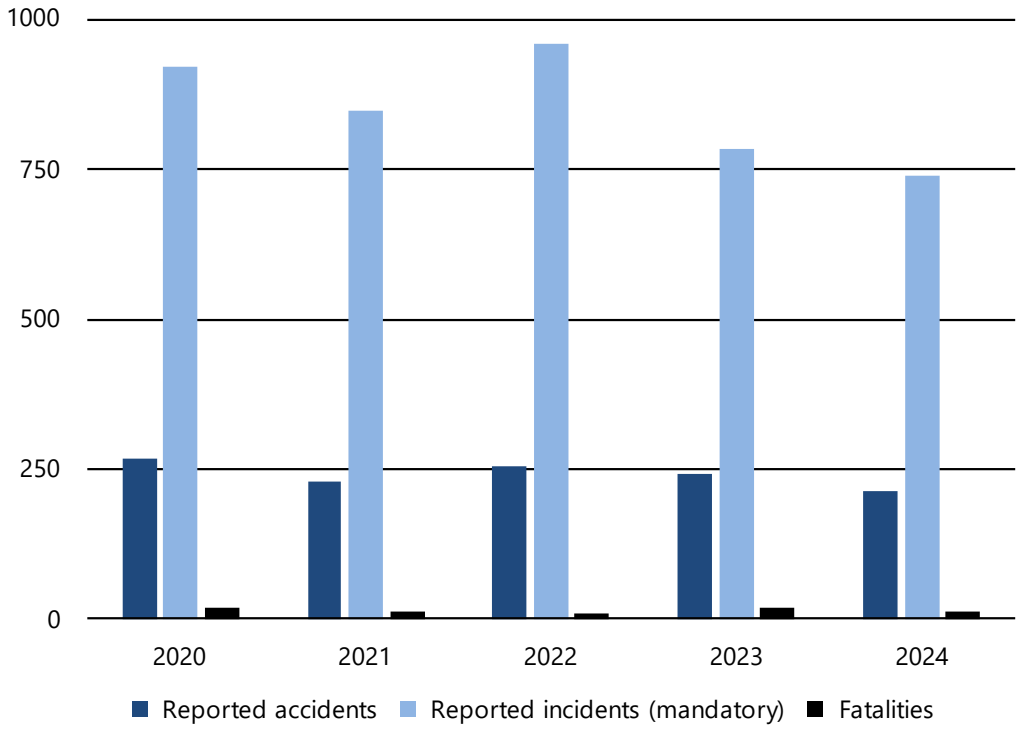
For all active recommendations, the TSB will continue to monitor the progress of planned actions and call for action to reduce or eliminate these deficiencies.

Marine transportation safety

The year in review

The TSB received 951 reports of marine transportation occurrences in 2024 (213 accidents and 738 incidents), including 12 fatalities.

Figure 5. Marine transportation accidents, incidents, and fatalities, 2020 to 2024



The total of 213 marine transportation accidents represents a decrease from the 243 accidents in 2023 and is below the 10-year average of 274. In 2024, 85% were shipping accidents (when a ship, for example, sinks, founders, or capsizes), slightly more than 83% on average over the previous 10 years. The remaining 15% of accidents in 2024 were aboard ship (when a person is seriously or fatally injured, for example, when boarding a ship or by falling overboard), just below the 10-year annual average of 17%.

The 12 marine transportation fatalities represent a 33% reduction from the 2023 total of 18 and the 10-year average of 15. Of the 12 fatalities, eight involved shipping accidents, slightly fewer than the average of nine per year. As in previous years, a high proportion of the fatalities (10 of the 12) was related to commercial fishing (Canadian-flag vessels in Canadian waters). Due to this continuing trend, commercial fishing safety remains a key safety issue on the TSB's Watchlist.

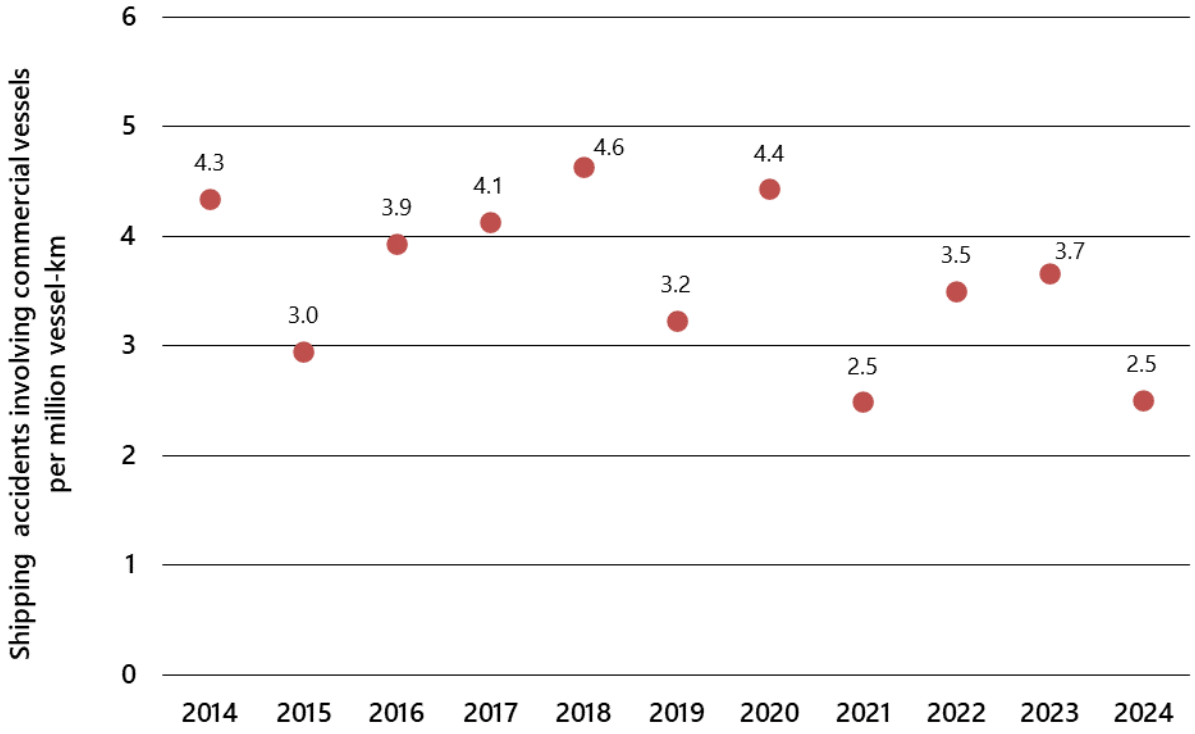
The 738 marine transportation incidents reported to the TSB in 2024 represents a 6% decrease from 2023 and is 13% below the 10-year average of 845. As in previous years, most reportable incidents (83%) were related to the total failure of machinery or technical systems.

Accident rate: A measure of marine transportation safety

According to Transport Canada, 2024 marine activity (commercial vessel-kilometres) for Canadian commercial non-fishing vessels with a gross tonnage of over 15 (excluding passenger vessels and

cruise ships) was unchanged from the 2014-to-2023 average. The 2024 accident rate was 2.5 accidents per million commercial vessel-kilometres, lower than the 2014-to-2023 average of 3.7.

Figure 6. Shipping accident rate, Canadian commercial non-fishing vessels, 2014 to 2024



Marine transportation investigations

In 2024–25, the TSB deployed to seven marine transportation occurrences (two fewer than in 2023–24), launched seven investigations, and completed 10 (tables 10 and 11).

Table 10. TSB marine transportation safety investigation activities, 2023–24 and 2024–25

Activities	2023–24	2024–25
Deployments	9	7
Investigations started	8	7
Investigations completed	8	10
Investigations in progress on 31 March of each year	17	14

Table 11. Marine transportation safety investigations completed, by type of investigation, 2023–24 and 2024–25

Class (investigation type)	Completed investigations		Completion target (days)	Average duration (days)	
	FY2023–24	FY2024–25		FY2023–24	FY2024–25
2 (complex)	1	2	600	963	871
3 (detailed)	3	6	450	909	740
4 (limited scope)	4	2	220	378	280

Here are some reports that highlight this past calendar year's most significant marine safety investigations.

TSB issues three recommendations following investigation into ferry collision with dock

The TSB issued three recommendations related to passenger safety management to Transport Canada along with the publication of its investigation report (M22C0231) into the 2022 occurrence in Toronto, Ontario, where the passenger ferry *Sam McBride*, with six crew members and approximately 910 passengers on board, struck the dock while berthing at the Jack Layton Ferry Terminal. Twenty passengers were reported injured.

In its investigation, the TSB determined that at the time of the occurrence, the vessel approached the dock faster than it had on earlier trips that day. Also, it had only one of its two propellers turning as it approached the dock, which, considering the vessel's speed and distance from the dock, was not enough to stop the ferry. Additionally, the investigation found that the City of Toronto did not have written procedures addressing issues like safe approach speed for docking, meaning that masters were left to operate in the way that they deemed appropriate. Without written procedures that defined safe practices for docking, decisions around travel or docking speed may have been influenced by operational pressures.

When the TSB investigates an occurrence, it not only looks at the event, but also the circumstances around it. By doing so, it found that the crew on the *Sam McBride* were not trained in emergency passenger management because this training was not required for crew on sheltered waters voyages. However, while passenger vessels that are on sheltered waters voyages are closer to shore and shore-based emergency responders than vessels on other types of voyages, there are a number of types of emergencies that need an immediate response that cannot await the arrival of shore-based responders. For this reason, the Board recommended that Transport Canada implement a requirement for crew members of all passenger vessels, including those on sheltered waters voyages, to complete appropriate training in passenger safety management. [M24-01]

Furthermore, all passenger vessels are required to have emergency procedures that dictate how all passengers and crew will evacuate from a vessel within 30 minutes of an abandon ship signal in Canada. Despite this being a regulatory requirement, Transport Canada has no formal procedure to assess if the requirement is being met. The investigation found that the ferry's evacuation procedures were unrealistic, leaving its six crew members to manage over 900 passengers while completing multiple competing tasks throughout the vessel. As is the case for many other vessels, emergency drills on the *Sam McBride* were typically carried out without passengers on board, which meant that they did not provide an opportunity to realistically validate the feasibility of the vessel's evacuation procedure. However, a vessel's crew will be insufficiently prepared for an emergency if passenger evacuation procedures are not validated through a realistic exercise with a representative number of participants. With this in mind, the Board recommended that Transport Canada implement a formal validation and approval process for passenger vessel evacuation procedures. [M24-02]

Lastly, on the *Sam McBride*, passenger counts were estimated and tracked using a hand-held tally counter, and children, infants, and those who may require extra assistance were not counted separately. Currently, there is no explicit requirement to keep a separate count of the children and infants on board on voyages of less than 12 hours. However, Transport Canada regulations specify that a vessel must carry child-sized lifejackets for 10% of the total number of passengers or the total number of children on board. In this occurrence, there was no way to determine whether there was an adequate number of appropriately sized life jackets available on board without a separate count of children. Therefore, the Board recommended that Transport Canada implement a process to validate that passenger vessels are keeping an accurate count of all passengers, including a separate count of the number of children and infants, on all voyages. [M24-03]

Since the occurrence, the City of Toronto has increased the size of the *Sam McBride*'s crew from six to 13. The City has also addressed passenger safety issues, including updating the pre-recorded safety briefings, adding additional signage, and warning passengers to not stand on the stairs while the vessel is moving.

TSB concerned about Canada's marine emergency preparedness following investigation into a fire aboard container vessel *ZIM Kingston*

The TSB issued two safety concerns following the 2021 loss of containers and fire on board the container vessel *ZIM Kingston* (M21P0297), off Vancouver Island, British Columbia (BC). The first safety concern relates to the risk of a phenomenon called parametric rolling, which led to the loss of containers, and the second concern addresses gaps in Canada's preparedness to respond to marine emergencies.

In October 2021, the *ZIM Kingston* was drifting outside the Juan de Fuca Strait while waiting for an anchorage to become available when it experienced a series of severe side-to-side rolls, resulting in the loss of 109 containers overboard and damage to others. Approximately 36 hours later, while the vessel was anchored off Victoria, BC, a fire broke out in a damaged container that held dangerous goods. The fire then spread to nearby containers and lasted for five days before it was declared extinguished.

During its investigation, the TSB conducted model testing that determined that the *ZIM Kingston* experienced parametric rolling, a phenomenon that occurs when sea conditions converge with vessel-specific factors in a precise way, resulting in dangerous side-to-side rolling motions. The investigation found that the risk of parametric rolling could have been identified using guidance material that is generally available to industry. However, this material was not on board the container vessel. The International Maritime Organization is taking steps to update industry guidance, but this will take time. While this work is underway, the Board is concerned that the absence of up-to-date comprehensive industry guidance for the management of parametric rolling may cause company policies, procedures, tools, and training to be inconsistent, ineffective, or absent altogether.

This occurrence also brought to the forefront the challenges that Canada faces when dealing with marine emergencies that go beyond the response capacity of the vessel's crew. Indeed, unlike the United States, Canada does not require pre-arranged plans for emergency response or marine salvage. In this occurrence, it was fortunate that the vessel's manager had made pre-arrangements for emergency response, and there simply happened to be two suitably equipped vessels nearby. To address this, Transport Canada has proposed to make regulations to strengthen preparedness requirements for industry, but this will also take time. In the interim, the Board issued a concern that there are gaps in Canada's preparedness for marine emergencies that exceed the response capacity of a vessel's crew, posing a risk to vessels, the environment, and the health and safety of the general public.

Marine transportation safety advisories and safety information letters

The TSB issued three marine transportation safety advisory letters and three marine transportation safety information letters as part of its investigations in FY2024–25.

Safety deficiencies on board the *Navark Faucon Millenium*

In June 2024, the TSB launched an investigation into a collision (M24C0142) between a pleasure craft carrying six people and the passenger vessel *Navark Faucon Millenium*, with 38 passengers and two crew members on board, on the St. Lawrence River. Many of the passengers onboard the *Navark Faucon Millenium* were knocked to the deck due to the impact, and some were treated in hospital for their injuries, which were aggravated by sharp edges at the base of the bulwark stanchions and by the lifebuoy cradle at the front.

So far, the investigation has identified safety issues relating to the protection of passengers and issued Marine Transportation Safety Advisory Letter 01/24 to Croisières Navark Inc. suggesting remedial action to reduce risks to safety, such as installing handrails and handles. In October 2024, Croisières Navark Inc. informed the TSB that it had taken action on several of the deficiencies identified in the letter.

Progress on outstanding Board recommendations

The Board assessed the progress of 28 marine transportation safety recommendations in 2024–25, and seven (M04-01, M17-01, M17-02, M17-04, M23-03, M23-04, M23-05) were closed as Fully Satisfactory. The 21 remaining recommendations assessed were rated as Satisfactory Intent (5), Satisfactory in Part (9), Unsatisfactory (5), and Unable to Assess (2).

In 2017, the Board issued recommendations M17-01 and M17-02 following the investigation (M15P0347) into capsizing of the passenger vessel *Leviathan II* aiming to advance safety in commercial passenger safety. In July 2024, the two recommendations were closed as Fully Satisfactory as the Board believed that Transport Canada's actions, namely the publication of the new *Marine Safety Management System Regulations* (MSMSR) in the *Canada Gazette*, Part II that require vessels to develop and implement a safety management system, in conjunction with the requirements of the *Navigation Safety Regulations 2020*, will substantially mitigate the underlying risks.

These changes implemented by Transport Canada also allowed the Board to close Recommendation M04-01 as Fully Satisfactory, which was issued following its investigation into the sinking and loss of life involving the amphibious passenger vehicle *Lady Duck* (M02C0030). The recommendation called for steps to ensure that small passenger vessel enterprises have a safety management

system. The Board determined that, with the introduction of the new MSMSR, Transport Canada has taken steps to meet this requirement.

In July 2024, the Board also assessed the response to Recommendation M17-04, which recommended that the government of New Brunswick and WorkSafeNB require the wear of a suitable PFDs at all times while on the deck of a fishing vessel. The recommendation was closed as Fully Satisfactory, as the risk to safety is reduced through the changes in provincial workplace legislation in New Brunswick, along with the oversight role of WorkSafeNB, which will provide education, awareness, and enforcement.

Following the release of investigation report (M21P0030) on the sinking and loss of life involving the tug *Ingenika* and barge *Miller 204*, the Board recommended that the Pacific Pilotage Authority (PPA) verify that eligibility requirements are met before issuing pilotage waivers to companies operating tugs in compulsory pilotage areas [M23-03] and implement a process to verify ongoing compliance with waiver conditions by companies operating tugs in compulsory pilotage areas [M23-04]. The Board is pleased with PPA's efforts to review and track the submitted documentation to ensure that any non-compliance with waiver requirements will be detected prior to issuing the waivers, and to enhance its pilotage waiver process by ensuring they are only granted to compliant operators and implementing a robust audit system. The responses to both recommendations were assessed and deemed to be Fully Satisfactory, and subsequently closed in December 2024.

As a result of the investigation (M22C0231) into the 2022 striking of berth by the passenger ferry *Sam McBride* in Toronto, the TSB issued three recommendations to Transport Canada [M24-01, M24-02, M24-03]. The Board has assessed the responses to the recommendations in March 2025:

- M24-01 was rated as Satisfactory in Part: While Transport Canada is taking steps in regard to passenger safety management training, these will only apply to seafarers who receive their initial qualifications. There is no current or planned requirement for Canadian seafarers sailing on domestic vessels to renew their Marine Emergency Duties training or to retake their examinations. Therefore, the underlying safety deficiency will take many years to resolve.

- M24-02 was rated as Satisfactory Intent: Although Transport Canada plans to review and update all of its training materials for marine safety inspectors and recognized organizations, it may be difficult to evaluate whether the evacuation procedures will meet the regulatory requirements if they do not simulate the presence of the passenger complement during an evaluation.

- M24-03 was rated Satisfactory in Part: Transport Canada's solution, i.e., the addition of a step for marine safety inspectors and recognized organizations to verify that procedures for passenger counting are included in a vessel's operating procedures, does not address the

recommendation, which is to "implement a process to **validate** that passenger vessels are keeping an accurate count of all passengers."

In March 2025, the Board closed its Recommendation M23-05, calling for improved regulatory oversight of written safety procedures for fishing vessels as Fully Satisfactory, when it determined that Transport Canada's efforts to update its inspection procedures, which now ensure that critical safety information is available to crew and that they are knowledgeable about this information, will substantially address the underlying risk.

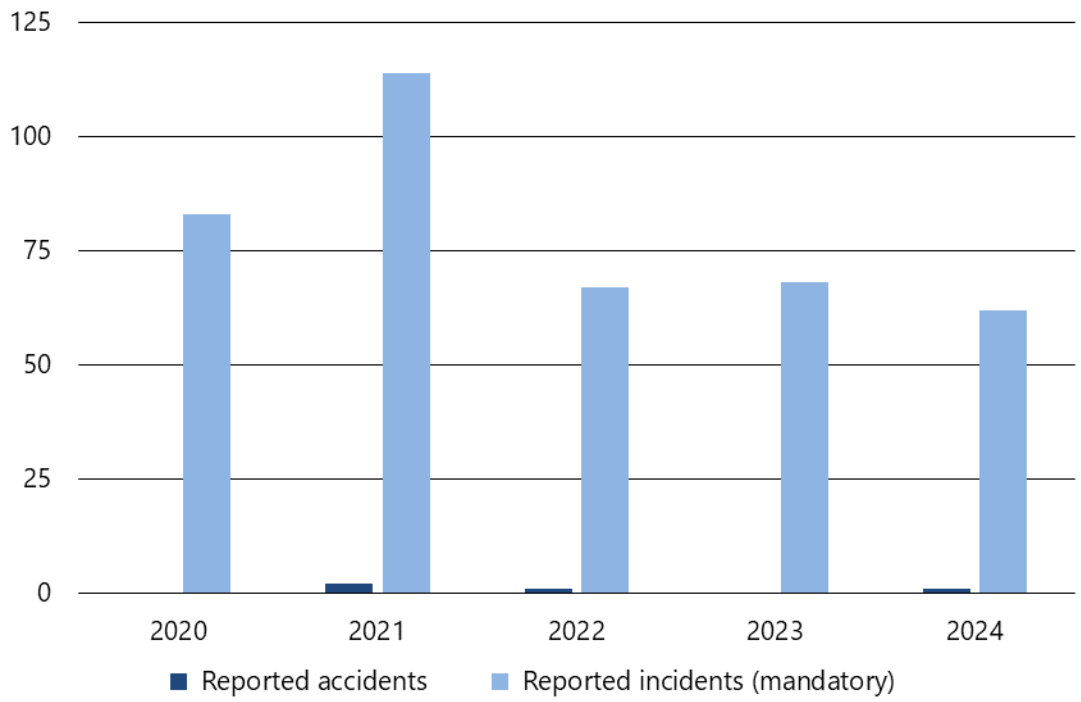
For all active recommendations, the TSB will continue to monitor the progress of planned actions and call for action to reduce or eliminate these deficiencies.

Pipeline transportation safety

The year in review

The TSB received 63 reports of pipeline transportation occurrences in 2024, one of which was an accident while the rest were incidents. There were no fatalities arising directly from the operation of any federally regulated pipeline, as has been the case since the TSB's inception in 1990.

Figure 7. Pipeline transportation accidents and incidents, 2020 to 2024



The number of reported occurrences in 2024 (63) is fewer than in 2023 (68) and 32% below the average of 93 for the previous 10 years. The single pipeline accident in 2024 equals the average number of accidents in the prior 10 years (1).

Of the 63 occurrences in 2024, 13 involved a release of product, which represents the smallest number of occurrences with product release in the past 11 years. These 13 occurrences are 21% of the total (63) occurrences in 2024, well below the 10-year average of 44%.

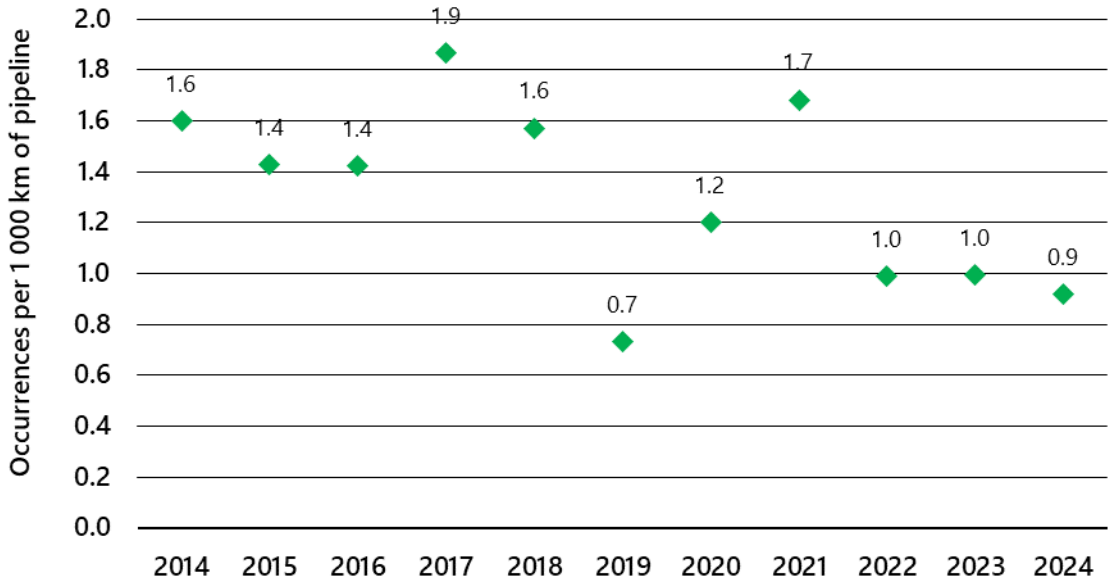
Eight of these 13 occurrences (62%) involved a release of hydrocarbon gas. The remainder (5) involved the release of low vapour pressure (LVP) hydrocarbons or other liquids. The TSB monthly and annual statistics on pipeline occurrences contain more information on product releases during the year.

In 2024, 20 of the 63 reported occurrences involved geotechnical, hydrotechnical, or environmental activity (e.g., slope movements or river erosion), five more than the number reported in 2023 and slightly above the average of 19 over the previous 10 years. There were 11 reports of pipelines being contacted by an object, compared with the average of 10 reports per year during the previous 10 years. There were also three occurrences with unauthorized third-party activity, slightly below the 10-year average of four per year.

Occurrence rate: A measure of pipeline transportation safety

There were 68 400 km of federally regulated pipeline operating in Canada in 2024, according to the Canada Energy Regulator. The 63 pipeline transportation occurrences reported to the TSB for the year resulted in an occurrence rate per 1000 km of operating pipeline of 0.9. This is below both the 2023 rate of 1.0 and the average of 1.4 occurrences per 1000 km from 2014 to 2023.

Figure 8. Pipeline transportation occurrence rate, 2014 to 2024



Pipeline transportation investigations

No pipeline investigations were completed in FY2024–25 (tables 12 and 13).

Table 12. TSB pipeline transportation safety investigation activities, 2023–24 and 2024–25

Activities	2023–24	2024–25
Deployments	0	2
Investigations started	0	1
Investigations completed	1	0
Investigations in progress on 31 March of each year	0	1

Table 13. Pipeline transportation safety investigations completed, 2023–24 and 2024–25

Class (investigation type)	Completed investigations		Completion target (days)	Average duration (days)	
	2023–24	2024–25		2023–24	2024–25
3 (detailed)	1	0	450	642	N/A

Pipeline transportation safety advisories and safety information letters

The TSB issued no pipeline transportation safety advisories or pipeline transportation safety information letters in 2024–25.

Progress on outstanding Board recommendations

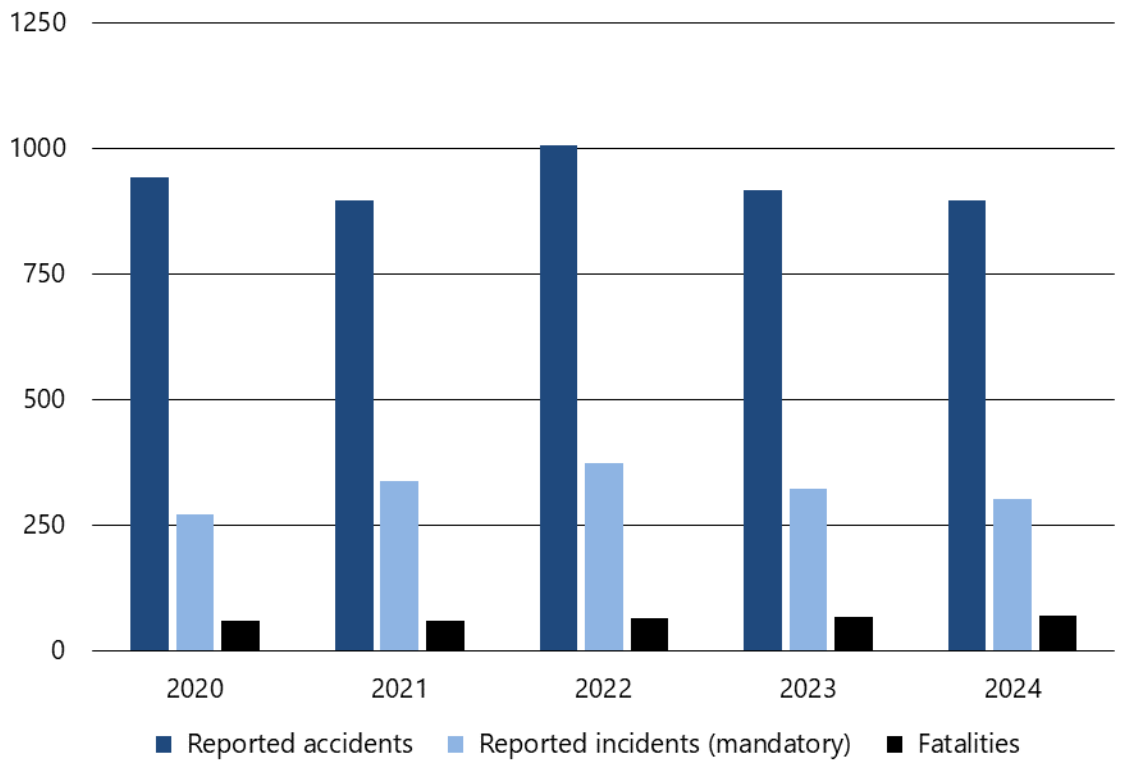
The Board did not issue any pipeline transportation safety recommendations in 2024–25 and had previously assessed all responses to pipeline transportation safety recommendations as Fully Satisfactory.

Rail transportation safety

The year in review

The TSB received 1198 reports of rail transportation occurrences in 2024 (896 accidents and 302 incidents), including 69 fatalities.

Figure 9. Rail transportation accidents, incidents, and fatalities, 2020 to 2024



The 896 accidents represent a 2% decrease from 2023 and a 12% decrease from the 10-year average of 1021.

The 69 rail transportation-related fatalities reported in 2024 are slightly higher than the 67 in 2023 and above the 10-year average of 62. Among the fatalities, 56 involved trespassers, compared to 53 in 2023 and the 10-year average of 42.

The number of crossing accident fatalities decreased in 2024 (12) compared to 2023 (13) and is lower than the 10-year average (18).

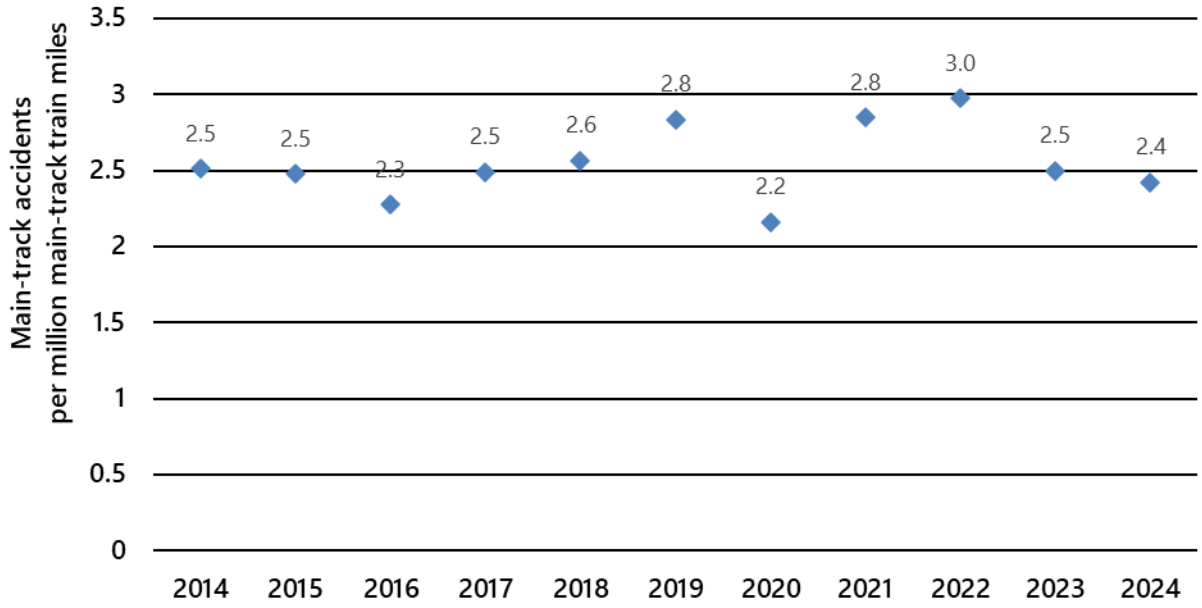
Among all rail transportation accidents, 87 involved dangerous goods. This is on par with 87 accidents in 2023 and is lower than the 10-year average of 115. Three of these accidents in 2024 resulted in dangerous goods being released.

There were 302 rail transportation incidents reported to the TSB in 2024, a 7% decrease from 2023 (323). Incidents involving movements that exceeded limits of authority accounted for 47% (143) of all rail transportation incidents in 2024, 19 fewer than in 2023 but above the 10-year average of 135.

Accident rate: A measure of rail transportation safety

According to Transport Canada, 2024 main-track (i.e., non-yard) rail activity increased by 3% to 82.2 million main-track train miles from 79.7 in 2023. The main-track accident rate in 2024 was 2.4 accidents per million main-track train-miles, down from 2.5 in 2023 and below the 10-year average of 2.6.

Figure 10. Main-track accident rate, 2014 to 2024



Rail transportation investigations

The TSB deployed to 14 rail transportation occurrences in 2024–25, launched four investigations, and completed 10 (tables 14 and 15).

Table 14. TSB rail transportation safety investigation activities, 2023–24 and 2024–25

Activities	2023–24	2024–25
Deployments	21	14
Investigations started	11	4
Investigations completed	8	10
Investigations in progress on 31 March of each year	17	11

Table 15. Rail transportation safety investigations completed, 2023–24 and 2024–25

Class (investigation type)	Completed investigations		Completion target (days)	Average duration (days)	
	FY2023–24	FY2024–25		FY2023–24	FY2024–25
1 (safety issue)	N/A	1	730	N/A	1528
2 (complex)	1	0	600	1634	N/A
3 (detailed)	7	8	450	1048	722
4 (limited scope)	N/A	1	220	N/A	473

Here are some of this past calendar year's rail safety investigations.

Risk of collision between two trains in Ontario highlights the need for physical safety defences on Canada's railways

The TSB investigated (R23H0006) an incident where a Canadian National Railway Company (CN) freight train nearly collided head-on with a VIA Rail Canada Inc. (VIA) passenger train carrying 167 passengers near Cornwall, Ontario.

On April 13, 2023, the CN train passed a Clear to Stop signal, which indicates to proceed and prepare to stop at the next signal. The crew missed the signal, and as the train approached the Stop signal at Wesco, they applied the air brakes in emergency and made an emergency radio broadcast.

At the same time, the VIA passenger train was approaching on the same track. Upon hearing the emergency radio broadcast from the CN crew, the VIA train crew brought the passenger train to a controlled stop, coming to rest about 1100 feet from the CN train.

TSB Watchlist Issue

Following Signal Indications

Train crews do not consistently recognize and follow railway signals, posing a risk of train collisions or derailments that can have catastrophic consequences. The issue of following railway signal indications is on the TSB Watchlist, and it will remain there until TC requires that railways implement additional physical safety defences to ensure that signal indications governing operating speed and operating limits are consistently recognized and followed.

The investigation determined that the CN train crew was focused on preparing for future tasks, which divided their attention from the primary task of following railway signal indications, resulting in the missed Clear to Stop indication. The crew was therefore not prepared to stop at the next signal, so when the emergency braking was applied, there was an insufficient distance to stop the train before passing the signal.

As a result of this occurrence and two other ongoing investigations (R23E0079 and R23V0205), the TSB sent a letter to the Minister of Transport concerning the absence of physical fail-safe defences for trains operating in Canada. To date, no response has been received from the Minister regarding the concerns raised by the TSB. Even though the TSB has been calling for physical fail-safe defences for trains for almost 25 years, the Canadian railway industry continues to rely solely on administrative defences to protect against train crews not responding appropriately to signal indications. TSB investigations and human factors science demonstrate that the current defences in place are not enough to prevent adverse outcomes. The United States has implemented such a system since 2020. Given the risk to train crews and the travelling public, the TSB strongly urges Transport Canada and the railway industry to accelerate the implementation of physical fail-safe train controls on high-speed rail corridors and key routes in Canada.

Inadequate securement of rolling stock led to uncontrolled movement in Toronto Yard, Ontario

The investigation report R22T0045 into an uncontrolled movement and derailment of a Canadian Pacific Railway Company (CP)[3] cut of cars highlights a TSB Watchlist issue, namely unplanned/uncontrolled movement of rail equipment.

In this March 2022 occurrence, 103 rail cars ran uncontrolled for about 3200 feet down a descending grade of a track in the CP Toronto Yard in Toronto, Ontario, which resulted in the derailment of the seven leading cars.

The investigation determined that a CP train crew initially secured the cars using six hand brakes, and then performed a hand brake effectiveness test to confirm that there was sufficient brake force to keep the rolling stock from moving on its own. After judging the test to be successful, the crew applied the emergency air brakes. The following morning, the air brakes were released in preparation for switching. When the air brakes on the last car were released, all 103 cars began to roll uncontrolled with the six hand brakes still applied.

The investigation found that the force applied during the hand brake test was insufficient and not enough time was allowed for the slack between the cars to fully adjust before the emergency air brakes were applied. Consequently, the hand brake effectiveness test was incomplete, and the crew were unaware that the number of hand brakes used to secure the cars was insufficient for the descending grade. In this occurrence, the crew applied a greater number of hand brakes than CP's practice required and were confident that the cars were secured based on the results of the hand brake effectiveness test. CP's instructions to crews did not provide location-specific guidance;

[3] On April 14, 2023, CP and Kansas City Southern (KCS) combined into a single railway company doing business as CPKC. As this occurrence took place before the transition date, the acronym CP was used.

therefore, crews had to rely on their knowledge, experience, and judgment when securing rolling stock in the yard.

Four significant uncontrolled movements, including this one, have taken place in Toronto Yard over the past five years. As a result, the TSB issued Rail Transportation Safety Advisory Letter 03/23 to Transport Canada in March 2023, which stated that Transport Canada might wish to audit CP's switching and car securement practices for the yard to ensure that adequate procedures are in place to prevent uncontrolled movements.

Transport Canada subsequently conducted inspections and issued a Notice under Section 31 of the *Railway Safety Act*, prompting CP to take safety actions. Also, CP introduced a revised operating bulletin to be used when securing rail equipment in the yard, as well as conducting further education, training, and safety blitzes for employees working at the yard.

TSB report highlights the importance of adequate supervision for newly qualified railway employees

On February 22, 2023, a train operated by Quebec North Shore and Labrador Railway (QNS&L) was pulling towards a station camp when it passed a signal displaying a Stop indication. Despite the signal being visible 0.75 miles away, the locomotive engineer (LE) did not undertake the braking manoeuvres required to stop before the signal. About 50 feet from the signal, the LE realized that it was displaying a Stop indication and applied full dynamic braking and made an emergency application of the train breaks.

The investigation (R23Q0022) determined that the LE's mental model was likely affected due to routinely stopping the lead locomotive of his train in front of the camp located after the signal. Furthermore, the LE had developed a habit of not always broadcasting Stop signal indications on the railway radio as required by the *Canadian Rail Operating Rules*.

On September 7, 2023, the TSB sent Rail Transportation Safety Information Letter 04/23 to QNS&L on the supervision of newly qualified LEs. As a result, QNS&L made changes to its evaluation program for apprentice LEs and increased the frequency of evaluations by supervisors in the field for LEs with less than two years of experience.

As this occurrence demonstrates, railway signals are not consistently recognized and followed, which, in the absence of physical fail-safe defences, poses a risk of train collisions or derailments that can have catastrophic consequences.

Train collision near Campbell Creek, British Columbia

On December 29, 2022, a CP track supervisor was inspecting the north and south main tracks on the Shuswap Subdivision in a hi-rail vehicle when he noticed a defect that required a repair. While

the supervisor was repairing the track, an eastbound freight train was given authorization to travel through this location and collided with the unoccupied hi-rail vehicle. No one was injured.

The investigation (R22V0238) determined that the supervisor had an electronic track occupancy permit (TOP) for the north main track to allow him to conduct his inspection. When he noticed the defect, he requested a second electronic TOP for the south track. Shortly after, the supervisor, realizing he had not cancelled the permit for the north track, accessed CP's employee application and inadvertently cancelled the permit for the south track instead. Because there was no multi-layer verification procedure in CP's application, the track supervisor was able to inadvertently select, verify, and cancel the wrong permit, leaving the track that he was working on unprotected.

In April 2023, the TSB sent Rail Transportation Safety Advisory Letter 04/23 to CP indicating that the verification procedures for cancelling electronic TOPs were less rigorous than those for cancelling over radio. As a result, CP implemented several safety actions, including enhancing the electronic application.

Rail transportation safety advisories and safety information letters

The TSB issued five rail transportation safety advisories and one rail transportation safety information letter as part of its investigations in 2024–25.

Collision involving distraction of train crew while approaching a point of restriction

The TSB sent Rail Transportation Safety Advisory Letter 02/24 to Canadian Pacific Railway Company (CPKC) following its investigation into a main-track train collision (R24C0020).

On February 16, 2024, a CPKC loaded unit coal train was travelling westward on the north main track of the CPKC Mountain Subdivision when it struck the trailing car of a stationary CPKC unit grain train, resulting in the derailment of and extensive damage to the four head-end locomotives, the spill of an undetermined amount of diesel fuel, and the fire of one locomotive.

During the course of the investigation, there was clear indication that just before the train passed the Clear to Stop signal, the crew's attention was diverted away from identifying signal indications to responding to a non-urgent call from the rail traffic controller, leading to a loss of shared awareness of signal indications and progressions. The crew's attention was also drawn away from critical train control tasks at a time and location when and where definitive action was required to reduce train speed approaching the next signal. Divided attention on two or more aspects of the working environment can result in a reduction of performance, which can then lead to an incident or accident.

The safety advisory letter informed CPKC that, in the absence of backup physical defences to prevent collisions when a signal is misinterpreted or misapplied, or when crew response is inadequate to ensure safety, it may wish to review its procedures to ensure that:

- non-urgent communications with train crews are minimized during times when attention and focus on critical tasks is absolutely necessary, and
- train crews are not compelled to engage in non-urgent tasks when approaching points of restriction.

Derailment of CN train at Southwark Yard

Following a train derailment that occurred in November 2024 (R24D0080) in Longueuil, Quebec, the TSB issued Rail Transportation Safety Advisory Letter 06/24 to inform Transport Canada that it may wish to consider reviewing rail inspection and testing requirements for tracks such as those located in rail yards to ensure that they remain fit for continued service.

Due to the nature of rail yard operations, it is not unusual for tracks located in rail yards to include vintage rail dating back many decades, when the yards were originally constructed. In addition, replacement rails used in yards are often old rails that were removed from service. Furthermore, because movements within rail yards are not systematically tracked by railway companies, the accumulated tonnage of yard rail is rarely known.

Rails in yards are regularly inspected, and inspection methods generally include visual inspections as well as ultrasonic testing using hi-rail vehicles to detect internal defects. Some track inspection equipment can perform rail wear measurement, but such equipment is generally used on main tracks. As such, in most rail yards, rail wear is not systematically measured as part of the scheduled inspection program. It is therefore possible that older and/or vintage rails that are near or exceed their established maximum wear standards remain in service in rail yards. Such rails could develop undetected internal defects which increase the likelihood of sudden in-service failure, resulting in a derailment and compromising the safety of the public and nearby infrastructure.

Locomotive voice and video recorder system data issues

In February 2025, the TSB sent Rail Transportation Safety Information Letter 01/25 to Transport Canada to advise that it may wish to ensure that the locomotive voice and video recorder (LVVR) systems installed on board all GO/Metrolinx trains operating on federally regulated territory meet the requirements of the LVVR Regulations.

On March 14, 2024, a GO Transit commuter train was departing the Aldershot station in Burlington, Ontario, when it passed a signal displaying a Stop indication. The train then went through a crossover switch at 9 mph and entered the main track of the CN Oakville Subdivision. After entering

the main track, the train was directly in the path of another GO Transit commuter train. Both trains were brought to a stop, avoiding a collision.

As part of its investigation (R24T0064), the TSB gathered the data from the LVVR system for each train. LVVR data provide a reliable means of determining the role of human factors in a railway occurrence. This information is used to determine whether corrective measures are required to improve rail safety. Unfortunately, when analyzing the LVVR data, the TSB observed that there were several audio and video issues with the LVVR systems.

Progress on outstanding Board recommendations

Of the 10 responses to rail transportation safety recommendations the Board assessed in 2024–25, one was closed as Fully Satisfactory. The nine remaining responses to recommendations were assessed as Satisfactory Intent (7), including two Dormant; and Satisfactory in Part (2).

As a result of the investigation into the crossing collision between a VIA passenger train and an OC Transpo double-decker bus in Ottawa, Ontario (R13T0192), the Board issued two recommendations calling for:

- Transport Canada to require commercial passenger buses to be equipped with dedicated, crashworthy, event data recorders [R15-03], and
- the City of Ottawa to reconsider the need for grade separations at the Woodroffe Avenue, Transitway, and Fallowfield Road level crossings. [R15-05]

For both recommendations, the rating of the latest response has remained Satisfactory Intent, but the status was changed to Dormant, notably because Transport Canada does not anticipate potential adoption of heavy vehicle event data recorder requirements into Canadian regulations for another seven to nine years, and the City of Ottawa's process to complete these grade separations is anticipated to be lengthy.

In March 2025, the Board assessed the response from Transport Canada to Recommendation R20-01 that was issued following investigation R17W0267 and that called for measures to reduce the frequency and associated risks of uncontrolled movements while switching without air. The recommendation was closed as Fully Satisfactory, given the safety action taken by Transport Canada and the corresponding overall decrease in the number of uncontrolled movements categorized as switching without air.

For all active recommendations, the TSB will continue to monitor the progress of planned actions and call for action to reduce or eliminate these deficiencies.

Who we are and what we do

The Transportation Safety Board of Canada (TSB) advances transportation safety in the air, marine, pipeline, and rail transportation sectors in Canada:

- It conducts independent investigations into selected occurrences and makes findings about their causes and contributing factors.
- It identifies safety deficiencies arising in transportation occurrences and makes recommendations to eliminate or reduce them.
- It reports publicly about its investigations and findings.

As part of its investigations, the TSB reviews developments in transportation safety and identifies safety risks that governments and the transportation industry must address in order to reduce the risk of injury and loss.

Role of the Board

The Board, which comprises up to five members, including the Chair, approves all investigation reports, makes findings, and issues recommendations.

The Board

Yoan Marier Chair	**Paul Dittmann** Board Member	**Kenneth Potter** Board Member	**Louise Smolska** Board Member	**Leo Donati** Board Member

The TSB welcomed a new Chair in August 2024, former Board Member Yoan Marier. Additionally, the Board welcomed new full-time Member, Louise Smolska, in September 2024. Biographies of each Board member can be found on the TSB website.

In making findings, the Board does not assign fault or determine civil or criminal liability for an occurrence. Rather, it seeks to find out what happened and why in an objective manner, independent from government and all other departments and agencies involved in transportation, and free from any conflict of interest. It also draws impartial conclusions and makes recommendations to those best placed to act.

About the TSB

A staff of 233, led by the Chief Operating Officer and an executive management committee, supports the Board. The work of the organization is guided by a five-year strategic plan and five core values:

- Respect: We are committed to inclusiveness and to treating all individuals and organizations with consideration, courtesy, discretion, and fairness.
- Openness: We actively share and exchange information to advance transportation safety.
- Safety: We maintain and promote a positive and proactive safety culture.
- Integrity: We are guided by honesty, transparency, impartiality, propriety, and accountability for our actions and decisions.
- Excellence: We maintain a highly skilled and knowledgeable team of professionals through leadership, innovation, and commitment to continuous improvement in the delivery of our products and services.

TSB investigators are professionals with years of experience in the various transportation modes the TSB covers. They work in collaboration with engineering and technical specialists, human factors investigators, and industry analysts, all of whom are supported by small teams of communications specialists, corporate services professionals, and administrative officers.

The TSB's head office is in Gatineau, Quebec. The TSB also has a laboratory in Ottawa and regional offices in Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Montréal, Québec, and Dartmouth.

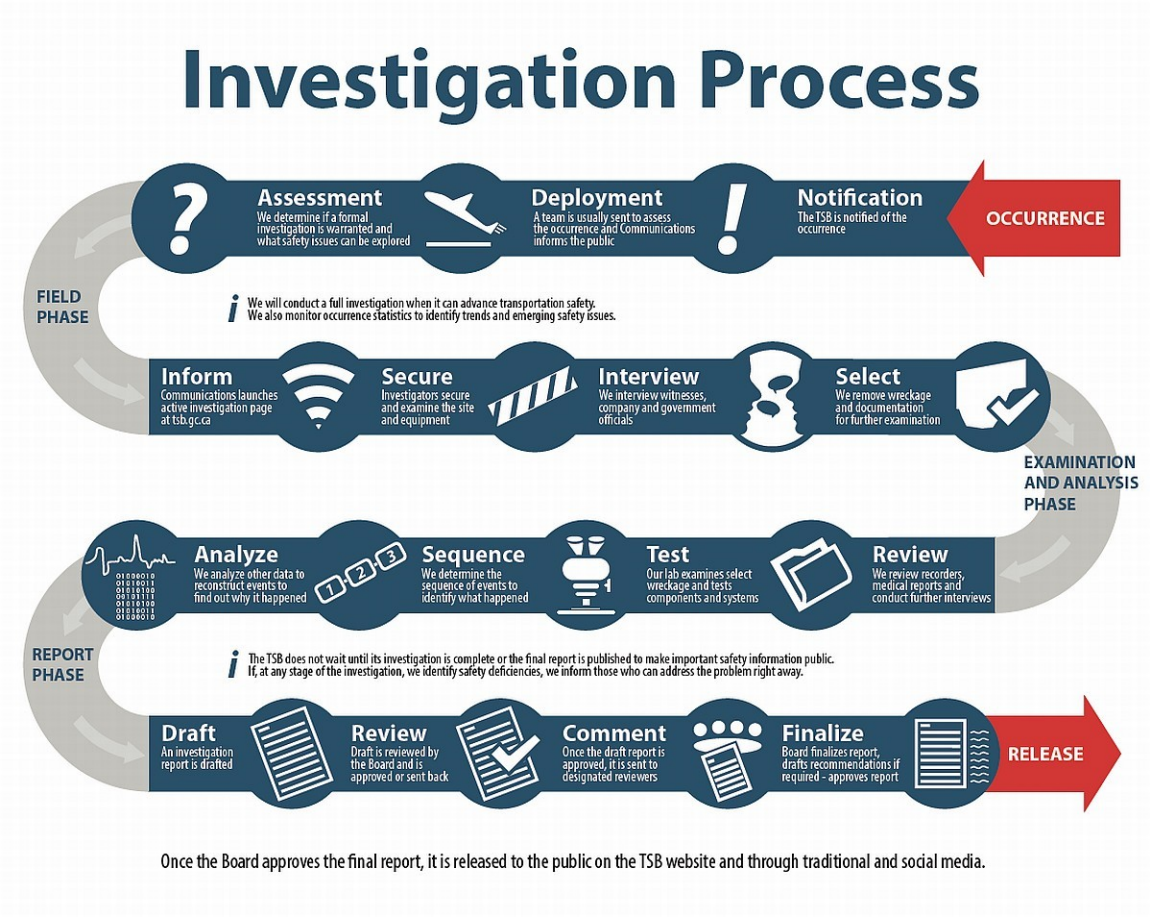
The investigation process

There are three main phases of the TSB's investigation process. During the field phase, investigators collect data and assess the occurrence. This generally involves travelling to the scene of the occurrence, securing the site and documenting it, conducting interviews, and selecting wreckage for further examination. Unless the investigation is limited to data collection, an investigation page is created, posted to the website, and updated periodically as the investigation progresses.

During the examination and analysis phase, investigators review the data to determine the sequence of events leading to the occurrence and the underlying causes and contributing factors.

In the report phase, investigators draft a report on the investigation, which then goes through a review and approval process, prior to public release.

Figure 11. The TSB investigation process from occurrence to report



Appendices

Appendix A: Investigation reports released in FY2024–25 and related safety actions

The following is a list of the investigation reports the TSB released during FY2024–25. Each entry includes details of any safety actions taken during the investigation and after the report was published, and a link to the main page for the investigation. The list is organized by transportation sector and in the order in which the occurrences took place.

The safety actions taken by industry stakeholders and regulators in the air, marine, pipeline, and rail transportation sectors are the tangible outcome of the TSB's investigative work to advance transportation safety. Their efforts as a result of our findings contribute to making our transportation system safer.

Air transportation sector

INVESTIGATION REPORT A23F0062: Runway excursion on takeoff, WestJet Airlines Ltd., Boeing 737-7CT, C-GWCN, Harry Reid International Airport, Nevada, United States, 16 February 2023

Safety action	Following the occurrence, **WestJet Airlines Ltd.:**
	• Issued a company memo to all pilots a memo to all pilots addressing the risks associated with departing from areas prior to a runway's displaced threshold, particularly under low-visibility conditions. The memo:
	  ○ cautions that pilots may inadvertently align with the runway edge during nighttime departures from non-threshold areas, especially at airports with non-standard runway and taxiway markings or lighting, as defined by Canadian regulations.
	  ○ outlines existing mitigations to reduce these risks and specifically identifies ground-based hazards at Harry Reid International Airport (KLAS), including a visually uniform layout, complex taxi routes, potential unfamiliarity, blending of airport and area lighting, intense runway activity, and non-standard markings and lighting.
	• Revised its Route & Aerodrome Qualification for KLAS.
	Following the occurrence, **Harry Reid International Airport:**
	• Implemented additional training and procedural adjustments related to runway inspections.
	• Launched a three-phase initiative aimed at improving the visibility of runway and taxiway markings, which is estimated to be completed by fall 2025.

INVESTIGATION REPORT A22P0057: Collision with terrain, Tyax Air Service Limited, De Havilland DHC-2 MK. I (Beaver), C-GIYV, Pemberton Aerodrome, British Columbia, 17 July 2022

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A23Q0069: Mid-air collision, Richcopter Inc. (dba Select Aviation College), Cessna 150M, C-FUAE, and Cessna 150M, C-GRAE, Ottawa/Gatineau Airport, Quebec, 20 June 2023

Safety action	Following the occurrence, **Select Aviation College:** • Reviewed procedures for circuit communications with all students; • Imposed a limit of four Select Aviation College aircraft in the circuit at the same time; • Put in place a monthly safety assessment related to events that occurred and/or relevant operational points; • Made a fixed radio fully available to the supervising instructor, who can use it at any time to communicate with pilots as required; • Held a safety seminar in June 2024, which was compulsory for all students and was attended by representatives from the air mode of the TSB. A minimum of two safety meetings (e.g., safety seminar, monthly safety committee meeting) is now required per year for each of our students; any failure to meet this rule will result in a refusal of training activities until participation in these mandatory events are completed.

INVESTIGATION REPORT A22P0067: Loss of engine power and forced landing, Conair Group Inc., Air Tractor, Inc. AT-802A, C-FFQS, Cranbrook, British Columbia, 2 August 2022

Safety action	Following the occurrence, **Conair Group Inc.** took the following safety action: • A flight operations briefing was introduced on engine failures in general and the accident specifics to initial and recurrent pilot training. • All AT-802 pilots received low-level engine failure training in the AT-802 simulator. • The AT-802 maintenance team worked with Perkins Technologies to implement a new alarm from the Data Acquisition Alarm Monitor system. Using historical data from previous momentary power fluctuations, an alarm was created that will alert the pilot when the engine Ng value is above 90% with a corresponding fuel flow of 190 L/h or less. The software update was applied to the AT-802 Fireboss fleet first. Once the update is ready, it will also be installed on the AT-802 wheeled fleet. • A fleet campaign has been implemented to check all fleet emergency locator transmitters for labels with an incorrect Hex Id. Any incorrect Hex Id will be corrected.

INVESTIGATION REPORT A23P0061: Collision with terrain, Privately registered, Quest Kodiak 100, C-GKTX, Tofino/Long Beach Airport, British Columbia, 20 June 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A22C0093: Aft fuselage strike on landing, Perimeter Aviation LP, De Havilland DHC-8-314, C-GJYZ, Sandy Lake Airport, Ontario, 19 October 2022

Safety action	Following the occurrence, **Perimeter Aviation LP:** • Incorporated the "Dash 8-Q400 Pitch Awareness" video in its initial and recurrent cockpit procedures training for the DHC-8-100 and DHC-8-300 series and made the video available for instructors to share; • Amended the DHC-8 standard operating procedures (SOPs) to revise its stabilized approach criteria to include target power settings, and added information and guidance regarding the flight management system's "LPV APPR INHIBITED" error message; • Amended the SOPs for the DHC-8, SA227, and SA226 to include an instrument approach policy that requires flight crews to fly the instrument approach procedure for the intended

	runway, if one is available, regardless of weather conditions, to assist in ensuring a stabilized flight profile; • Developed flight operations quality assurance and line operations safety audit procedures; • Added this occurrence to the company's crew resource management course; • Implemented a command and decision-making course; • Amended DHC-8 initial simulator training to include excessive pitch recovery and black hole exercises; • Implemented a restricted crew status list; • Instituted a flight data monitoring program for its DHC-8 and SA227 AC fleet.

INVESTIGATION REPORT A23P0003: Controlled flight into terrain, Summit Helicopters Ltd., Bell Helicopters Textron Inc. 407 (helicopter), C-GTHU, Terrace, British Columbia, 4 January 2023

Safety action	Following the occurrence, **Summit Helicopters Ltd.:** • Discovered that it was possible to skip the flight risk assessment step when filing a flight itinerary for visual flight rules (VFR) operations. This issue has been rectified and it is no longer possible for pilots to file a flight itinerary for VFR flights without first filling out a flight risk assessment. • Expanded the ground briefing portion of low-visibility operations in its annual training. In addition, this accident has been added to the annual crew resource management training with emphasis on the topics of pilot decision making, workload management, and situational awareness.

INVESTIGATION REPORT A23Q0088: Loss of control and collision with ground, Orizon Aviation Québec Inc., Cessna 152, C-FNBP, Québec/Jean Lesage International Airport, Quebec, 1 August 2023

Safety action	Following the occurrence, **Orizon Aviation:** • Implemented a procedure stipulating that if student pilots fail their first pre-solo evaluation, they must be evaluated again by a check instructor following their correction flights, before being authorized to conduct their first solo flight.

INVESTIGATION REPORT A21F0210: Runway excursion on takeoff and in-flight fuel imbalance resulting in diversion, Jazz Aviation LP, Mitsubishi Heavy Industries, Ltd. CL-600-2D24 (Regional Jet Series 900), C-GJZV, San Diego International Airport, California, United States, 29 November 2021

Safety action	Following the occurrence, **Jazz Aviation LP:** • Examined 35 airports in the United States and 41 airports in Canada and identified those that require risk-mitigation measures to minimize the risk associated with the presence of displaced thresholds. • Updated airport charts (e.g., KSAN) with specific warnings and procedures for displaced threshold areas, including centerline verification methods and lighting use in low visibility. • Issued a company memo to all pilots, for all aircraft types, concerning departures from the areas before the displaced threshold on a runway. This memo referenced this occurrence and the current investigation and informed flight crews of the threats that exist during departures from runway areas other than the threshold, and the mitigations in place to minimize these threats. Jazz Flight Operations also published an amendment to section of its *CRJ AOM Volume II Aircraft Operating Manual*. • Revised its CRJ 900 QRH Gravity Crossfeed Procedure which includes concise wording on initiating a sideslip and requires that the autopilot be disengaged as part of the procedure. • Submitted immediately after the occurrence a service difficulty report to Transport Canada detailing the events involving the crossflow pump, the fuel quantity gauging computer, and

	the resultant fuel imbalance. Jazz submitted another service difficulty report to Transport Canada following the 2022 fuel imbalance occurrence in Winnipeg. • Amended its CRJ 900 QRH XFLOW PUMP Caution Message Procedure to improve crew response to this failure mode in a manner that proactively mitigates against a potential fuel transfer pump runaway as a contributor to a fuel imbalance condition. • Added the occurrence into the 2024 Crew Resource Management (CRM) training program, emphasizing threat recognition, complexity of inflight issues, and fuel imbalance management. • Conducted a fleet-wide inspection campaign on CRJ 900 fuel transfer systems; no faults were found.

INVESTIGATION REPORT A23O0028: Collision with terrain, 1401380 Ontario Limited (dba Wilderness North Air), Cessna 208B Caravan, C-GMVB, Nakina Airport, Ontario, 28 February 2023

Safety action	Following the occurrence, **Wilderness North Air:** • Issued a company directive requesting the use of cargo netting between each loading zone in the 208B aircraft to prevent cargo from moving fore and aft in the event of an in-flight upset or unusual attitude. • Added unusual attitude recovery to the in-aircraft training syllabus. • Equipped two of the company's three 208B aircraft with synthetic vision and automatic dependent surveillance – broadcast (ADS-B) in/out to enhance pilot situation awareness and improve flight following and data collection. WNA is planning to upgrade its third 208B aircraft as soon as practical.

INVESTIGATION REPORT A23P0091: Collision with terrain, Air Nootka Ltd., De Havilland DHC-2 Mk. I (Beaver), C-FZVP, Gold River Water Aerodrome, British Columbia, 28 July 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A23P0123: Collision with terrain, Sealand Aviation Ltd., De Havilland DHC-2 (Beaver), C-GSBA, Campbell River Airport, British Columbia, 20 September 2023

Safety action	Following the occurrence, **Sealand Aviation Ltd.:** • Actioned a company Non-Conformance Report and performed a root cause analysis. • Revised their Procedures Manual, adding a section that specifically addresses making changes to an experimental aircraft. As part of this section, there is now a Design Change for Development form with checkboxes to ensure that all changes have been communicated to all key team members including Transport Canada, and check boxes to ensure that a new Flight Permit has been received from Transport Canada. All of this is required before the aircraft is permitted to fly.

INVESTIGATION REPORT A23P0143: Collision with terrain, Privately registered, Piper PA-28-180, C-GGOR, Brisco, British Columbia, 24 November 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A21Q0131: Lateral runway excursion, Keewatin Air LP, Beechcraft King Air B200, C-FSKO, Sanikiluaq Airport, Nunavut, 17 December 2021

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A22P0111: Collision with terrain, Geotech Aviation Ltd., Airbus Helicopters AS350 B3, C-FVCR, Kitsault, British Columbia, 9 November 2022

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A23W0091: Controlled flight into terrain, Privately registered, Piper Aircraft Corporation PA-32R-301 (Saratoga SP), C-FCCY, Calgary/Springbank Airport (CYBW), Alberta, 28 July 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A23P0063: Collision with water, Privately registered, Savannah (advanced ultralight), C-ISVG, Simpson Lake, British Columbia, 25 June 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A24P0016: Runway overrun, Summit Air Ltd., British Aerospace Avro 146 Series RJ100, C-FRJY, Prince Rupert Airport (CYPR), British Columbia, 7 February 2024

Safety action	Following the occurrence, **Summit Air Ltd.:**
	• Made changes to its operating and dispatch procedures, focusing on the coordination between the pilot-in-command and dispatch when runway conditions are uncertain—especially if no runway report is available. Under the new procedures:
	  ○ if the temperature is below 5°C, a flight can be dispatched, but the flight crew is not allowed to start the approach or land without a current runway report.
	  ○ If the runway report is expired, the flight crew must review past weather to check for things like precipitation, strong winds that could cause snowdrifts, or a temperature drop below freezing that might lead to ice or frost on the runway.

INVESTIGATION REPORT A21P0107: Collision with water, Black Tusk Helicopter Inc., Kaman Aerospace Corporation K-1200 (helicopter), C-FZVM, Killam Bay, British Columbia, 4 October 2021

Safety action	Following the occurrence, **Kaman Aerospace Corporation:**
	• Conducted tests to assess the airworthiness of the K-MAX servo flap: static capability and fatigue evaluation of a flap section, as well as fatigue evaluation and impact assessment of a full-size flap.
	• **Flap Section Tests:**
	  ○ Static Capability: Ply misalignment in the carbon fiber composite reduced connection strength by up to 30%, but all loads remained within acceptable limits (margin >1.5). Closeouts were found to be structural, enhancing flap strength and stiffness by 100% and 150%, respectively.
	  ○ Fatigue: Introduced cracks did not propagate significantly; flap deemed resistant to fatigue-related failure.

	• **Full-Size Flap Tests:**
	  ○ Fatigue: Simulated 3,000-hour service life showed no damage or failure.
	  ○ Impact: A hard strike damaged the stainless steel leading edge and underlying composite, but no spar or skin failure occurred.
	  ○ Further fatigue testing is planned to continue evaluation
	• **Procedures:**
	  ○ The Kaman Model K-1200 K-MAX Maintenance and Servicing Instructions were revised on 01 June 2023. The latest revision provides added instructions for the repair of chordwise paint cracks in the bond line of the servo flap inboard closeout. The instructions note that the flap must be removed from service if the crack extends beyond the paint layer.

INVESTIGATION REPORT A23C0105: Runway overrun, North Star Air Ltd., Pilatus Aircraft Ltd. PC-12/45, C-GEOW, Kasabonika Airport (CYAQ), Ontario, 21 November 2023

Safety action	Following the occurrence, **North Star Air Ltd.:** • Revised its SOPs to include cross-checking of ground speed to indicated airspeed on final approaches.

INVESTIGATION REPORT A23C0081: Runway overrun, Superior Airways Limited, Cessna 208B, C-FYMK, Pikangikum Airport, Ontario, 12 September 2023

Safety action	Following the occurrence, **Superior Airways Limited:** • Modified the VFR stabilized approach criteria in the Cessna 208B SOPs to include: 1. The runway's full length must be visible before landing. 2. The target approach speed at 500 feet above ground level will be 100 knots and within a range between 110 knots and 95 knots. 3. Flaps will be set at 30° when landing in winds less than 10 knots and at 20° when landing in winds greater than 10 knots. 4. Touchdown is to be completed in the first 1000 feet of the runway. • Required new captains to complete a captain's risk assessment form before every flight that includes weather minima, as well as other criteria, to be met in order for the pilot to dispatch on a flight. • Installed GPS (global positioning system) tracking devices in all aircraft to allow monitoring of aircraft fleet.

INVESTIGATION REPORT A23O0046: Runway overrun, Porter Airlines Inc., De Havilland Aircraft of Canada Ltd. DHC-8-402, C-GLQB, Sault Ste. Marie Airport (CYAM), Ontario, 16 April 2023

Safety action	Following the occurrence, **Porter Airlines Inc.** took the following safety action: • **Approach briefing:** An internal bulletin was issued to DHC-8-400 pilots to inform them that the approach briefing was changed to include a prescriptive touchdown zone. • **Training and communication:** The ground school training syllabus was audited to ensure that the course material during initial training includes sufficient instruction related to aircraft performance, the use of reverse thrust, and braking techniques. • The crew were assigned additional training with a senior training pilot which included discussions and briefings pertaining to touchdown zone awareness, runway length, contaminated runway definition and operations, consideration for flap selection, touchdown point limits, and aircraft performance. The performance of the crew was demonstrated to standard. • The company released a training memo to highlight the landing procedures described in its aircraft flight manual (AFM).

	• A bulletin was issued with information related to the use of reverse thrust SOP updates that were added to the initial DHC-8-400 pilot SOP training course which all new hires are expected to take. • An internal memo was issued on to all DHC-8-400 pilots reminding them that not all airports provide Global Reporting Format reports for runway surface conditions and reminding them that standing water is a contaminant that may be present in any season. • An internal bulletin was issued to all DHC-8 pilots requiring that all normal landings should have the flaps set at 35° when the landing distance available is 6000 feet or less. • Porter Airlines Inc. (Porter Airlines) introduced a digital records system. Furthermore, pilot candidates must now practise the use of reverse thrust during a line indoctrination flight and be considered proficient before they are recommended for an initial line check. • A memo was issued to the Training Department that clarified the Line Indoctrination Captain's seat position, the shadowing of controls, and how to make decisions concerning flap configuration and power settings on approach. • Porter Airlines' DHC-8-400 Training Department implemented a thorough briefing on the appropriate use and techniques of reverse thrust. • **Standard Operating Procedures:** Porter Airlines removed previous guidance that encouraged pilots to minimize braking and reverse thrust after landing, allowing more discretion based on conditions. • An internal memo issued to all DHC-8-400 pilots amended the SOPs to require that the braking plan after touchdown be included in the briefing and that consideration be given to the use of reverse thrust.

INVESTIGATION REPORT A24W0038: Aft fuselage strike and hard landing, WestJet Encore Ltd., Bombardier Inc. DHC-8-402, C-GJWE, Calgary International Airport (CYYC), Alberta, 13 April 2024

Safety action	Following the occurrence, **WestJet Encore Ltd.:** • Provided the captain and FO with additional simulator training reinforcing pitch awareness, among other elements, before they were assigned any further flying duties. • Communicated awareness of pitch attitudes, tail strikes, and hard landings to its flight crews in several of its internal communication products. • Amended its pilot training curriculum and guidance material to include more emphasis on pitch awareness, landing technique, pilot monitoring call outs, and power management in the flare. • Increased the use of flap 35 landing configuration during initial line indoctrination training, and initial and recurrent simulator training. In addition to the previously mentioned internal actions, WestJet Encore has implemented flight crew follow-ups for high-pitch events and continuous monitoring. These efforts are documented in monthly reports and contribute to the airline's continuous improvement initiatives. Encore also continues to utilize their flight data monitoring program and company reporting system to track changes implemented through their safety management system.

INVESTIGATION REPORT A24W0059: Stall, spin, and collision with terrain, Privately registered, Sportinė Aviacija ir Ko LAK-17B FES (glider), C-FMXC, Black Diamond/Cu Nim Aerodrome, Alberta, 29 May 2024

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A22Q0025: Runway overrun, Skyservice Business Aviation Inc., Honda Aircraft Company, LLC, HondaJet HA-420, C-FJJT, Montréal/St-Hubert Airport (CYHU), Quebec, 7 March 2022

Safety action	Following the occurrence, **Skyservice Business Aviation Inc.** took the following safety action: • No operations (departures or arrivals) are permitted when runway surface conditions are below runway condition code 5/5/5. • All flights to destinations where the runway might be wet or contaminated upon landing must be approved in advance by the chief pilot. • Flight crews must only choose aerodromes that are capable of accommodating the aircraft when the runway landing distance available is equal to, or greater than, twice the wet runway unfactored landing distance. • Given the landing distances available at certain airports, pre-approval has been provided for the following: Toronto/Lester B. Pearson International Airport (CYYZ), Ontario; Montréal/Pierre Elliott Trudeau International Airport (CYUL), Quebec; and Windsor Airport (CYQG), Ontario. Following the occurrence, **Honda Aircraft Company Inc.:** • Published in October 2022 a service letter on the factors that can affect landing distances on wet and contaminated runways. The letter contains a recommendation regarding the use of data from the aircraft flight manual (AFM) supplement for landing performance on wet and contaminated runways, as well as a recommendation to enter the AFM supplement's data into the Garmin G3000 system. • Launched a communications campaign focused on HondaJet HA-420 aircraft operators, recommending the use of the AFM supplement for landing performance on wet and contaminated runways, and recommending data entry in the Garmin G3000 system. • Revised in July 2023 and September 2023 the AFM supplement to include the HondaJet Elite S and Elite II models. • Revised the Wet and Contaminated Runway Performance AFM Supplement with data computed using an improved wet runway model, based on the methodology contained in the Code of Federal Regulations, Title 14, subsection 25.109(c). The scheduled publication in 2025 of this revised supplement will be the "final corrective action."

INVESTIGATION REPORT A23W0096: Loss of control and collision with water, Cooking Lake Aviation Academy Inc., Diamond Aircraft Industries Inc. DA20-C1, C-FRZG, Cooking Lake Aerodrome (CEZ3), Alberta, 11 August 2023

Safety action	Following the occurrence, **Diamond Aircraft Industries Inc.:** • Issued in November 2023 a mandatory service bulletin (MSB), DAC1-25-05, to highlight safety issues with the DA20-C1 series aircraft and, specifically, the installation of the ARTEX ELT 1000 emergency locator transmitter (ELT) system in its aircraft. The MSB calls for the inspection of the ELT connector wiring and, if necessary, the corrective actions needed to ensure full functionality of the ELT in the event of an accident. • Conducted a factory campaign to ensure compliance among all affected aircraft and also updated the aircraft production drawings. Following the occurrence, **Cooking Lake Aviation Academy Inc.:** • Revised its flight operations manual, integrating the emergency response procedures and formalizing minimum altitudes for upper-air work and spins. The new flight operations manual was approved by Transport Canada (Transport Canada) and disseminated to staff in April 2024. Following the occurrence, **Transport Canada:** • Conducted a scheduled Class 1 flight instructor rating renewal flight test on the flight training unit's Chief Flight Instructor in September 2023. The Transport Canada Inspector

	who conducted the flight test focused on the spin exercise as part of the ground and in-flight components of the flight test.

INVESTIGATION REPORT A24A0046: Collision with terrain, Privately registered, Earthstar Aircraft eGull (basic ultralight), C-IRAY, Weyman Airpark (CCG3), New Brunswick, 19 July 2024

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT A24A0038: Hard landing and aft fuselage strike, Porter Airlines Inc., Bombardier Inc. DHC-8-402, C-GLQP, Fredericton International Airport (CYFC), New Brunswick, 28 June 2024

Safety action	Following the occurrence, **Porter Airlines Inc.:** • Debriefed the flight crew, who then completed a return to flying program. After meeting this requirement, both flight crew members returned to flying. • Added a section to the pilot report form so that flight crew can provide feedback on individual runway approaches and departures. This information can then be added to the company route manual. • Published in December 2024 a new revision of its SOPs. The revision includes a new landing techniques section, which states that during the recovery after a bounced landing, pilots are to "apply full power and maintain a pitch attitude of no more than six degrees until the aircraft has reached an altitude where a tail strike is not possible, then continue with the normal go-around."

INVESTIGATION REPORT A24O0048: Tail rotor strike during ground handling, Heli Explore Inc., Aerospatiale AS-350 BA (helicopter), C-GWMO, Akimiski Island, Nunavut, 21 April 2024

Safety action	Following the occurrence, **Heli Explore Inc.:** • Required that pilots shut down the engine while disembarking passengers for the remainder of the Goose Break flights during that season. • Revised its passenger guidance to provide more information and to warn of the danger of going near the back of a helicopter.

INVESTIGATION REPORT A22O0161: Runway overrun, Flair Airlines Ltd., Boeing 737-800, C-FFLC, Kitchener/Waterloo Airport (CYKF), Ontario, 25 November 2022

Safety action	Following the occurrence, **Flair Airlines Ltd.:** • Adjusted the Standard Callouts subsection in its *B737-800 Flight Crew Operating Manual*, Volume 1. The "AUTOPILOT DISENGAGED" and "AUTOTHROTTLE DISENGAGED" callouts were replaced with a "MANUAL FLIGHT" callout in order to support the existing procedure, which requires both autopilot and autothrottle to be disengaged at the same time.

INVESTIGATION REPORT A23W0082: Collision with terrain, Valhalla Helicopters Inc., Bell B205A-1 (helicopter), Haig Lake, Alberta, 19 July 2023

Safety action	Following the occurrence, **Valhalla Helicopters Inc.:** • Issued a company memo reminding flight crews that the electric cargo hook be armed for any external load operations and that both the manual and electric releases be checked before the first flight of the day.

INVESTIGATION REPORT A24W0086: Mid-air collision, L R Helicopters Inc., Bell Helicopter Company, a Division of Textron Inc., 212 (helicopter), C-FTLR, and Namao Flying Club, Cessna 172M, C-GJJL, Edmonton/Villeneuve Airport (CZVL), Alberta, 9 July 2024

Safety action	Following the occurrence, **Namao Flying Club:** • Ceased flight training activities for approximately two weeks to assess risk mitigation options. After the 2-week assessment period, a decision was made to conduct flight training in the Class C airspace, where possible, to provide a layer of defence with ATC providing traffic alerts based on radar information.

INVESTIGATION REPORT A23Q0038: Controlled flight into terrain, Canadian Helicopters Limited – Hélicoptères Canadiens Limitée, Bell 206L (helicopter), C-GLQY, Vallillee Lake, Quebec, 7 April 2023

Safety action	Following the occurrence, **Canadian Helicopters Limited - Hélicoptères Canadiens Limitée:** • Published several articles in the company newsletter regarding controlled flight into terrain, continuation bias, and expectation bias. • Published a memo from the flight operations manager clarifying the company weather limits. • Held in June 2023 an operations and safety update meeting for all company personnel, during which several topics relevant to the occurrence were discussed. • Started using the occurrence accident as an example of low-visibility operations for both initial and recurrent training to familiarize pilots with the issue and encourage them to be vigilant. • Incorporated the United States Helicopter Safety Team-sanctioned video "56 Seconds to Live," on inadvertent flight into instrument meteorological conditions, into the training for all pilots. A new section on whiteout conditions has also been added to the training. • Reviewed the specific sections of the flight operations manual governing reduced day visual flight rules operations and weather limitations, and drafted and submitted changes to Transport Canada for approval. • Shared the lessons learned from this occurrence have been with all relevant stakeholders.

INVESTIGATION REPORT A24A0019: Collision with terrain, Custom Helicopters Ltd., Bell 206L (helicopter), C-FYHN, Goose Bay Airport (CYYR), Newfoundland and Labrador, 2 May 2024

Safety action	Following the occurrence, **Custom Helicopters Ltd.:** • Developed several simulator training scenarios for VFR pilot training that emphasize pilot decision making in reduced-visibility conditions. • Implemented a checklist designed for a pilot's first flight in a duty sequence with a particular helicopter that includes prompts for the pilot to ensure Zoleo and SkyTrac functionality.

INVESTIGATION REPORT A24Q0104: Collision with water, Privately registered, Airbus AS350 B2 (helicopter), C-GGLM, Lac d'Elvert, La Vérendrye Wildlife Reserve, Quebec, 18 August 2024

Safety action	The Board is not aware of any safety action taken following this occurrence.

Marine transportation sector

INVESTIGATION REPORT M23F0012: Mooring accident, Naval auxiliary supply vessel *Asterix*, Busan, Republic of Korea, 28 May 2023

Safety action	Following the occurrence, **Federal Fleet Services Inc.:** • Indicated that it had modified its operating manuals to forbid crew from making changes to the mooring plan after it had been agreed to with the pilot. • Required all the vessels in the fleet to come to a complete stop alongside a dock before mooring lines are sent ashore, and tug assistance must be used for any vessel movement.

INVESTIGATION REPORT M22A0332: Person overboard, Pilot boat *A.P.A. No. 18*, Atlantic Ocean, 2 NME of St. John's, Newfoundland and Labrador, 26 September 2022

Safety action	Following the occurrence, **Atlantic Pilotage Authority** took the following safety action: • Changes to the wire and tether system on the *A.P.A No. 18* and sister vessels (the *A.P.A No. 1* and the *A.P.A No. 20*); lines were added to areas of the vessels that had none before, and the wires along the sides of the wheelhouses were loosened. • Implementation of a 2-tether system. • Addition of a third crew member to the *A.P.A. No. 18*'s complement. • Upgrading the *A.P.A. No. 18*'s fixed steps with gratings for added grip. • Instructions given to the *A.P.A. No. 18* crew to set the person-overboard retrieval system prior to leaving the harbour. • Implementation of mandatory inspection and testing of inflatable PFDs. • A fleet-wide review of tethering systems, with hardware upgrades when possible to ensure tethering can occur at all times (including the upgrade of safety rail for the *A.P.A. No. 18* and sister ships). • Field testing of PFDs with wind and waves, as well as employee familiarization of PFDs and lifejackets. • A list of APA–approved PFDs, tethers, and harnesses was compiled. • A fleet-wide review of retrieval systems with upgrades provided when possible, including electric winches with a single whip for side-arm davits. • Increased frequency of person-overboard drills in more realistic conditions. • The conduct of person-overboard drills with one and two persons. • The procurement of person-overboard danbuoys for the fleet. • The assessment of existing exterior lighting on pilot boats and the installation of improved exterior lighting where required. • Issuing most employees with SOLAS–approved inflatable lifejackets with twin inflation chambers, instead of PFDs. Following the occurrence, **Canship Ugland Ltd.:** • Required the use of double lanyards when using the tethering system. • Installed an electric winch on the *A.P.A. No. 18*'s recovery system. • Created a new safety committee form. • Reviewed the operating procedures and developed vessel-specific risk assessments for pilot transfer operations. • Increased the frequency of person-overboard drills in a variety of environmental conditions.

	• Replaced the shepherd hooks for person-overboard recovery with lighter, extendable hooks. • Procured SOLAS–approved Spinlock double-cannister PFDs. Annual service for the PFDs is provided by a third-party contractor. • Developed and implemented a Safety Equipment Inspection and Maintenance regime. • Sent a vessel deficiency list to the Superintendent weekly, instead of monthly. All deficiencies will be added to DocMap for tracking and closure. • Installed a safety rail system on the *A.P.A. No. 18*. • Improved of heat-tracing capabilities in the safety rail systems on all pilot boats; ensure in working order. • Outfitted all crew members with personal safety kits that include a harness, a lanyard, a PFD, a helmet, and an automatic identification system (AIS) unit. • Implemented a personal protective equipment checklist and a personal protective equipment reference guide for crew members of the *A.P.A. No. 18*. • Procured a person-overboard danbuoys for all pilot boats, as an additional means of flotation for person-overboard emergencies. • Improved the outside lighting and person-overboard lighting on board the *A.P.A. No. 18* for better visibility during nighttime operations.

INVESTIGATION REPORT M22C0005: Mooring accident, Roll-on/roll-off ferry *Madeleine II*, Cap-aux-Meules, Quebec, 9 January 2022

Safety action	Following the occurrence, **Transport Canada:** • Delegated a Transport Canada occupational health and safety officer selected by the Labour Program, who carried out an inspection under the *Canada Labour Code*, Part II, and compliance action was taken. • Required that mooring procedures be implemented for the *Madeleine II* at Cap-aux-Meules and Souris (Prince Edward Island). Following the occurrence, the **Coopérative de Transport Maritime et Aérien:** • Reviewed various files, documents, reports and correspondence with stakeholders regarding winch operation and wharf conditions at Cap-aux-Meules. • Met with crew members to discuss the incident and safety measures to be implemented. • Performed physical testing and analysis of equipment on the vessel's aft deck, including winch function tests and analysis of winch guides and technical support documents. • Updated the safety management system. • Posted a mooring procedure for the *Madeleine II* at Cap-aux-Meules and Souris. This procedure temporarily stopped the addition of the second aft spring line during the dynamic phase and always required the use of a tug during docking at Cap-aux-Meules. • Revised this procedure in May 2022, and the use of the tug became required when the wind was over 25 knots. • Suspended the use of the second spring line during the dynamic phase at wharf no. 2. • Took action to mark hazard zones on mooring stations. • Added in July 2022 a training module on crew use of winches.

INVESTIGATION REPORT M21P0297: Loss of containers overboard and subsequent fire, Container vessel *ZIM Kingston*, La Perouse Bank, British Columbia, 21 October 2021

Safety action	Following the occurrence, **Danaos Shipping Co. Ltd.:**

	• Added in November 2021 a Yes/No line item to the departure report to ensure that Danaos is informed when a vessel is sailing with excessive lashing forces. • Issued in November 2021 a safety bulletin to all fleet masters. The bulletin described loading guidelines and some common lashing problems. As well, the bulletin reminded masters to ensure that they had a good understanding of vessel-specific lashing requirements, as documented in each vessel's cargo securing manual. Finally, masters were encouraged to challenge ship planners if plans did not conform with the loading program or documented requirements. Following the occurrence, the **Canadian Coast Guard**, **Transport Canada**, and the **Vancouver Fraser Port Authority** took the following safety action: • A working group was formed to examine and respond to the risks resulting from the increase in the number of vessels holding offshore, especially when weather is poor, few berths are available, or there are limited anchorages that can accommodate the vessels holding offshore. • This working group has developed a weekly memo, issued to the members of the working group and other partners, summarizing weather conditions, the number of vessels requiring berths, anchorage availability, and forecast risks. The CCG is leading an initiative to evolve this memo into a dynamic model to support decision making. The working group has also developed guidelines for communicating these risks to the masters of the vessels holding offshore. • As well, when forecast risks are high, the members of the working group collaborate to have CCG assets both available and on standby, make anchorages available to vessels holding offshore, or direct vessels to enter sheltered waters. Following the occurrence, **Fisheries and Oceans Canada:** • Issued a Fishery Notice to multiple fisheries listing the known location of 25 containers on the ocean floor. • Marked the containers as navigational seabed hazards on the Canadian Hydrographic Service chart for the area.

INVESTIGATION REPORT M22P0298: Risk of collision and capsize, General cargo vessel *Saga Beija-Flor* and pleasure craft BC4010135, Vancouver Harbour, British Columbia, 15 October 2022

Safety action	Following the occurrence, **Granville Island Boat Rentals** took the following safety action: • The renter check-in and familiarization process has been reviewed. Employees now emphasize to renters the need to pay attention to surrounding vessels and give way to large commercial vessels, especially in the vicinity of bridges in Vancouver Harbour. • In addition to renters watching the training video in the rental office, the video is also now available to view in advance on the company website.

INVESTIGATION REPORT M22C0231: Striking of berth, Passenger ferry *Sam McBride*, Toronto, Ontario, 20 August 2022

Safety action	Following the occurrence, **Transport Canada:**
	• Requested in October 2023 that the City of Toronto resubmit applications for the minimum safe manning documents for each of its ferries. Transport Canada reviewed the applications and, with respect to the *Sam McBride*, issued new safe manning documents on 07 December 2023. The new safe manning documents required the following:
	  ○ At 100% passenger capacity, a minimum crew complement of 13.
	  ○ At 75% passenger capacity, a minimum crew complement of 11.
	  ○ At 50% passenger capacity, a minimum crew complement of 10.

	• Advised the City of Toronto that any requests for consideration of alternative safe manning levels must be submitted to the Transport Canada Marine Technical Review Board (MTRB) for consideration.
	• Delivered, with respect to the processing of safe manning applications more generally, refresher training to all delegated inspectors on crewing calculations for safe manning requirements and has updated internal procedures to process new and renewal applications.
	Following the occurrence, the **City of Toronto** took the following safety action:
	• Procedures for all of its ferries were updated to include instructions related to playing pre-departure safety briefings. Masters were reminded about the importance of the briefings and to ensure they are broadcasted on each trip per the *Life Saving Equipment Regulations*, and they will continue to receive a reminder every six months.
	• The recorded safety briefing was updated to advise passengers to review the instructions posted on how to don lifejackets. Additionally, the safety briefing will be repeated prior to arrival to remind passengers to not stand on the stairs while the vessel is moving. The malfunctioning speakers were repaired to the City's satisfaction.
	• Additional signage was posted around the vessel to indicate:
	  ○ the two types of lifejackets used on the vessel;
	  ○ the maximum capacity of the promenade deck; and
	  ○ a warning to not stand on the stairs while the vessel is moving.
	• One of the deckhands was also assigned to monitor the number of passengers on the promenade deck.
	• In September 2022, crew members began tracking the number of passengers who may require assistance in an emergency and recording this information for each trip in the logbook.
	• In October 2022 an annual training exercise that included man-overboard, lifeboat, fire, and evacuation drills was held. It was carried out in collaboration with PortsToronto, Toronto Police Service Marine Unit, City of Toronto Corporate Security, and Toronto Emergency Medical Services.
	• In December 2022, a mechanism was installed to ensure that the heavy sliding doors leading to the embarkation decks are secured in place while the vessel is in operation.
	• The number of child-sized lifejackets was increased to 30% of the total vessel capacity. The City posted SSB 14/2020 at points of sale and on its website to advise parents to bring infant lifejackets. The City purchased 10 infant lifejackets for each of its ferries and has posted instructions for donning these lifejackets. Storage of lifejackets has been adjusted to allow passengers to identify each type.
	• Light fixtures were installed to illuminate each life raft launching station.

INVESTIGATION REPORT M23C0032: Crew member injury during mooring operations, Roll-on/roll-off ferry *Atlantic Vision*, Les Méchins, Quebec, 23 March 2023

Safety action	Following the occurrence, **Marine Atlantic Inc.:** • Conducted an internal investigation that made several recommendations to prevent similar occurrences. • Reviewed the job safety analysis and conducted training. For the next vessel that was dry docked subsequent to the occurrence, the vessel's crew and shore technical superintendents reviewed the risk analysis register, and a pre-docking meeting was conducted with the shipyard.

	• Indicated that further refinements to job safety analyses and safe work procedures will be part of each dry dock preparation meeting and that updates will be tracked. Following the occurrence, the **Groupe Océan:** • Conducted an internal investigation and made additions to an existing checklist that a vessel's crew is required to fill out before they arrive at the dry dock. The additions include obtaining a sketch from the vessel of its planned mooring line configuration and requesting more specific information about the operational status of the vessel's mooring winches.

INVESTIGATION REPORT M22A0052: Rescue operation and subsequent loss of life, Fishing vessel *Mucktown Girl* and Canadian Coast Guard ship *Jean Goodwill*, Canso, Nova Scotia, 12 March 2022

Safety action	Following the occurrence, **Canadian Coast Guard:**
	• Updated the requirements for scramble nets before the occurrence to be compliant with International Maritime Organization (IMO) International Convention for the Safety of Life at Sea (SOLAS) requirements and replaced scramble nets on some vessels.
	• Equipped the *Jean Goodwill* with a rescue scoop.
	• Updated the towing waiver to improve the language communicating the risks inherent with towing and the responsibilities of the parties involved.
	• Indicated that it will
	  ○ Assess rescue scoops for future procurement and outfitting.
	  ○ Assess towing gear onboard its vessels.
	  ○ Assess search and rescue training and exercising standards, including training gaps that existed with the function and deployment of self-locating datum marker buoys.
	  ○ In collaboration with Transport Canada through the National Strategy on Emergency Towing, review training specific to towing.
	Following the occurrence, **Transport Canada:**
	• Issued the Ship Safety Bulletin 14/2024, *Fishing vessels safety procedures and crew familiarization* to remind authorized representatives of fishing vessels of their responsibilities for developing emergency procedures and for training crew.

Rail transportation sector

INVESTIGATION REPORT R23Q0022: Movement exceeds limits of authority, Quebec North Shore and Labrador Railway, Ore train W039, Mile 128.3, Wacouna Subdivision, Mai, Quebec, 22 February 2023

Safety action	Following the occurrence, **Transport Canada:** • Stated, in response to Rail Transportation Safety Advisory Letter 04/22, that it had carried out regulatory inspections to verify what measures had been taken by Quebec North Shore and Labrador Railway (QNS&L) to prevent similar occurrences in the future. • Confirmed that QNS&L had no specific instructions at the time of the occurrence governing the use of dynamic braking, particularly on locomotives with alternating current traction motors. Following the occurrence, **Quebec North Shore and Labrador Railway:** • Made changes to its evaluation program for apprentice locomotive engineers (LEs). Field evaluations are now performed by supervisors every 200 hours instead of every 300 hours. For qualified LEs with less than two years of experience, field evaluations are performed by supervisors every four months instead of every eight months.

INVESTIGATION REPORT R23D0011: Crossing collision, Réseau de transport métropolitain, Commuter train EXO 816, Mile 62.18, Canadian National Railway Company, St-Hyacinthe Subdivision, Saint-Bruno-de-Montarville, Quebec, 27 January 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT R22T0045: Uncontrolled movement and derailment, Canadian Pacific Railway Company, Cut of cars, Mile 196.7, Belleville Subdivision, Toronto Yard, Toronto, Ontario, 13 March 2022

Safety action	Following the occurrence, **Transport Canada:** • Indicated, in response to Rail Transportation Safety Advisory Letter 03/23, that it had conducted inspections and determined that the three uncontrolled movements were the result of non-compliance to *Canadian Rail Operating Rules* Rule 112. • Issued a Notice to CP as a result of its inspection conducted following the occurrence. The Notice was issued due to the railway's "failure to implement effective measures to prevent the uncontrolled movement of equipment in CP's Toronto Yard." The Notice prompted the company to take safety actions; subsequent Transport Canada inspections at the yard confirmed the implementation of the safety actions. Following the occurrence, **Canadian Pacific Railway Company:** • Performed simulations in Calgary, Alberta, that were followed with a risk assessment of car securement procedures in G Yard based on rail car tonnage and track gradient. The risk assessment established that additional hand brakes were required to adequately secure unattended cars throughout G Yard. • Performed hand brake effectiveness testing in G Yard to validate these simulations. As a result, CP developed a new hand brake table to be used when securing unattended equipment in G Yard. CP accordingly issued Operating Bulletin SO-007-22 containing a new minimum hand brake chart for unattended cars in G Yard. In the new chart, the minimum number of hand brakes for a train with the same tonnage as the occurrence train is 10 hand brakes. • Issued Operating Bulletin SO-032-23, implementing the use of track skates as a physical defence against uncontrolled movements. • Took action to further educate employees on securement requirements at G Yard.

INVESTIGATION REPORT R20W0025: Main-track train derailment, Canadian Pacific Railway Company, Freight train 516-380, Mile 43.66, Sutherland Subdivision, Guernsey, Saskatchewan, 06 February 2020

Safety action	Following the occurrence, **Transport Canada:**
	• Issued a number of ministerial orders (MO), in response to Rail Transportation Safety Advisory Letter 02/20, including the following:
	  ○ MO 20-05, which ordered federally regulated railway companies to implement additional safety measures for key trains. Federally regulated railways were ordered to implement an additional definition for a higher-risk key train. The MO also included additional speed restrictions, requirements for continuous welded rail (CWR) joint management, and requirements for installing replacement (plug) rail.
	  ○ MO 20-06, which ordered federally regulated railway companies to revise the *Rules Respecting Key Trains and Key Routes*. The MO required that revised rules be based on an assessment of safety risk.
	  ○ MO 20-10 (MO 20-05 was repealed), which ordered federally regulated railway companies to implement additional safety measures for key trains.
	• Approved the revised *Rules Respecting Key Trains and Key Routes* submitted by the industry, which came into effect on 22 August 2021.

	• Issued MO 20-07, in response to Rail Transportation Safety Advisory Letter 03/20, which ordered federally regulated railway companies to revise the *Rules Respecting Track Safety*. The revised *Rules Respecting Track Safety* should be based on an assessment of safety risks, track-related derailment causes, evolving technology, current railway internal standards, and industry best practices. • Communicated to industry the *Guideline for the use of rail previously in service as replacement rail*, which provides railways with recommended elements to consider in the development of internal procedures regarding the use of a rail previously in service as a replacement rail. Following the occurrence, **Canadian Pacific Railway Company:** • Implemented its own wayside system for the detection of track discontinuities in non-signalled territory, in response to rail breaks that have occurred on subdivisions governed by the occupancy control system. The wayside system can detect broken rails and indicate the presence of trains. • Added two more autonomous track geometry measuring systems and is building another one, which will bring the total to five. • Conducted track work on the Sutherland Subdivision in 2020.

INVESTIGATION REPORT R23H0006: Movement exceeds limits of authority, Canadian National Railway Company, Freight train M 37231-13, Mile 69.4, Kingston Subdivision, Near Cornwall, Ontario, 13 April 2023

Safety action	Following the occurrence, **Canadian National Railway Company:** • Distributed Operating Bulletin No. 026 to all operating employees governed by the *Canadian Rail Operating Rules* (CROR). The operating bulletin introduced a special instruction to modify CROR Rule 578 so that the requirement to broadcast indications displayed on an advance signal is applicable not only in single-track territory, but in multi-track territory as well.

INVESTIGATION REPORT R22V0238: Collision between a train and a track unit, Canadian Pacific Railway Company, Freight train 302-25 and hi-rail vehicle L15034, Mile 116.7, Shuswap Subdivision, Near Campbell Creek, British Columbia, 29 December 2022

Safety action	Following the occurrence, **Canadian Pacific Railway Company:** • Enhanced the EIC (Employee in Charge) application by building in time delays to give the employee time to pause and review information while making changes to track occupancy permits (TOPs). The application also now has features to differentiate the TOPs on screen, and some sections are displayed in larger font, to make them easier to read. Employees were given an opportunity to provide feedback on the changes. • Issued a Safety Flash, in which employees were reminded of the steps that must be completed when verifying a TOP and before cancelling it, and that cancelling a TOP is a critical task requiring full attention. Managers were required to review the Safety Flash with their teams. • Developed a video reminding employees to take the time they need to perform work safely. The video was rolled out to all Engineering track employees. • Implemented a new tool, referred to as the "4 second reset," that identifies signs of rushing, frustration, fatigue, and complacency, and reminded employees what they should do if they or their coworkers lose focus, and that they should speak up if they see something that they are concerned about. • Initiated a project to further enhance the EIC application.

INVESTIGATION REPORT R23M0050: Main-track train derailment, Canadian National Railway Company, Freight train L59411-30, Mile 32.7, Sussex Subdivision, Near Dunsinane, New Brunswick, 30 October 2023

Safety action	The Board is not aware of any safety action taken following this occurrence.

INVESTIGATION REPORT R22C0065: Main-track derailment, Canadian Pacific Railway Company, Train 301-222, Mile 97.4, Brooks Subdivision, Bassano, Alberta, 13 July 2022

Safety action	Following the occurrence, **Canadian Pacific Railway Company:** • Undertook track renewal program work, including program work for cross ties, rail anchors and shoulder ballast, as well as weld destressing and spot undercutting. • Amended the engineering managers' safety accountabilities to include a train ride (on a track evaluation car, work train, or revenue train) once a month, as an additional means to evaluate track condition. • Updated the CWR maintenance forms in its Digital Track Network (DTN) system to reflect locations that need to be restressed pending final repair. • Made changes to the training for supervisors of track inspection. • Issued engineering safety bulletin ESBT061, *CWR Maintenance Records Expectations* with an accompanying instruction sheet, *DTN Job Aid for CWR Maintenance Task*, to reinforce and clarify requirements for documenting CWR maintenance activities. • Issued engineering safety bulletin ESBT140, *Red Book Change: Section 8.7.5 Speed Restriction Requirements*, which provides clearer instructions for when the maximum rail temperature is expected to be above the preferred rail laying temperature, minus 15 °F in the next 24 hours.

INVESTIGATION REPORT R24C0020: Main-track train collision, Canadian Pacific Railway Company, doing business as CPKC, Freight trains 805-339 and 301-230, Mile 116.8, Mountain Subdivision, Near Greely, British Columbia, 16 February 2024

Safety action	Following the occurrence, the **TSB**: • Issued Rail Transportation Safety Advisory Letter 01/24 to Transport Canada as a result of this occurrence and other recent collisions involving trains operating under restricting signals in centralized traffic control territory. The TSB suggested that, as a priority, Transport Canada work with the railway industry to address the limitations with the existing administrative defences to reduce the likelihood of collisions when trains operate under restricting signals in centralized traffic control territory, and to reduce the risks to train crews and the travelling public. • Issued Rail Transportation Safety Advisory Letter 02/24 to CPKC, which indicated that the crew's attention was drawn away from critical train control tasks at a time and location when and where definitive action was required to reduce train speed approaching the next signal. The letter also specified that, in the absence of backup physical defences to prevent collisions when a signal indication is misinterpreted or misapplied, or when crew response is inadequate to ensure safety, CPKC may wish to review its procedures to ensure that ○ non-urgent communications with train crews are minimized during times when attention and focus on critical tasks is absolutely necessary, and ○ train crews are not compelled to engage in non-urgent tasks when approaching points of restriction. Following the occurrence, **CPKC:** • Implemented a module on situational awareness as part of the conductor training. This module builds on the concepts of crew resource management and is tailored to the

	specific needs of the railway industry. This training reminds employees that it is each crew member's responsibility to develop and maintain situational awareness in order to contribute to a safe working environment. • Installed a software that provides a message to mechanical support personnel when a report from a wheel temperature detector (WTD) on the Mountain Subdivision includes a car that would not be on a unit train subject to WTD inspection. • Began creating a master list for mechanical support personnel to verify that car numbers on cold car reports are correct for unit trains subject to the exemptions granted by Transport Canada for coal, sulfur, potash, and grain trains. • Created a job aid intended for the mechanical support personnel, which provides instructions to verify that cars with cold wheels listed in WTD reports are the proper series. If the report contains a car number from another train, the car number must not be provided to the train crew of the unit train identified on the report. This process reduces the time it takes a train crew to obtain accurate information on cars with cold wheels. • Incorporated in its training program a module about respecting signal indications. This module highlights the importance of signal recognition and compliance. It discusses the need to positively identify signals and to check that a called signal indication is correct before repeating it. The module also provides guidance on avoiding distractions, such as stopping conversation, keeping eyes forward, and not engaging in non-urgent activities at critical times. • Conducted a blitz to ensure that all train and engine employees watch a new *Respect the Signal* video and discussed its content. This five-minute video demonstrates what can happen if employees lose situational awareness and fail to respect the signals. • Indicated, in response to Rail Transportation Safety Advisory Letter 02/24, that it had taken the differences in actions and attention of each employee into consideration. As part of their training, employees learn about communication requirements when operating. CPKC also stated that it believes that "train crews are enabled and educated to minimize distractions and to interrupt; defer and stop non-urgent communications during times when attention and focus on critical tasks is absolutely necessary." Following the occurrence, **Transport Canada**: • Responded to Rail Transportation Safety Advisory Letter 01/24 indicating that it promptly conducted compliance inspections upon notification of each occurrence. Transport Canada indicated that, in each case, violations of Rule 436 of the *Canadian Rail Operating Rules* had been identified, leading to the issuance of letters of non-compliance.