



STATISTICAL SUMMARY

RAILWAY OCCURRENCES 2015

April 2016

Canada

Transportation Safety Board of Canada
Place du Centre
200 Promenade du Portage, 4th floor
Gatineau QC K1A 1K8
819-994-3741
1-800-387-3557
www.tsb.gc.ca

© Her Majesty the Queen in Right of Canada, represented by the
Transportation Safety Board of Canada, 2016

Statistical Summary – Railway Occurrences 2015 (Transportation
Safety Board of Canada)

Catalogue No. TU1-2E-PDF
ISSN 1701-6606

This document is available on the TSB website at
<http://www.tsb.gc.ca>

Le présent document est également disponible en français.

Statistical Summary

Railway Occurrences 2015

This document is a summary of selected 2015 railway safety data. It covers federally regulated railways only. Data concerning non-federally regulated railways reported to the Transportation Safety Board of Canada (TSB) are not included in this report.

The TSB gathers and uses these data during the course of its investigations to analyse safety deficiencies and identify risks in the Canadian transportation system.

The 2015 data were collected according to the reporting requirements described in the *Transportation Safety Board Regulations* in force during that calendar year.

The statistics presented here reflect the TSB database at 17 February 2016. Since the occurrence data are constantly being updated in the live database, the statistics may change slightly over time.

Because many occurrences are not formally investigated, information recorded on some occurrences may not have been verified. Consequently, be cautious in using these statistics.

The following data tables associated with this annual summary can be found at <http://www.bst-tsb.gc.ca/eng/stats/rail/2015/sser-ssro-2015.asp>

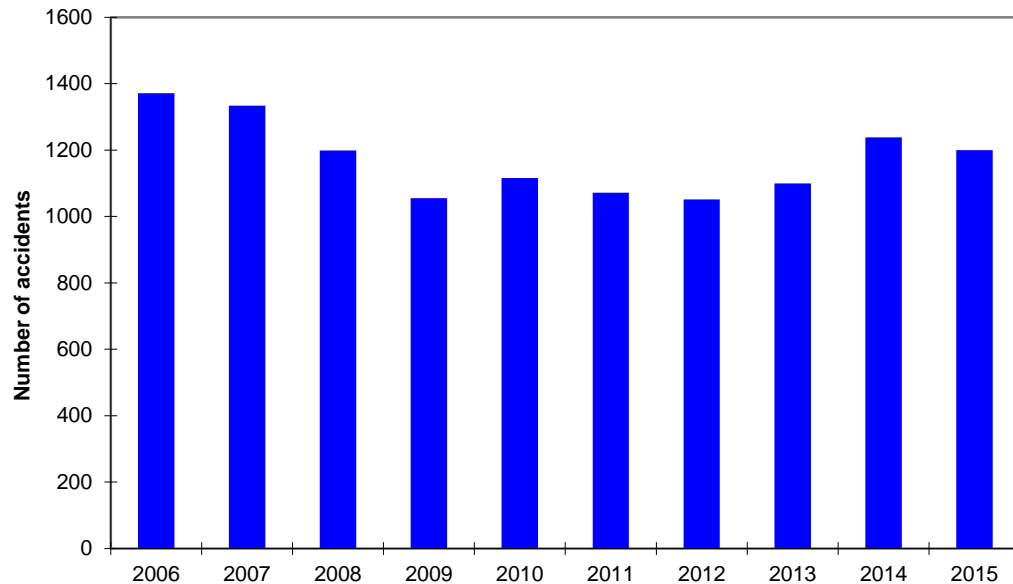
- Railway occurrences and casualties, 2006–2015
- Fatalities and serious injuries (type of occurrence, person type), 2006–2015
- Number of trains (rolling stock) involved in accidents, by train type and accident type, 2006–2015
- Main-track derailments (province, number of derailed cars), 2006–2015
- Main-track derailments (assigned factors), 2006–2015
- Non-main-track collisions (province, number of derailed cars), 2006–2015
- Non-main-track collisions (assigned factors), 2006–2015
- Non-main-track derailments (province, number of derailed cars), 2006–2015
- Non-main-track derailments (assigned factors), 2006–2015
- Crossing accidents, by type and protection, 2006–2015
- Crossing accidents, by province, 2006–2015
- Trespasser accidents, by province, 2006–2015
- Reportable incidents (incident type, assigned factors), 2006–2015

Accidents

Overview of accidents and casualties

In 2015, 1200 rail accidents¹ were reported to the TSB (Figure 1), a 3% decrease from the 2014 total of 1238 but an 8% increase from the 2010–2014 average of 1115.

Figure 1. Number of rail accidents, 2006–2015



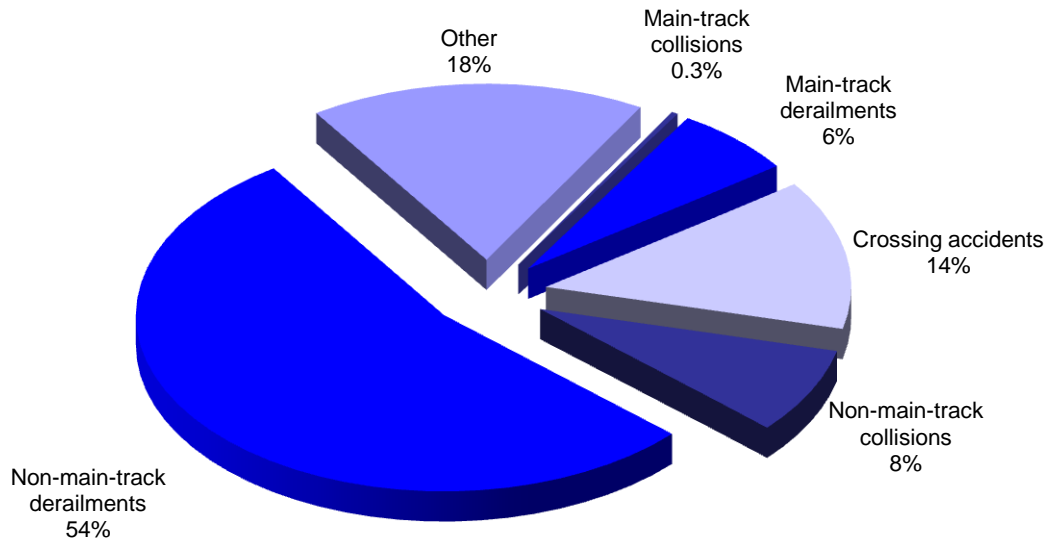
Approximately 34% of the trains involved in rail accidents in 2015 were freight trains; 4% (57 trains) were passenger trains. The remaining 62% were mainly single cars or cuts of cars, locomotives, and track units.

The majority of reported rail accidents (62%) were non-main-track derailments² and collisions (Figure 2). Excluding crossing and trespasser accidents, non-main-track accidents accounted for more than three quarters of the total (77%) in 2015. Most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

¹ Refer to the appendix for the definition of reportable railway accident.

² "Derailment" means any instance where 1 or more wheels of rolling stock have come off the normal running surface of the rail.

Figure 2. Percentage of rail accidents by type, 2015



Main-track derailments and collisions accounted for 7% of all accidents in 2015, compared with 9% in the previous year.

In 2015, 14% of rail accidents involved vehicles or pedestrians at rail crossings, down slightly from the 16% average in the previous 5-year period. The proportion of other accident types³ (18%) in 2015 is up slightly from the previous 5-year average (15%).

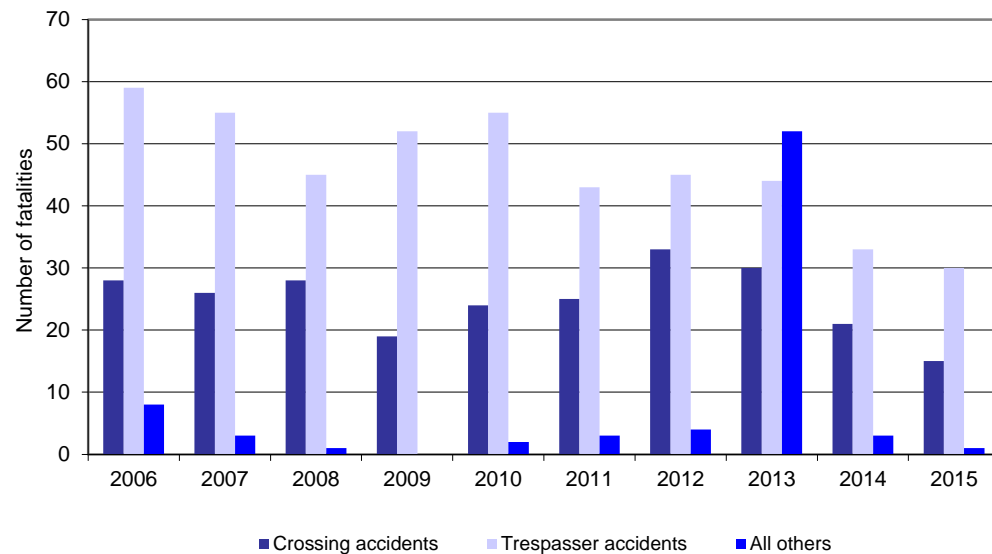
In 2015, 144 accidents involved dangerous goods,⁴ down from 174 in 2014 and comparable to the 5-year average of 140. Six accidents resulted in a dangerous goods release in 2015, up from 4 in 2014, and up from the 5-year average of 4. Two of the 6 accidents resulted in a release of petroleum crude oil, 1 resulted in a release of liquid petroleum gas, and 1 resulted in a release of diesel fuel from a tanker truck involved in a crossing accident.

There was a total of 46 rail fatalities in 2015, down from 57 recorded last year and down from the 5-year average of 83. Of these, there were 15 crossing fatalities, down from 21 in 2014 and down from the 5-year average of 27 (Figure 3) and 30 trespasser⁵ fatalities, down from 33 last year and down from the 5-year average of 44. One 1 rail employee was fatally injured, down from the 5-year average of 3 employee fatalities.

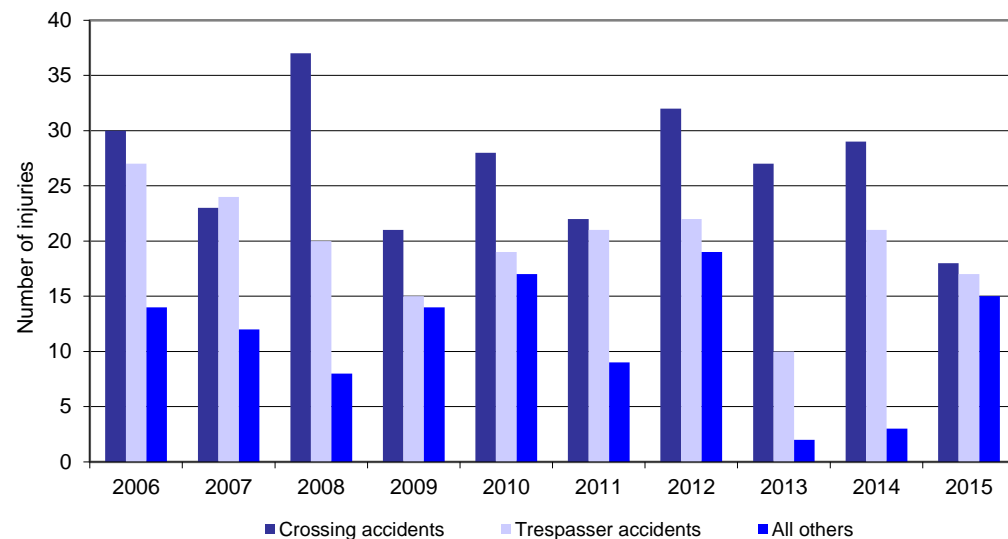
³ Other accident types include but are not limited to, trespasser, collisions/derailments involving track units, rolling stock collision with object, or employee/passenger accidents.

⁴ Accidents involving dangerous goods can include road vehicles carrying dangerous goods.

⁵ Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock other than at railway crossings.

Figure 3. Number of fatalities, by type of occurrence, 2006–2015

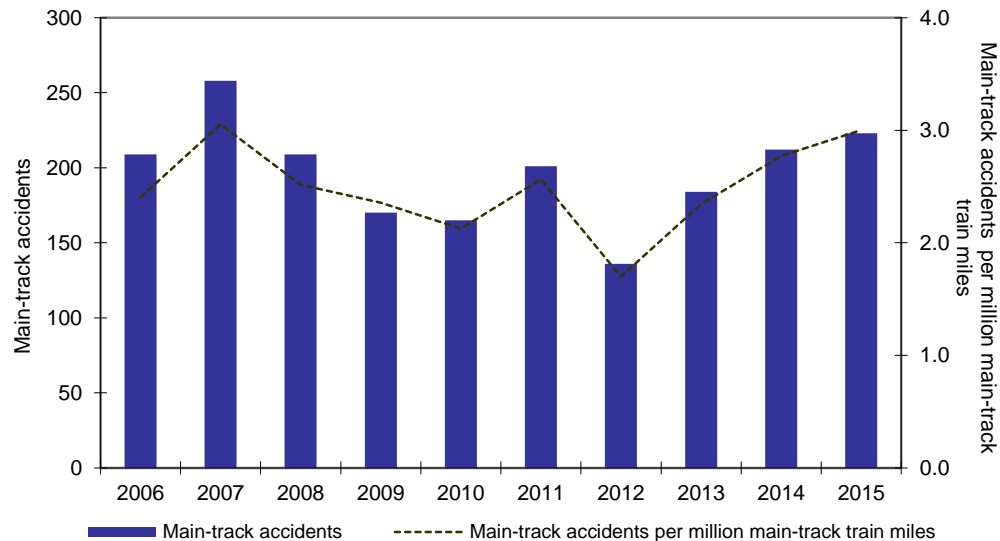
A total of 50 serious injuries resulted from rail occurrences in 2015 (Figure 4), down slightly from 53 in 2014 and down as well from the 5-year average of 56. There were 17 trespasser injuries in 2015, a reduction from 21 in the previous year and less than the 5-year average of 19. Crossing accidents⁶ resulted in 18 serious injuries, down from 29 in 2014 and down from the 5-year average of 28. Eight rail employees were seriously injured in 2015, compared with 7 in 2014 and the average of 8 in the previous 5-year period.

Figure 4. Number of serious injuries by type of occurrence, 2006–2015

⁶ A crossing accident occurs when railway rolling stock is involved in a grade-crossing collision with a motor vehicle or pedestrian, resulting in death, serious injury, or property damage.

The number of main-track accidents⁷ totalled 223 in 2015 (Figure 5), up 5% from 212 in 2014 and up 24% from the 5-year average of 180. With reported rail activity⁸ on main track having decreased 3% from the previous year, the main-track accident rate in 2015 was 3.0 accidents per million main-track train-miles, up 8% from 2.8 in 2014, and up 30% from the 5-year average of 2.3.

Figure 5. Number of main-track accidents and accident rates, 2006–2015



Accidents by type

Main-track collisions and derailments are the most serious categories of rail accidents in terms of potential risk to the public and of financial loss (e.g., when passenger trains are involved or dangerous goods are released from trains that derail in populated areas).

There were 4 main-track collisions (Figure 6) in 2015, down from 9 in 2014 and the average of 5 over the previous 5-year period. These collisions did not result in any fatalities or serious injuries or lead to the release of dangerous goods.

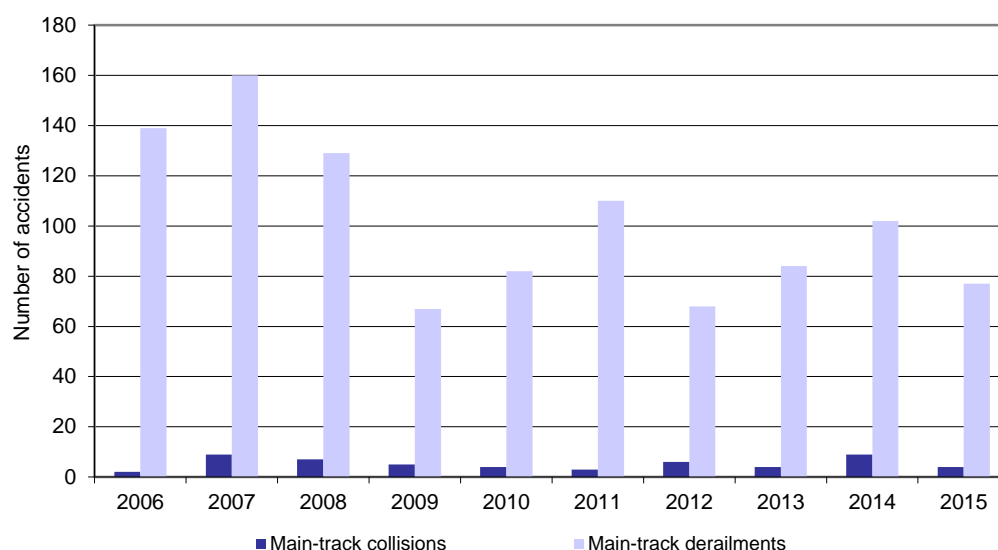
A total of 77 main-track derailments were reported in 2015, a 25% decrease from the 2014 total of 102 and a 14% decrease from the 5-year average of 89 (Figure 6). Of the 77 main-track derailments, 21 occurred in Ontario (27%) and 17 occurred in Alberta (22%). However, while 7 of the 21 Ontario derailments (33%) involved 6 or more cars, 10 of the 17 Alberta derailments (59%) involved 6 or more cars.

The number of main-track derailments per million main-track train-miles decreased to 1.0 in 2015 from 1.3 the previous year and from the 5-year average of 1.1.

No fatalities or serious injuries resulted from main-track derailments in 2015.

⁷ Accidents which occur on main-track or spurs (not including crossing and trespasser accidents) are combined in order to match the figures used in the activity data, which are based on combined million main-track and spur-track miles.

⁸ As provided to the TSB by the Strategic Information Branch of Transport Canada

Figure 6. Number of main-track collisions and derailments, 2006–2015

In 2015, there were 12 main-track derailments involving dangerous goods, down from 25 in 2014 and the average of 15 in the previous 5-year period. Three of these resulted in a release of product (crude oil or liquified petroleum gas).

In 2015, 39% of assigned factors⁹ for main-track derailments were track-related compared with the 5-year average of 37%. Equipment-related factors accounted for 29% of assigned factors compared with the 5-year average of 31%. Actions-related factors¹⁰ were reported in 18% of main-track derailments in 2015 compared with the 5-year average of 21%.

There were 95 non-main-track collisions in 2015, down from 114 in 2014 (Figure 7) and comparable to the 5-year average of 99. Derailments occurred in 33% of non-main-track collisions, and 74% of those derailments involved the derailment of 1 car.

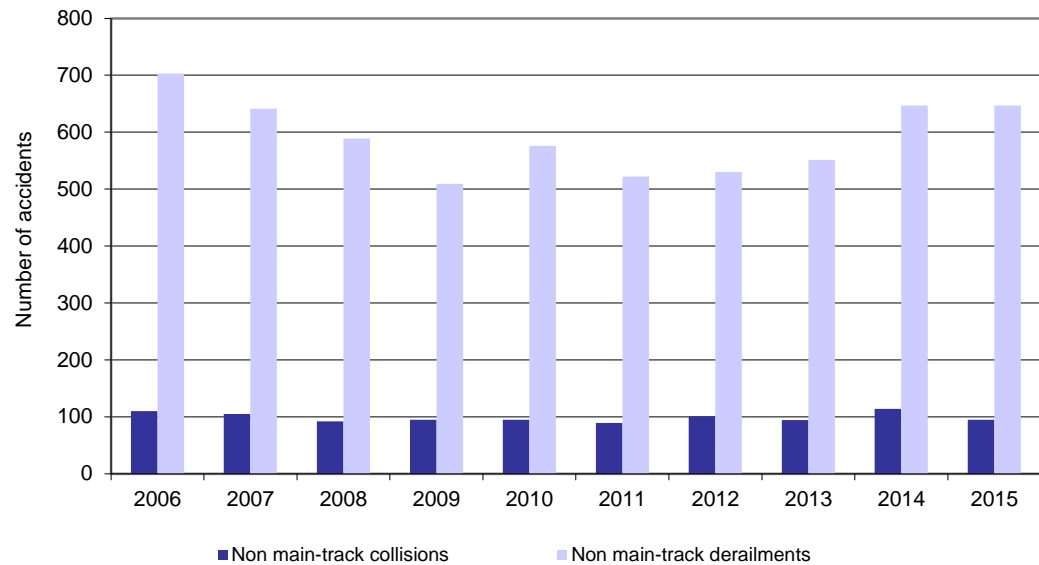
No fatalities or serious injuries resulted from non-main-track collisions in 2015.

Dangerous goods were involved in 34% of non-main-track collisions, none of which resulted in a release of product.

Factors assigned to non-main-track collisions were mostly actions-related (88%) compared with 87% for the last 5-year average. Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often as a factor.

⁹ Occurrences are normally reported to TSB with 1 assigned factor. Since multiple factors can contribute to an occurrence, the TSB may assign additional factors to an occurrence. Note that when multiple factors are assigned to an accident, they are considered to have acted in combination to contribute to the occurrence.

¹⁰ Actions-related factors are, but not limited to, non-compliance with prescribed procedures such as failure to protect or failure to secure. Note that in previous publications, actions-related factors were c rules-related factors.

Figure 7. Number of non-main-track collisions and derailments, 2006–2015

There were 647 non-main-track derailments¹¹ in 2015, unchanged from last year and up 14% from the 5-year average of 565 (Figure 7). In 83% of these accidents, 1 or 2 cars derailed.

No fatalities or serious injuries resulted from non-main-track derailments in 2015.

Dangerous goods cars were involved in 14% of non-main-track derailments with 2 resulting in a release of dangerous goods (ammonium nitrate, styrene monomer).

In 2015, actions-related factors represented 51% of all assigned factors for non-main-track derailments, up from the 5-year average of 45%. Track-related factors represented 31% of all assigned factors, comparable to the 5-year average of 34%. Environmental-related factors represented 9% of all assigned factors in 2015, unchanged from the 5-year average.

Crossing accidents represented one of the more serious types of rail accidents in 2015, with 18% of these resulting in either serious or fatal injuries.

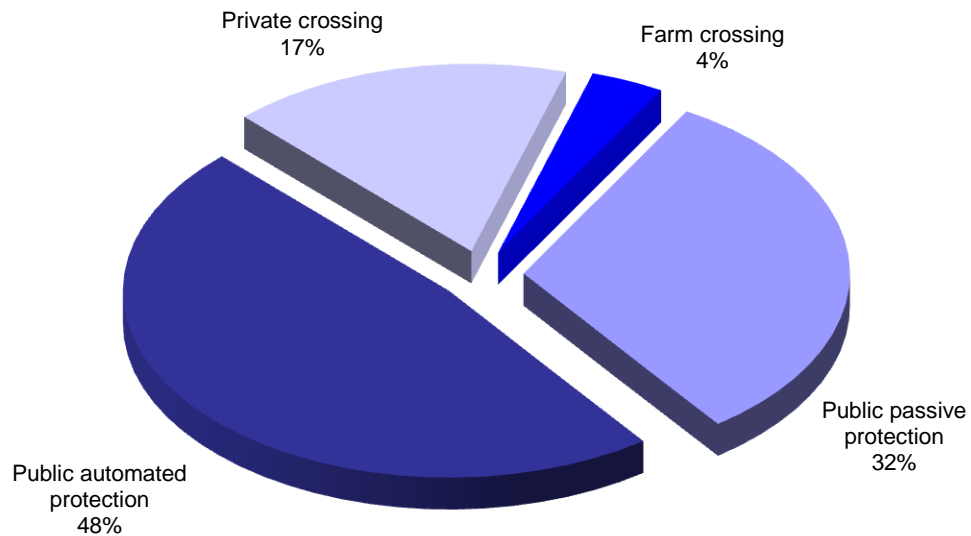
There were 165 crossing accidents in 2015, an 11% decrease from the 2014 total of 185 and a 10% decrease from the 5-year average of 182. Accidents at public automated crossings (79) decreased 8% from the 2014 total of 86 and 15% from the 5-year average of 93. Accidents at public passive crossings (52) decreased 24% from the 2014 total of 68 and 22% from the 5-year average of 66. Accidents at private and farm crossings (34) increased 10% from the 2014 total of 31 and 49% from the 5-year average of 23.

In 2015, the proportion of crossing accidents that occurred at public automated crossings was 48%, compared with 32% at public passive crossings (Figure 8). Although there are nearly twice as many public passive crossings as public automated crossings, the higher

¹¹ New TSB regulations came into effect on 01 July 2014. The new regulations require all derailments to be reported, including minor derailments where there were no injuries and no damage to track or equipment.

number of accidents at automated crossings is due, in part, to higher vehicle and train traffic volumes at these crossings.

Figure 8. Percentage of crossing accidents by type of crossing, 2015



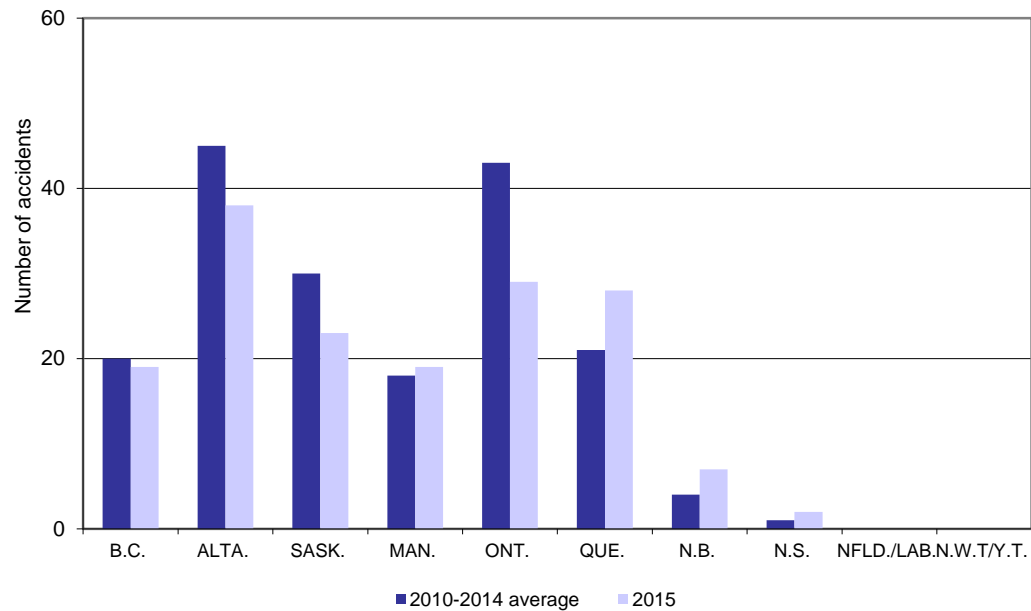
There were 15 fatal crossing accidents in 2015, down from the 21 reported in 2014 and down also from the 5-year average of 23. Although crossing accidents involving pedestrians accounted for 5% (8) of all crossing accidents in 2015, they accounted for 27% (4) of fatal crossing accidents.

Crossing-related fatalities totalled 15 in 2015 compared with 21 in 2014 and the average of 27 in the previous 5-year period. Pedestrians were 27% of crossing-related fatalities.

In 2015, 6 crossing accidents resulted in derailments, down from the 2014 total of 9 but up from the 5-year average of 5.

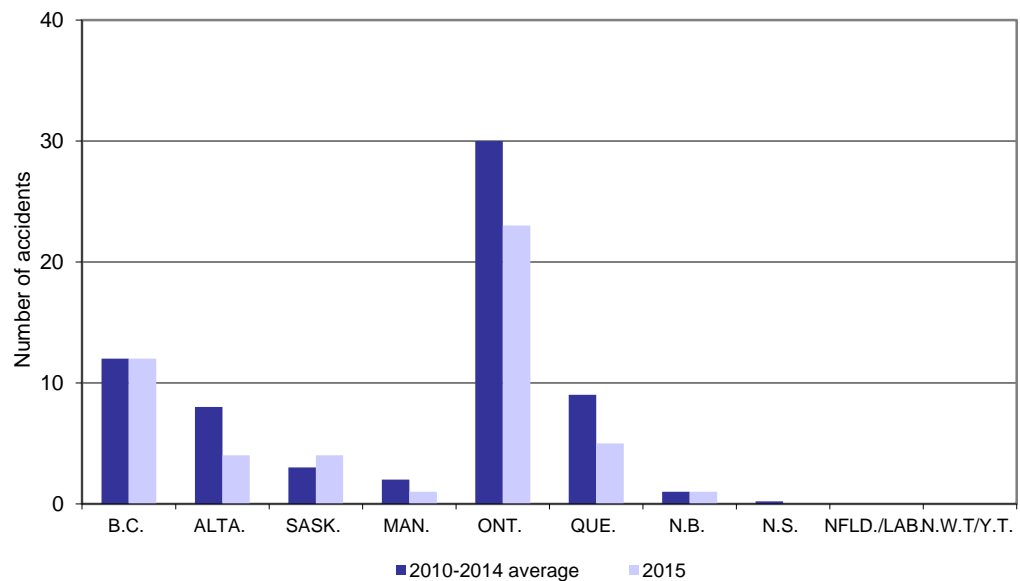
One crossing accident resulted in a release of dangerous goods (from a tanker truck struck at a level crossing).

Alberta was the province where the most crossing accidents occurred, accounting for 23% of all crossing accidents, comparable to its 5-year average of 24% (Figure 9). Ontario had the second highest total with 18% of crossing accidents, down from its 5-year average of 24%. Those provinces were followed by Quebec with 17%, Saskatchewan with 14%, and Manitoba and British Columbia with 12% each.

Figure 9. Number of crossing accidents, by province, 2015

Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock at a location other than a railway crossing. These accidents totalled 50 in 2015, down from the 2014 total of 55 and down also from the 5-year average of 66.

In 2015, Ontario accounted for 46% of trespasser accidents (23), followed by British Columbia with 24%. Quebec accounted for 10% of all trespasser accidents, followed by Alberta and Saskatchewan with 8% each (Figure 10).

Figure 10. Number of trespasser accidents by province, 2015

In 2015, the proportion of trespasser accidents that were fatal (60%) was down compared with the 5-year average of 65%. The proportion of trespasser accidents resulting in serious injuries (34%) was higher than the 5-year average of 28%.

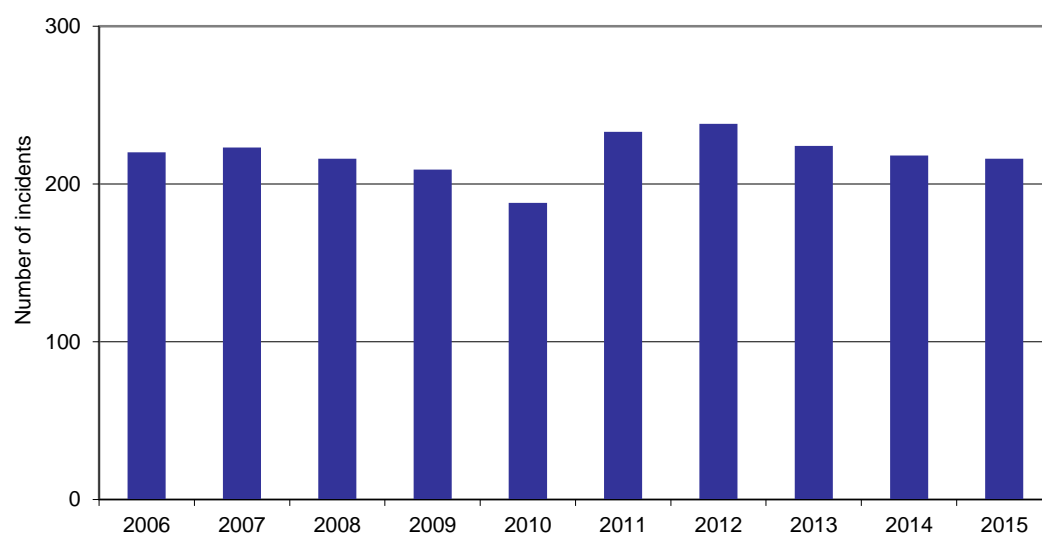
Incidents

Overview of incidents

In 2015, there were 216 reported rail incidents (Figure 11), which is comparable to 218 in 2014 and the 5-year average of 220. Incidents of the type “movement exceeds the limit of authority”¹² (66% of reportable incidents) were the main type of incident, as it has been since 2006, followed by dangerous goods leakers (15%), runaway rolling stock (6%), and main-track switch in abnormal position (6%).

There were 14 runaway rolling stock incidents and 28 rolling stock accidents in 2015, giving a total of 42 occurrences, up from 30 in 2014.

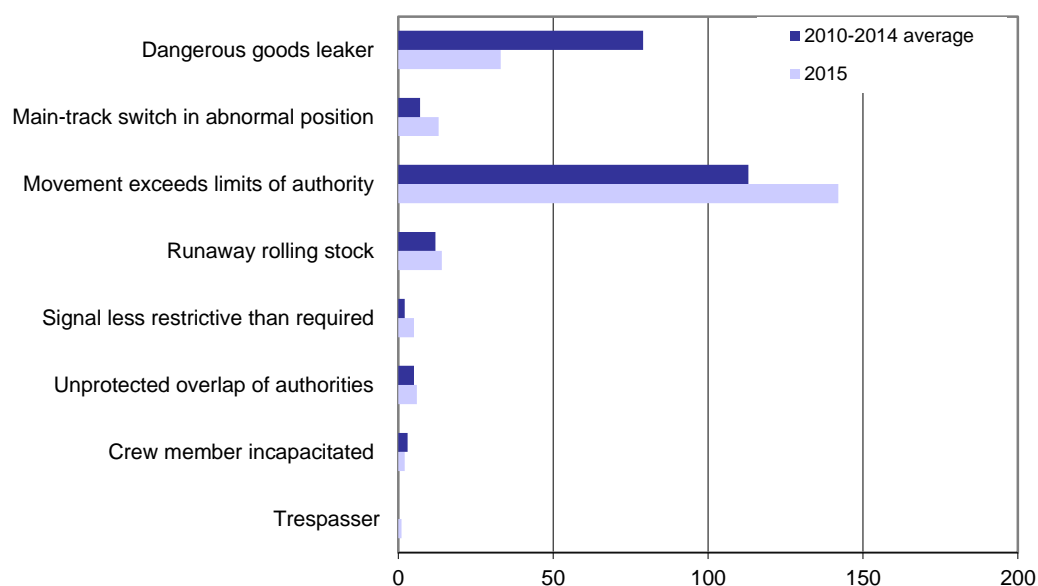
Figure 11. Number of rail incidents, 2006–2015



In 2015, there were 142 incidents where the movement exceeded the limit of authority, a 10% increase from the 129 recorded in 2014 and a 25% increase from the 5-year average of 113 (Figure 12).

¹² A movement exceeds limits of authority incident occurs when rolling stock occupies a main track or subdivision track, or track work takes place, in contravention of the Rules or any regulations made under the *Railway Safety Act*.

Figure 12. Number of rail incidents by type, 2015



A dangerous goods (DG) leaker incident¹³ is the unintentional release of a hazardous material while in transit, and does not involve an accident. Twelve percent of these incidents in 2015 involved the release of petroleum crude oil. The 33 reported DG leaker incidents in 2015 represented a 48% decrease from the 2014 total of 63 and a 58% decrease from the 5-year average of 79. DG leaker incidents accounted for 37% of all incidents in 2006, but 15% in 2015 (Figure 12).

The decrease in DG leaker incidents in 2014 and 2015 was due in part to the harmonization of the new rail regulations with Part 8 of the *Transportation of Dangerous Goods Regulations*. A DG release of flammable liquid (Class 3) is a reportable incident if more than 200 litres are released. The new regulations do not specify a threshold for reportable gas releases (Class 2).

¹³ Under the new reporting requirements the minimum reporting threshold for incidents (200 litres) involving the release of low vapour pressure flammable liquids has been harmonized with Part 8 of the *Transportation of Dangerous Goods Regulations*. Formerly, any release of that product type was reportable.

Definitions

The following definitions apply to railway occurrences that are required to be reported pursuant to the *Canadian Transportation Accident Investigation and Safety Board Act* and the associated Regulations.

Railway occurrence

- Any accident or incident associated with the operation of rolling stock on a railway
- Any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described below

Reportable railway accident

- A person is killed or sustains a serious injury as a result of
 - getting on or off or being on board the rolling stock, or
 - coming into contact with any part of the rolling stock or its contents
- The rolling stock or its contents
 - sustain damage that affects the safe operation of the rolling stock,
 - cause or sustain a fire or explosion, or
 - cause damage to the railway that poses a threat to the safe passage of rolling stock or to the safety of any person, property or the environment

Reportable railway incident

- A risk of collision occurs between rolling stock
- An unprotected main track switch or subdivision track switch is left in an abnormal position
- A railway signal displays a less restrictive indication than that required for the intended movement of rolling stock
- Rolling stock occupies a main track or subdivision track, or track work takes place, in contravention of the Rules or any regulations made under the *Railway Safety Act*
- Rolling stock passes a signal indicating stop in contravention of the Rules or any regulations made under the *Railway Safety Act*
- There is an unplanned and uncontrolled movement of rolling stock
- A crew member whose duties are directly related to the safe operation of the rolling stock is unable to perform their duties as a result of a physical incapacitation which poses a threat to the safety of persons, property or the environment, or
- There is an accidental release on board or from a rolling stock consisting of a quantity of dangerous goods or an emission of radiation that is greater than the quantity or emission level specified in Part 8 of the Transportation of Dangerous Goods Regulations

Serious injury

- A fracture of any bone, except simple fractures of fingers, toes or the nose

- Lacerations that cause severe hemorrhage or nerve, muscle or tendon damage
- An injury to an internal organ
- Second or third degree burns, or any burns affecting more than 5% of the body surface
- A verified exposure to infectious substances or injurious radiation, or
- An injury that is likely to require hospitalization

Dangerous goods involvement

“Dangerous goods” has the same meaning as in section 2 of the *Transportation of Dangerous Goods Act*, 1992. An accident is considered to have dangerous goods involvement if any car in the consist carrying (or having last contained) a dangerous good derails, strikes or is struck by any other rolling stock or object. It does not mean that there was any release of any product. Also included are crossing accidents in which the motor vehicle involved (e.g., tanker truck) is carrying a dangerous good.

Derailment

Any instance where 1 or more wheels of rolling stock have come off the normal running surface of the rail, including occurrences where there are no injuries and no damage to track or equipment.