



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



STATISTICAL SUMMARY RAIL TRANSPORTATION OCCURRENCES IN 2018

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Statistical summary: Rail transportation occurrences in 2018

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Le présent rapport est également disponible en français.

Table of contents

Accidents.....	2
Overview of accidents and casualties	2
Accidents by type	6
Incidents.....	11
Overview of incidents.....	11
Data tables	13
Definitions	26

Statistical Summary

Rail Transportation Occurrences in 2018

This document is a summary of selected 2018 rail transportation safety data. It covers federally regulated railways only. Non-federally regulated data reported to the TSB are not included in this report.

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

It should be noted that certain characteristics of the data constrain statistical analysis and identification of emerging trends. These include the small totals of accidents and incidents, the large variability in the data from year to year, and changes to regulations and definitions. The reader is cautioned to keep these limitations in mind when viewing this summary to avoid drawing conclusions that cannot be supported by statistical analysis.

The 2018 data were collected according to the reporting requirements described in the TSB Regulations in force during that calendar year.

The statistics presented here reflect the TSB RODS database at 18 February 2019. Since the occurrence data are constantly being updated in the live database, the statistics may change slightly over time.

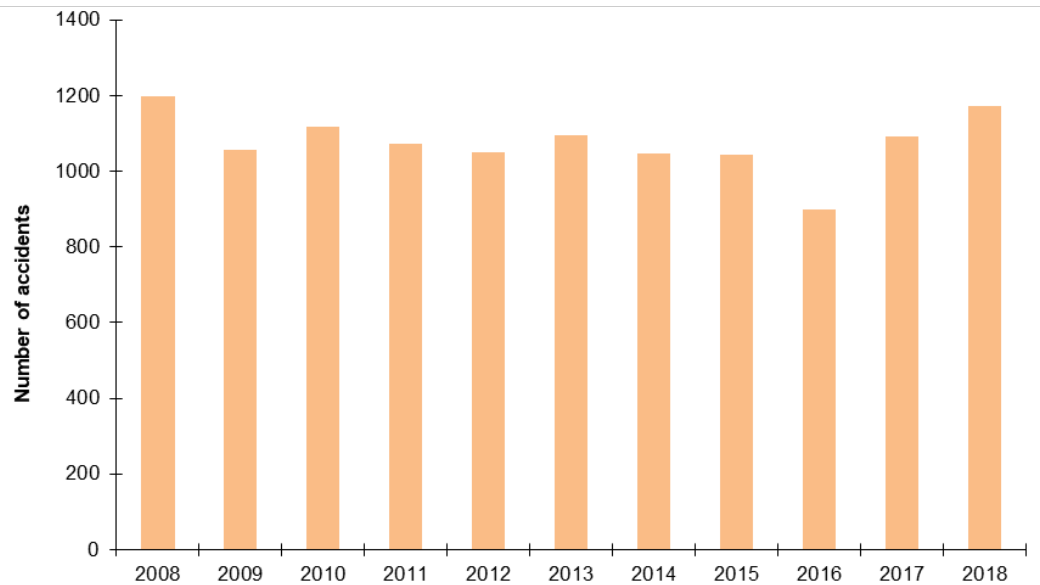
Also, as many occurrences are not formally investigated, information recorded on some occurrences may not have been verified.

Accidents

Overview of accidents and casualties

In 2018, 1172 rail accidents¹ were reported to the TSB (Figure 1), a 7% increase from the 2017 total of 1091, and a 10% increase from the previous 10-year (2008–2017) average of 1067. The TSB has noted these increases and will analyse this issue in more depth to try to determine possible causal factors.

Figure 1. Number of rail accidents, 2008 to 2018



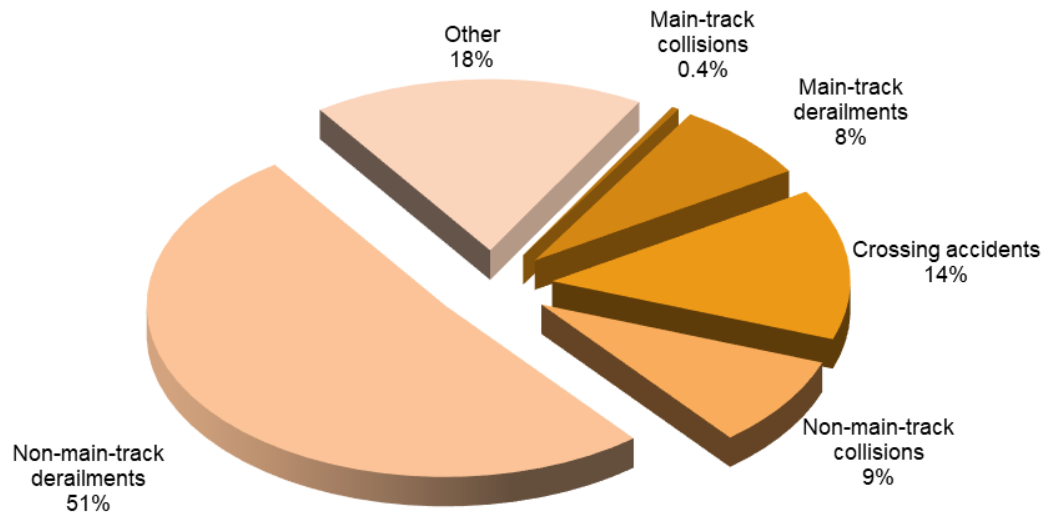
Freight trains accounted for approximately 30% of all trains involved in rail accidents in 2018. Five percent (68 in total) were passenger trains with the remaining 65% comprising mainly single cars/cuts of cars, locomotives and track units.

The largest proportion of reported rail accidents comprised non-main-track derailments² and collisions (60%) (Figure 2). Typically, most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

¹ See the Definitions section.

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

Figure 2. Percentage of rail accidents by type, 2018*



* Due to rounding of percentages in data labels, additions across accident types should be calculated from Table 1 data rather than by adding percentages shown in Figure 2.

The proportion of accidents that were main-track derailments or collisions in 2018 was approximately the same as both the previous year and the 10-year average.

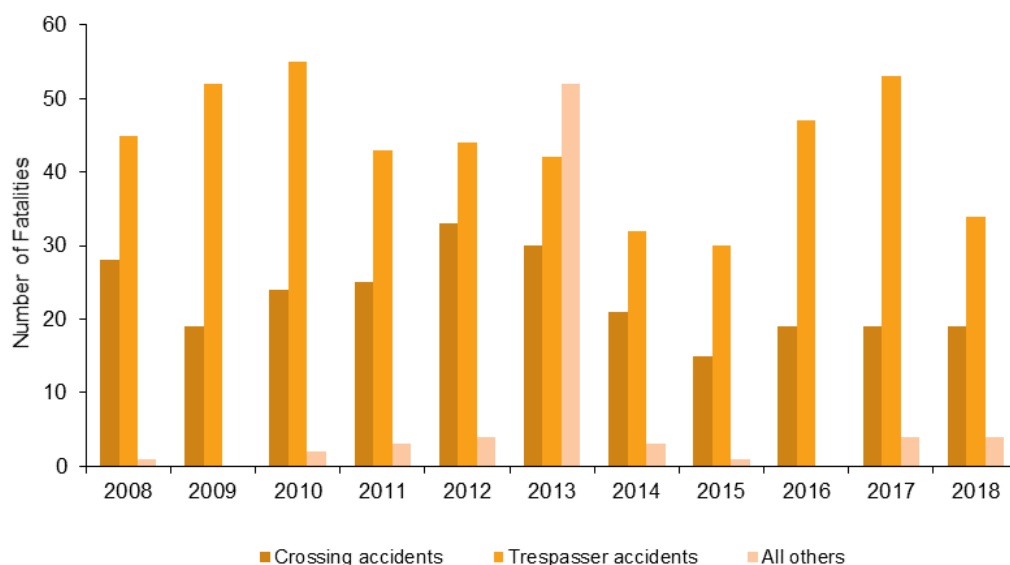
In 2018, 14% of rail accidents involved vehicles or pedestrians at rail crossings, below the 17% average of the previous 10 years. The proportion of other accident types³ (18%) in 2018 is approximately the same as the previous 10-year average (17%).

In 2018, 125 accidents involved dangerous goods,⁴ up from 115 in 2017 but below the 10-year average of 129. Six accidents resulted in a dangerous goods release in 2018, compared to 5 in 2017, and the 10-year average of 4.

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

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

Figure 3. Number of fatalities by type of occurrence, 2008 to 2018



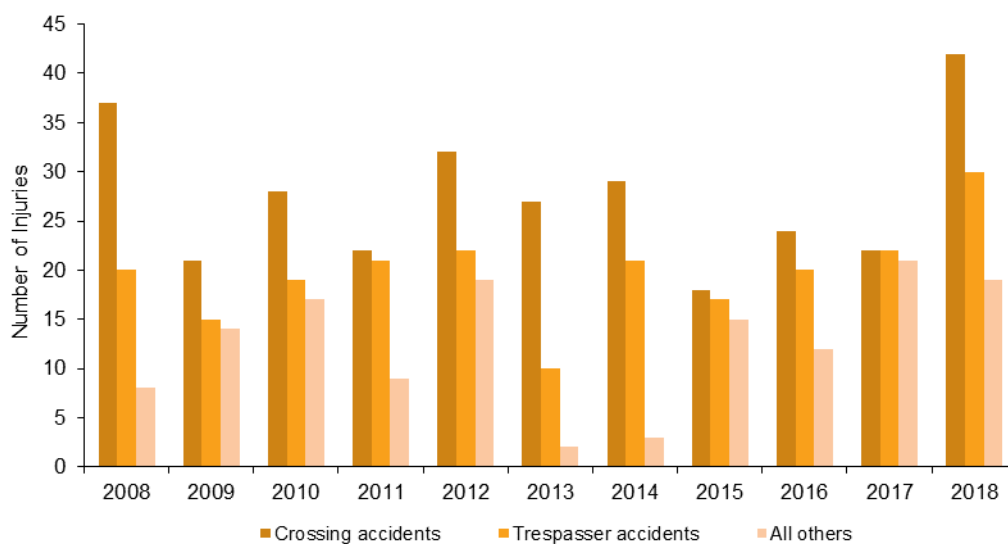
Rail fatalities (Figure 3) totalled 57 in 2018, down from 76 reported last year and from the 10-year average of 75. Crossing fatalities totalled 19 in 2018, the same as in 2017 but below the 10-year average of 23. Trespasser⁵ fatalities totalled 34 in 2018, down from 53 in the previous year and below the 10-year average of 44. In 2018, 4 rail employees were fatally injured, above the 10-year average of 2 employee fatalities.

A total of 91 serious injuries resulted from rail occurrences in 2018 (Figure 4), up from 65 in 2017 and above the 10-year average of 57. Similarly, trespasser injuries totalled 30 in 2018, up from 22 last year and above the 10-year average of 19. Seventeen rail employees were seriously injured in 2018, down from 19 in 2017 but above the 10-year average of 10. Crossing accidents⁶ resulted in 42 serious injuries, up from 22 in 2017 and above the 10-year average of 26.

⁵ Trespasser accidents involve persons, primarily pedestrians, who are struck by rolling stock while they are on railway rights-of-way (other than railway crossings) that they are not authorized to occupy.

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

Figure 4. Number of serious injuries by type of occurrence, 2008 to 2018

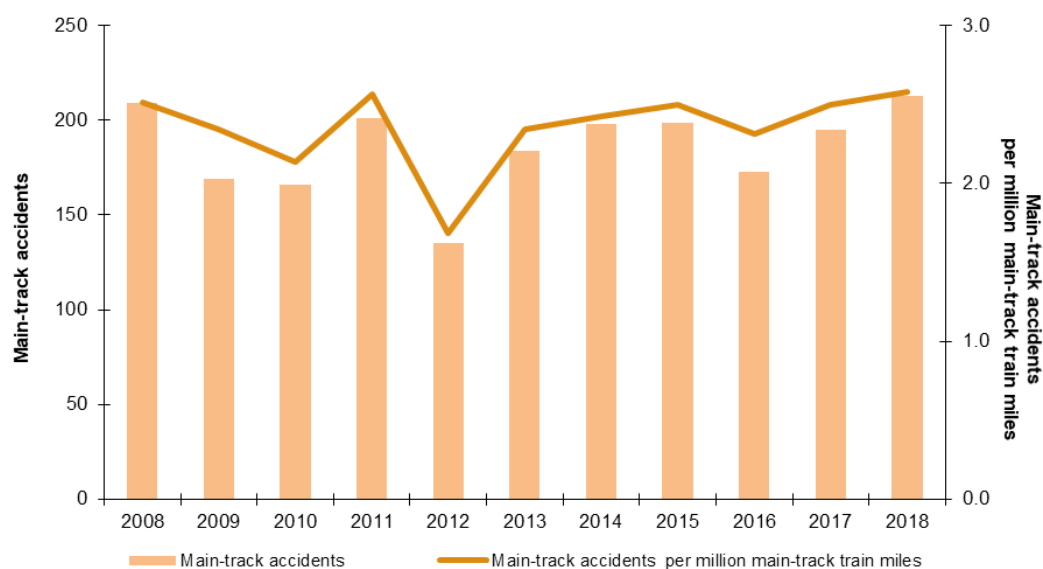


The number of main-track accidents⁷ totalled 213 in 2018 (Figure 5), up 9% from 195 in 2017 and 16% above the 10-year average of 183. Rail activity⁸ on main track (i.e., non-yard) increased by 6% from the previous year. The main-track accident rate in 2018 was 2.6 accidents per million main-track train miles, up 3% from 2.5 in 2017 and 10% above the 10-year average of 2.3.

⁷ Accidents which occur on main-track or spurs (not including crossing accidents, trespasser accidents, and non-main-track collisions and derailments) are combined in order to match the figures used in the activity data, which is the total of main track and spur million track miles (i.e., non-yard).

⁸ As provided to TSB by Transport Canada, Strategic Information Branch.

Figure 5. Number of main-track accidents and accident rates, 2008 to 2018



Accidents by type

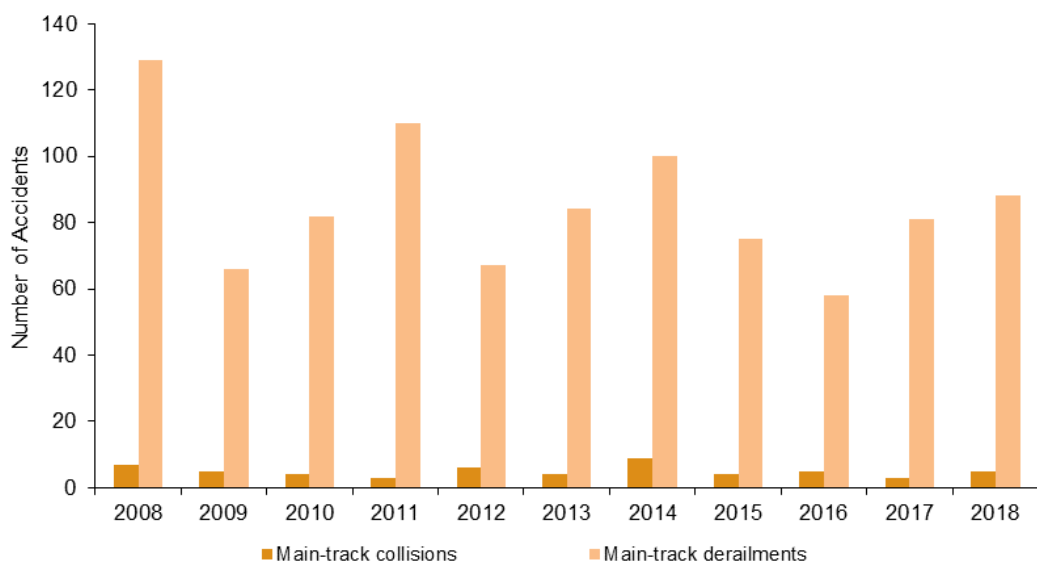
Main-track collisions and derailments are the most serious categories of rail accidents in terms of potential risk to the public and financial loss (e.g., when passenger trains are involved or dangerous goods are released from trains that derail in populated areas).

There were 5 main-track collisions (Figure 6) in 2018, up from the 2017 total of 3 but the same as the 10-year average. No fatalities or serious injuries resulted from main-track collisions in 2018. There was no release of dangerous goods as a result of main-track collisions.

A total of 88 main-track derailments (tables 4a and 4b) were reported in 2018, a 9% increase from the 2018 total of 81, and 3% above the 10-year average of 85 (Figure 6). Twenty-three percent of the 88 main-track derailments occurred in Alberta, 22% occurred in Saskatchewan, and 20% occurred in British Columbia.

The number of main-track derailments per million main-track train miles (i.e., non-yard) increased to 1.06 in 2018 from 1.04 the previous year but below the 10-year average of 1.09.

Figure 6. Number of main-track collision and derailment accidents, 2008 to 2018



One fatality and 3 serious injuries resulted from main-track derailments in 2018. Seventeen involved dangerous goods, up from the 2017 total of 10 and above the 10-year average of 14. Three of these derailments resulted in release of product (1 crude oil, 1 toluene and acetone, and 1 propane).

In 2018, 26% of assigned factors⁹ for main-track derailments were equipment-related, down from the 10-year average of 31%. Actions-related factors¹⁰ accounted for 33% of assigned factors in 2018, up compared to 19% for the 10-year average. Track-related factors were reported in 27% of main-track derailments in 2018, below the 10-year average of 38%.

Non-main-track collisions (tables 5a and 5b) (Figure 7) totalled 101 in 2018, similar to the 2017 total of 103, but above the 10-year average of 93. Derailments occurred in 47% of non-main-track collisions, and 57% of the derailments resulting from non-main-track collisions involved the derailment of one car.

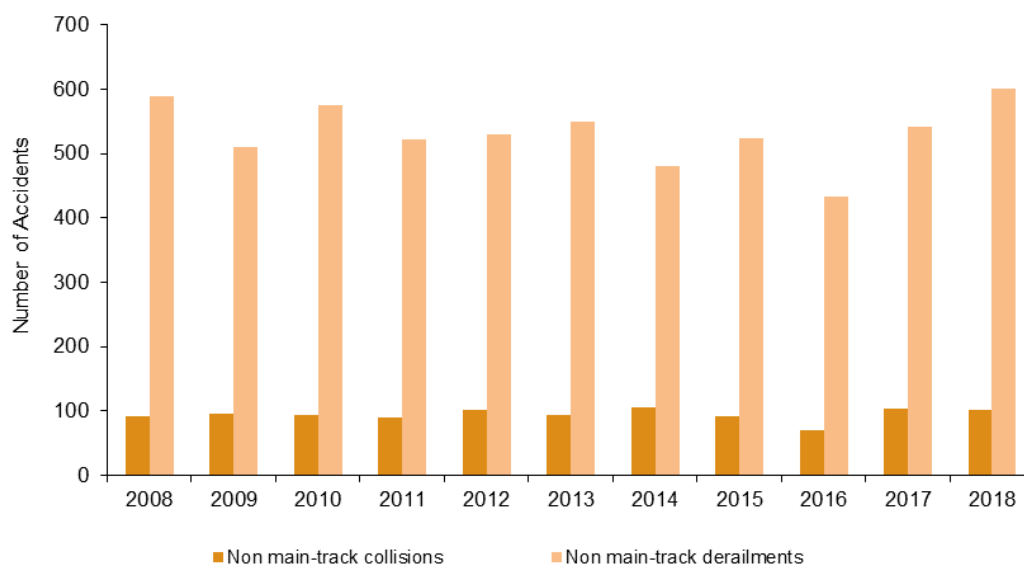
Non-main-track collisions resulted in 2 fatalities in 2018. Dangerous goods were involved in 33% of non-main-track collisions, none of which resulted in a release of product.

Factors assigned to non-main-track collisions were mostly actions-related (87%), comparable to the 10-year average of 85%. Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often (54%) as a factor.

⁹ Occurrences are normally reported to TSB with one 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 include, but are not limited to, departure from prescribed procedures, such as failure to protect or failure to secure.

Figure 7. Number of non-main-track collision and derailment accidents, 2008 to 2018



There were 600 non-main-track derailments¹¹ in 2018 (tables 6a and 6b) (Figure 7), an 11% increase from 541 last year and 14% above the 10-year average of 526. In 80% of these accidents, 1 or 2 cars derailed. No fatalities or serious injuries resulted from non-main-track derailments in 2018.

Non-main-track derailments involving fewer than 6 cars accounted for 77% of the accident increase in 2018 compared to the 10-year average. The TSB has noted this increase and will analyse the issue in more depth to try and determine possible causal factors.

Dangerous goods cars were involved in 10% of non-main-track derailment accidents, none of which resulted in a release of product.

In 2018, actions-related factors represented 51% of all assigned factors for non-main-track derailment accidents, above the 10-year average of 45%. Track-related factors represented 30% of all assigned factors, below the 10-year average of 35%.

Environmental-related factors represented 13% of all assigned factors in 2018, above the 10-year average of 8%.

Crossing accidents (tables 7 and 8) represented one of the more serious types of rail accidents in 2018, with 29% of these resulting in either serious or fatal injuries.

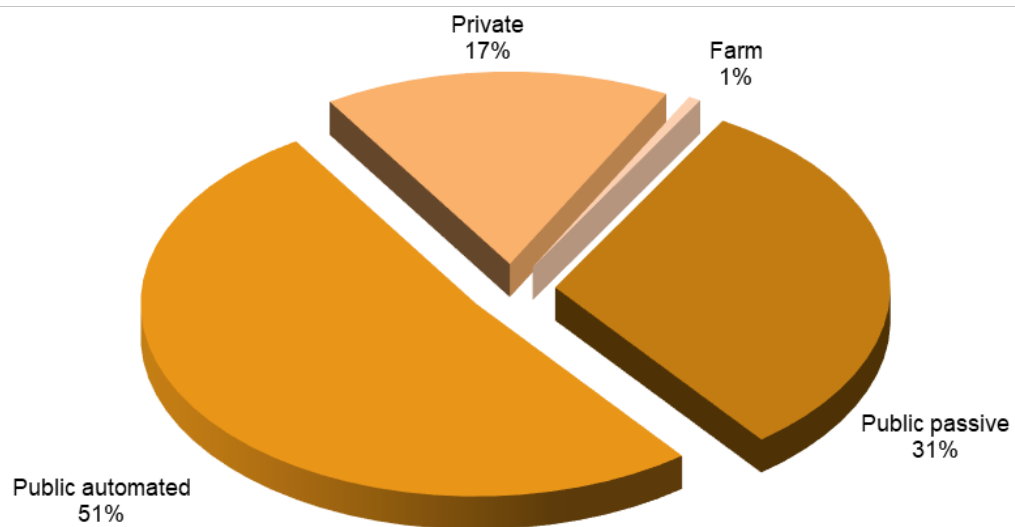
There were 167 crossing accidents in 2018, a 17% increase from the 2017 total of 143 but 5% below the 10-year average of 176. The number of accidents at public automated crossings (86) was up from the 2017 total of 70, but 4% below the 10-year average of 90. Accidents at public passive crossings (52) increased 11% from the 2017 total of 47 but

¹¹ New TSB regulations came into effect on 1 July 2014. The new regulations require that all derailments be reported, including minor derailments where there were no injuries and no damage to track or equipment.

were 11% below the 10-year average of 59. Accidents at private and farm crossings (29) increased 12% from the 2017 total of 26 and were 4% above the 10-year average of 28.

In 2018, the proportion of crossing accidents that occurred at public automated crossings was 51%, compared to 31% at public passive crossings (Figure 8). Although there are nearly twice as many public passive crossings than public automated crossings, the higher number of accidents occurring at automated crossings is due, in part, to higher vehicle and train traffic volumes at these crossings. The TSB is conducting further ongoing research to better understand crossing accident data.

Figure 8. Percentage of crossing accidents by type of crossing, 2018



There were 18 fatal crossing accidents in 2018, down from the 19 reported in 2017 and below the 10-year average of 21. Although crossing accidents involving pedestrians accounted for 11% (18) of all crossing accidents in 2018, they accounted for 56% (10) of fatal crossing accidents.

Crossing-related fatalities totalled 19 in 2018, the same as in 2017 but down from the 10-year average of 23. Pedestrians comprised 53% of crossing-related fatalities.

Crossing-related serious injuries totalled 42 in 2018, up from the 2017 total of 22 and above the 10-year average of 26.

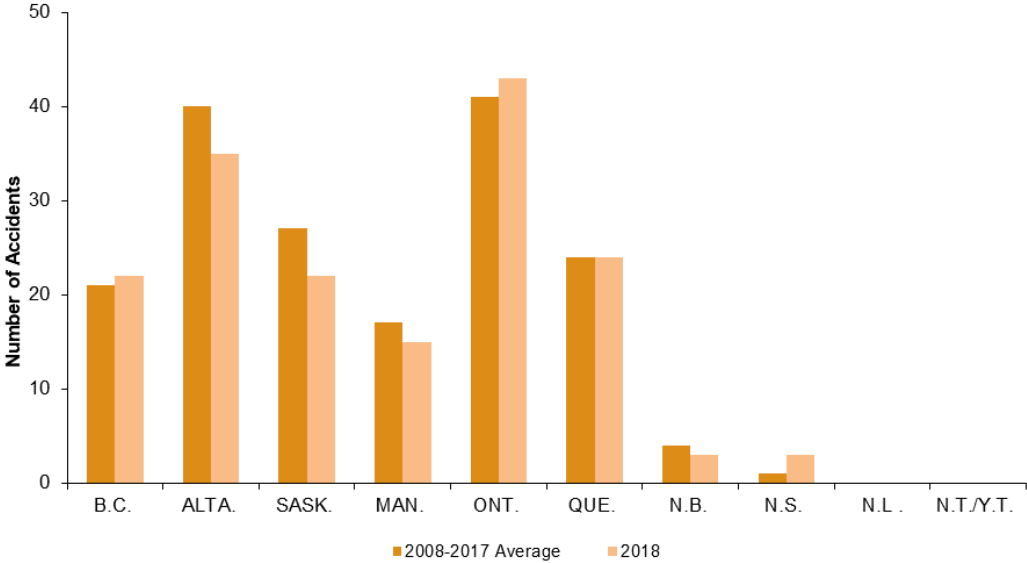
In 2018, 7 crossing accidents resulted in derailments, up from the 2017 total of 5 and above the 10-year average of 5.

Two crossing accidents resulted in release of product in 2018 (1 water/oil by-product, 1 ethanol).

Ontario had the highest proportion (26%) of all crossing accidents in 2018, above its 10-year average of 23%. Alberta had the second highest total with 21% of crossings

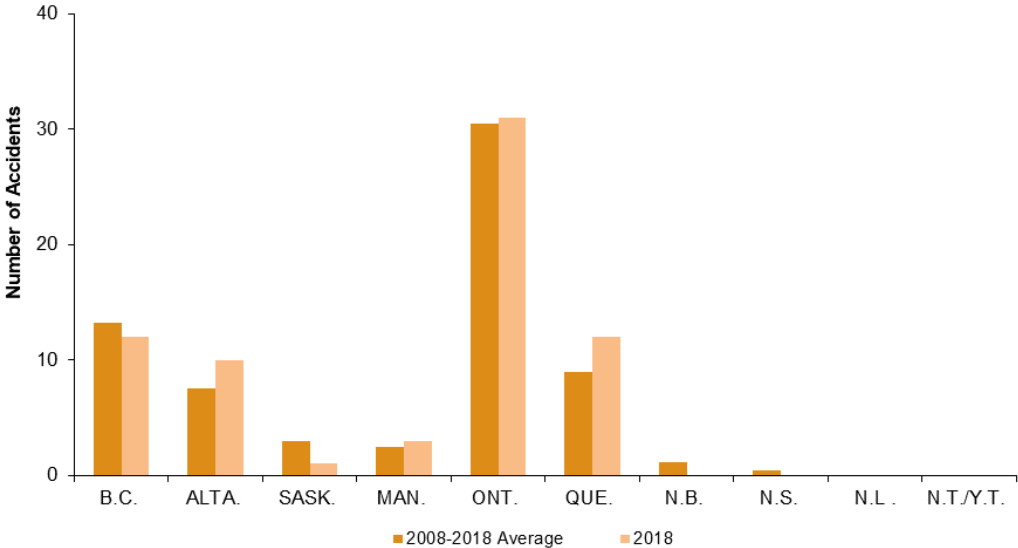
accidents, followed by Quebec with 14%, Saskatchewan and British Columbia with 13% each, and Manitoba with 9% (Figure 9).

Figure 9. Number of crossing accidents by province/territory, 2018



Trespasser accidents (Table 9) (Figure 10) totalled 69 in 2018, down from 80 in 2017 but above the 10-year average of 67. Ontario accounted for 45% of trespasser accidents, followed by British Columbia and Quebec with 17% each and Alberta with 14%.

Figure 10. Number of trespasser accidents by province/territory, 2018



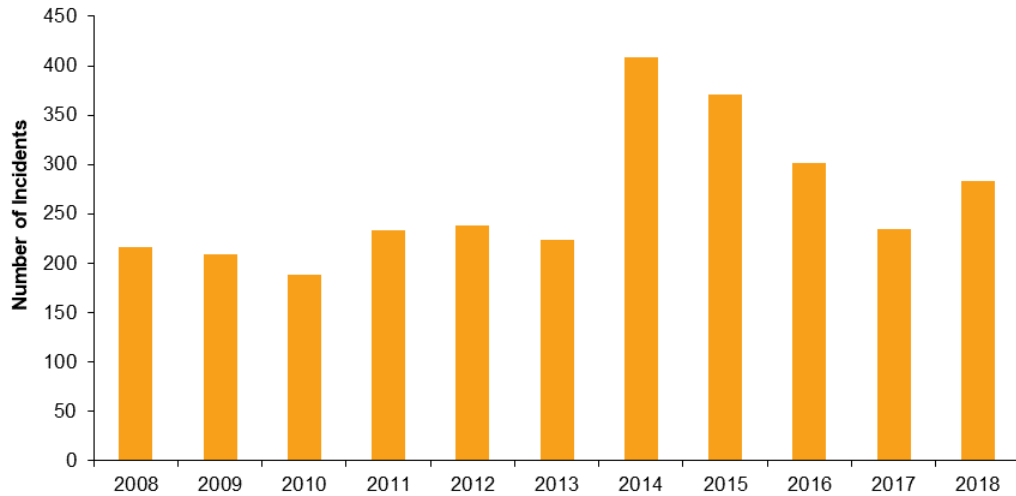
In 2018, the proportion of trespasser accidents that were fatal (49%) was below the 10-year average of 65%. The proportion of trespasser accidents resulting in serious injuries (43%) was above the 10-year average of 28% (data not shown).

Incidents

Overview of incidents

In 2018, there were 283 reported rail incidents (Figure 11), up from 235 in 2017.

Figure 11. Number of rail incidents,* 2008 to 2018



* New TSB Regulations came into effect on 1 July 2014. Under the new reporting requirements all derailments are reportable. The TSB has reviewed derailments and collisions back to 1 January 2014 and recategorized occurrences with minimal consequences as reportable incidents including: derailments involving 1 to 2 cars, with no equipment or track damage, no injuries, no fires, and no release of dangerous goods; non-main-track collisions, with no equipment or track damage, no injuries, no fires, no release of dangerous goods, and did not foul the main track.

“Movement exceeds the limit of authority”¹² (48% of reportable incidents) continued to be the main incident type since 2008 (Figure 12), followed by “non-main-track train derailments – no damage” (33%), “uncontrolled movement of rolling stock” (5%), and “unprotected overlap of authorities” (4%). There were no dangerous goods leaker incidents in 2018.¹³

In addition to the 15 “uncontrolled movement of rolling stock” incidents and 4 other collision/derailment incidents involving an “uncontrolled movement of rolling stock” in

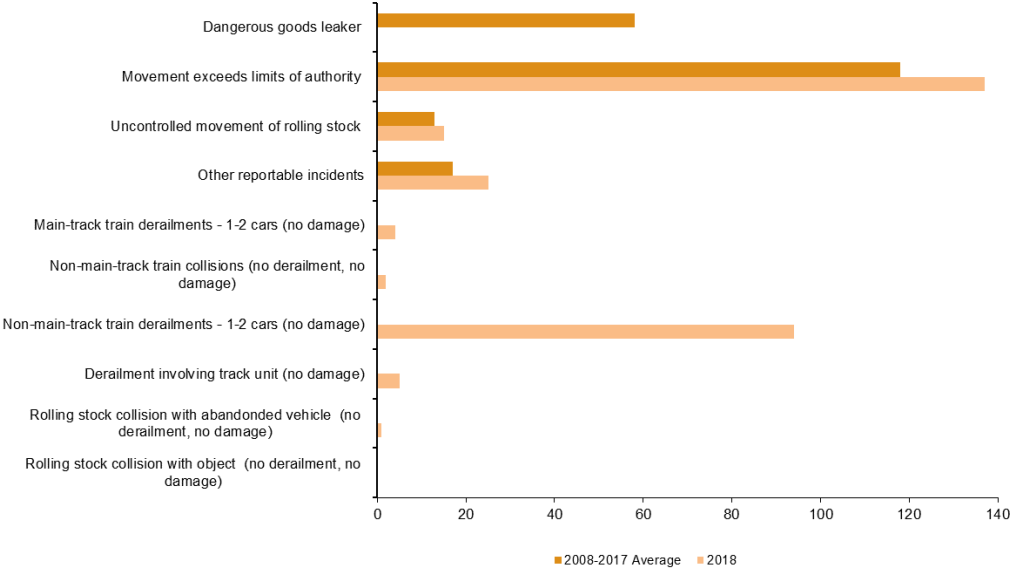
¹² A movement exceeds limits of authority incident occurs when rolling stock occupies a main track or subdivision track, or track work takes place, in contravention of the Rules or any regulations made under the *Railway Safety Act*.

¹³ In 2018, the TSB retroactively applied a June 2016 regulatory change by Transport Canada that revised the criteria for a dangerous goods leaker from a volume-based threshold to outcome-based consequences, resulting in the re-categorization of a number of occurrences. Consequently, the number of dangerous goods leaker incidents between June 2016 and December 2018 fell from 78 to 1.

2018, there were 44 accidents involving an “uncontrolled movement of rolling stock,” for a total of 63 occurrences. This is fewer than the total (65) of those occurrences in 2017.

There were 137 incidents in 2018 where the movement exceeded the limit of authority, a 12% increase from the 122 reported in 2017 and 16% above the 10-year average of 118.

Figure 12. Number of rail incidents by type, 2018*



* In 2018, the TSB retroactively applied a June 2016 regulatory change by Transport Canada that revised the criteria for a dangerous goods leaker from a volume-based threshold to outcome-based consequences, resulting in the re-categorization of a number of occurrences. Consequently, the number of dangerous goods leaker incidents between June 2016 and December 2018 fell from 78 to 1.

Data tables

Table 1
Railway occurrences and casualties
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accidents	1199	1055	1116	1072	1049	1095	1047	1045	898	1091	1172
Main-track collisions	7	5	4	3	6	4	9	4	5	3	5
Main-track derailments - 1-2 cars*	67	38	41	49	35	52	44	40	33	48	40
Main-Track Train Derailments - 3-5 cars	16	6	11	17	9	13	15	8	7	5	10
Main-Track Train Derailments - 6 or more	46	22	30	44	23	19	41	27	18	28	38
Crossing accidents	223	188	180	171	192	184	185	165	133	143	167
Non-main-track collisions	92	95	94	89	101	93	106	92	69	103	101
Non-main-track derailments - 1-2 cars*	446	396	457	404	424	436	357	410	346	424	477
Non-Main-Track Train Derailments - 3-5	101	89	93	91	77	88	90	87	61	82	100
Non-Main-Track Train Derailments - 6 or	42	25	26	27	29	25	34	26	27	35	23
Collisions/Derailments involving track	27	50	36	34	25	41	27	43	23	45	48
Employee/Passenger accidents	12	12	9	11	7	8	12	15	16	17	13
Trespasser accidents	71	71	81	66	71	56	54	50	70	80	69
Fires/Explosions	12	20	30	23	17	11	36	32	35	33	34
Other accident types	37	38	24	43	33	65	37	46	55	45	47
Reportable incidents	216	209	188	233	238	224	408	371	302	235	283
Main-track train derailments - 1-2 cars* (no	n/a	n/a	n/a	n/a	n/a	n/a	2	3	6	3	4
Non-main-track train collisions* (no	n/a	n/a	n/a	n/a	n/a	n/a	8	4	4	2	2
Non-main-track train derailments - 1-2	n/a	n/a	n/a	n/a	n/a	n/a	166	125	97	67	94
Dangerous goods leaker**	64	78	68	79	93	94	63	33	7	0	0
Main-track switch in abnormal position	13	4	5	10	5	7	6	12	7	12	7
Movement exceeds limits of authority	111	106	101	118	120	98	129	142	133	122	137
Uncontrolled movement of rolling stock	16	13	5	16	13	14	11	14	10	14	15
Other reportable incidents	12	8	9	10	7	11	23	38	38	15	24
Main-track accidents (a)	209	169	166	201	135	184	198	199	173	195	213
Million main-track train-miles (MMTTM)	83.1	72.2	77.6	78.4	80.1	78.5	81.6	79.6	74.7	78.0	82.6
Main-track accidents/MMTTM	2.5	2.3	2.1	2.6	1.7	2.3	2.4	2.5	2.3	2.5	2.6
Accidents involving dangerous goods	151	133	141	121	120	143	143	127	100	115	125
Main-track derailments	23	11	13	20	6	11	25	12	10	10	17
Crossing accidents	4	3	7	1	4	5	5	4	4	6	7
Non-main-track collisions	33	32	26	21	21	26	36	32	19	39	33
Non-main-track derailments	85	81	88	73	88	96	68	75	59	54	62
Other accident types	8	6	7	6	1	5	9	4	8	6	6
Accidents with a dangerous goods release	3	3	3	3	2	7	4	6	2	5	6
Accidents involving an uncontrolled	31	39	32	35	43	57	43	41	33	48	44
Fatalities for reportable occurrences	74	71	81	71	81	124	56	46	66	76	57
Crossing accidents	28	19	24	25	33	30	21	15	19	19	19
Trespasser accidents	45	52	55	43	44	42	32	30	47	53	34
Other occurrence types (c)	1	0	2	3	4	52	3	1	0	4	4
Serious injuries for reportable occurrences	65	50	64	52	73	39	53	50	56	65	91
Crossing accidents	37	21	28	22	32	27	29	18	24	22	42
Trespasser accidents	20	15	19	21	22	10	21	17	20	22	30
Other occurrence types (c)	8	14	17	9	19	2	3	15	12	21	19

Data extracted February 18, 2019.

Federally regulated railway occurrences.

a. Accidents which occurred on main-track or spurs, excluding crossing and trespasser accidents, and excluding non-main-track collisions

b. Main-track (i.e., non-yard) train-miles are estimated (Source: Transport Canada).

c. See Table 2 for details on occurrences by type.

*New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable. The TSB has

** TSB Regulations have been harmonized with Section 8.4 of the Transportation of Dangerous Goods Regulations, under which TSB DG

Table 2
Fatalities and serious injuries (type of occurrence, person type)
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities for reportable occurrences	74	71	81	71	81	124	56	46	66	76	57
Main-track collisions	0	0	0	0	0	0	0	0	0	0	0
Main-track derailments	0	0	1	0	3	47	0	0	0	0	1
Crossing accidents	28	19	24	25	33	30	21	15	19	19	19
Non-main-track collisions	0	0	0	0	0	1	0	0	0	0	2
Non-main-track derailments	0	0	0	0	1	0	0	0	0	0	0
Collisions/Derailments involving track units	0	0	0	0	0	0	0	0	0	0	0
Employee/Passenger accidents	1	0	1	1	0	4	2	1	0	3	1
Trespasser accidents	45	52	55	43	44	42	32	30	47	53	34
Other accident types	0	0	0	2	0	0	1	0	0	0	0
Reportable incidents	0	0	0	0	0	0	0	0	0	1	0
Serious injuries for reportable occurrences	65	50	64	52	73	39	53	50	56	65	91
Main-track collisions	0	0	0	0	1	0	0	0	0	0	0
Main-track derailments	0	0	8	0	10	0	0	0	0	0	3
Crossing accidents	37	21	28	22	32	27	29	18	24	22	42
Non-main-track collisions	0	0	0	0	1	0	0	0	0	2	0
Non-main-track derailments	0	0	0	0	0	0	0	0	0	0	0
Collisions/Derailments involving track units	0	2	2	1	0	0	0	0	3	0	0
Employee/Passenger accidents	7	8	7	7	6	1	1	11	8	16	12
Trespasser accidents	20	15	19	21	22	10	21	17	20	22	30
Other accident types	0	4	0	1	0	0	0	2	1	3	0
Reportable incidents	1	0	0	0	1	1	2	2	0	0	4
Fatalities by person type	74	71	81	71	81	124	56	46	66	76	57
Employees	1	0	1	1	4	5	2	1	0	3	4
Passengers	1	0	1	0	0	0	1	0	0	1	0
Pedestrians	11	3	8	6	17	13	8	3	7	8	10
Vehicle occupants	14	17	15	22	16	17	12	11	12	11	9
Trespassers	45	50	55	42	44	42	32	31	47	53	34
Other person types	2	1	1	0	0	47	1	0	0	0	0
Serious injuries by person type	65	50	64	52	73	39	53	50	56	65	91
Employees	11	13	12	8	9	2	7	8	15	19	17
Passengers	1	1	7	0	14	1	1	8	2	3	3
Pedestrians	2	0	4	5	5	3	1	2	0	2	8
Vehicle occupants	31	22	22	18	23	23	21	16	18	18	33
Trespassers	20	14	19	21	22	10	23	16	21	23	30
Other person types	0	0	0	0	0	0	0	0	0	0	0

Data extracted February 18, 2019.
 Federally regulated railway occurrences.

Table 3**Number of trains (rolling stock) involved in accidents by train type and accident type
2008-2018**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Freight trains	1005	808	842	823	800	834	544	413	338	405	388
Main-track collisions	9	8	6	4	8	7	8	6	6	6	5
Main-track derailments	119	63	76	102	62	79	90	66	48	75	76
Non-main-track collisions	98	82	94	95	94	85	42	27	11	28	20
Non-main-track derailments	491	406	421	401	382	423	187	108	87	95	95
Crossing accidents	187	148	137	132	160	144	139	117	86	94	106
Trespasser accidents	49	50	53	43	51	38	39	36	49	54	41
Other accident types	52	51	55	46	43	58	39	53	51	53	45
Passenger trains	79	69	63	72	47	46	50	46	57	55	68
Main-track collisions	2	0	0	0	0	0	1	0	0	0	1
Main-track derailments	3	0	3	2	1	3	3	2	4	2	2
Non-main-track collisions	3	1	1	5	1	0	1	0	0	0	0
Non-main-track derailments	17	11	8	5	5	4	1	2	1	4	6
Crossing accidents	25	26	21	20	15	17	18	16	11	13	19
Trespasser accidents	20	20	27	23	17	16	12	10	13	23	24
Other accident types	9	11	3	17	8	6	14	16	28	13	16
Track units	48	82	66	61	41	76	50	78	41	71	81
Main-track collisions	0	0	0	0	0	0	0	0	0	0	0
Main-track derailments	0	0	0	0	0	0	0	0	0	0	0
Non-main-track collisions	0	0	0	0	0	0	0	0	0	0	0
Non-main-track derailments	0	0	1	0	0	0	0	0	0	0	0
Crossing accidents	5	4	9	7	2	7	2	5	4	5	6
Trespasser accidents	0	0	0	0	0	0	0	0	0	0	0
Other accident types	43	78	56	54	39	69	48	73	37	66	75
Single car/Cut of cars	110	141	136	121	131	126	378	476	416	527	598
Main-track collisions	1	1	0	1	2	0	6	0	1	0	2
Main-track derailments	1	1	1	5	1	2	8	2	4	2	7
Non-main-track collisions	55	89	69	53	70	59	114	103	93	119	133
Non-main-track derailments	49	42	57	51	49	51	222	333	278	362	403
Crossing accidents	1	2	0	0	1	1	9	17	17	21	26
Trespasser accidents	0	0	0	0	0	0	1	4	6	1	3
Other accident types	3	6	9	11	8	13	18	17	17	22	24
Other train/rolling stock types	69	86	140	107	150	111	138	132	127	117	153
Main-track collisions	0	0	1	0	1	0	0	0	2	0	0
Main-track derailments	6	2	2	3	3	1	1	5	2	2	3
Non-main-track collisions	8	8	20	15	27	13	26	15	21	14	18
Non-main-track derailments	42	61	101	69	98	73	78	92	72	82	104
Crossing accidents	8	8	13	12	14	15	17	10	15	10	12
Trespasser accidents	2	1	2	0	3	2	2	0	2	2	1
Other accident types	3	6	1	8	4	7	14	10	13	7	15

Data extracted February 18, 2019.

Federally regulated railway occurrences.

As some accidents may involve more than one train (rolling stock), the number of trains involved may differ from the total number of accidents.

New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable.

Table 4a**Main-track derailment accidents (province, number of derailed cars)****2008-2018**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Main-track derailments by province	129	66	82	110	67	84	100	75	58	81	88
Newfoundland & Labrador	1	0	3	1	1	1	0	0	0	2	0
Nova Scotia	0	1	0	0	0	1	0	0	1	0	0
New Brunswick	1	1	0	0	0	1	3	2	1	0	0
Quebec	16	8	9	10	8	8	11	9	6	6	9
Ontario	35	21	19	24	7	19	20	21	15	11	14
Manitoba	13	4	9	19	9	3	10	4	4	6	8
Saskatchewan	14	9	14	11	4	13	10	8	6	14	19
Alberta	31	12	14	21	17	19	30	17	13	21	20
British Columbia	18	10	14	24	21	19	16	14	12	21	18
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0	0
Derailments per million main-track train-miles (a)	1.55	0.91	1.06	1.40	0.84	1.07	1.23	0.94	0.78	1.04	1.06
Derailments per billion gross ton-miles (b)	0.29	0.17	0.18	0.23	0.13	0.16	0.18	0.14	0.11	0.14	n/a
Derailments by number of derailed cars	129	66	82	110	67	84	100	75	58	81	88
1 car	55	28	30	39	29	47	29	30	26	39	30
2 cars	12	10	11	10	6	5	15	10	7	9	10
3 cars	6	3	2	6	3	5	4	4	2	1	4
4 cars	5	3	3	6	2	6	6	2	2	3	4
5 to 10 cars	24	12	19	29	16	7	22	16	10	13	21
11 cars or more	27	10	17	20	11	14	24	13	11	16	19

Data extracted February 18, 2019.

Federally regulated railway occurrences.

a. The source of the million main-track (i.e., non-yard) train-miles is Transport Canada. Data are estimated.

b. The source of the billion gross ton-miles is the Railway Association of Canada.

New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable.

Table 4b
Main-track derailment accidents (assigned factors)
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total number of assigned factors	153	80	91	126	68	96	109	80	63	81	86
Environmental	12	6	1	6	4	5	10	2	3	4	6
Equipment	42	23	27	48	19	33	27	23	20	30	22
Axle	11	5	7	11	6	8	4	6	6	10	2
Brakes	3	6	3	7	3	3	4	4	4	4	4
Draft system	4	4	4	4	4	2	5	5	1	4	7
Superstructure	5	0	2	3	2	7	3	1	2	1	3
Truck	5	1	5	7	2	5	6	2	1	5	0
Wheel	12	7	6	16	2	8	5	5	6	6	6
Track	62	34	33	45	28	30	49	33	18	29	23
Geometry	23	12	16	18	14	10	11	8	8	12	11
Object on track	1	1	2	2	0	2	1	0	0	1	0
Other track material	6	5	2	4	2	0	7	2	1	3	2
Rail	27	7	7	12	8	12	17	12	4	8	3
Roadbed	4	5	2	6	4	4	5	7	2	4	4
Switch	1	2	2	1	0	0	6	1	3	0	1
Turnouts	0	0	1	1	0	1	0	0	0	1	1
Actions	20	9	24	19	15	26	18	14	18	17	28
Failure to protect	8	2	2	5	5	5	4	2	4	5	10
Failure to secure	0	1	0	0	1	1	0	0	0	0	0
Failure to use equipment properly	6	5	10	7	2	10	6	5	9	8	14
Improper loading/lifting	1	1	3	0	2	2	3	2	0	2	1
Improper placement/position for task	1	0	4	2	2	6	3	1	4	2	2
Inadequate/Inappropriate maintenance of equipment	3	0	1	1	0	0	0	1	0	0	0
Operating at improper speed	1	0	3	3	2	2	2	3	0	0	1
Vandalism	0	0	0	0	0	0	0	0	1	0	0
Other actions	0	0	1	1	1	0	0	0	0	0	0
Other assigned factors	17	8	6	8	2	2	5	8	4	1	7
Derailments by number of assigned factors	129	66	82	110	67	84	100	75	58	81	88
One factor assigned	117	57	74	98	66	74	94	70	53	75	78
More than one factor assigned	12	9	7	12	1	10	6	4	4	3	3
No factor assigned	0	0	1	0	0	0	0	1	1	3	7

Data extracted February 18, 2019.

Federally regulated railway occurrences.

TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. Occurrences are normally only reported to TSB with one assigned factor. The TSB may assign additional factors.

Some factors are assigned by highest category (e.g. Equipment or Track), therefore the breakdowns may not sum up to the category total. New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable.

Table 5a**Non-main-track collision accidents (province, number of derailed cars)****2008-2018**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-main-track collisions by province	92	95	94	89	101	93	106	92	69	103	101
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0	1
Nova Scotia	1	0	0	0	0	0	0	0	0	1	0
New Brunswick	3	1	1	1	1	1	4	0	1	1	2
Quebec	5	6	11	12	8	10	4	10	7	9	5
Ontario	26	24	15	17	10	16	23	20	19	25	19
Manitoba	9	15	15	15	21	14	18	15	10	14	8
Saskatchewan	10	5	3	8	12	11	21	8	5	7	13
Alberta	27	25	29	16	34	28	19	17	19	23	26
British Columbia	11	19	20	20	15	13	17	21	8	23	27
Northwest Territories/Yukon	0	0	0	0	0	0	0	1	0	0	0
Collisions by number of derailed cars	92	95	94	89	101	93	106	92	69	103	101
No cars derailed	33	49	51	50	63	63	63	63	38	64	54
1 car	24	26	24	21	14	18	19	21	14	16	27
2 cars	11	8	7	8	10	7	13	1	7	11	6
3 cars	9	5	4	3	6	2	4	3	4	5	4
4 cars	8	3	4	5	5	0	3	2	2	3	2
5 to 10 cars	5	3	3	2	3	3	3	2	3	4	7
11 cars or more	2	1	1	0	0	0	1	0	1	0	1

Data extracted February 18, 2019.

Federally regulated railway occurrences.

Table 5b
Non-main-track collision accidents (assigned factors)
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total number of assigned factors	99	107	111	105	114	113	118	103	81	113	97
Environmental	1	4	1	2	4	1	2	2	2	1	2
Equipment	1	2	1	3	4	5	4	3	3	1	3
Track	4	6	5	1	3	6	8	7	1	3	3
Actions	73	83	96	92	100	95	102	88	70	102	84
Failure to protect	49	55	64	64	63	54	61	59	43	66	52
Failure to secure	7	12	11	10	16	13	11	4	5	7	8
Failure to use equipment properly	10	11	8	9	10	14	16	14	11	19	16
Improper placement/position for task	0	0	2	0	0	2	0	1	0	0	0
Inadequate/Inappropriate communications	0	1	3	4	2	3	2	3	3	1	1
Inadequate/Inappropriate maintenance of equipment	0	0	0	0	0	0	0	0	0	0	0
Operating at improper speed	7	4	7	5	8	8	12	7	8	9	7
Vandalism	0	0	0	0	0	0	0	0	0	0	0
Other actions	0	0	1	0	1	1	0	0	0	0	0
Other assigned factors	20	12	8	7	3	6	2	3	5	6	5
Collisions by number of assigned factors	92	95	94	89	101	93	106	92	69	103	101
One factor assigned	87	83	77	73	88	73	97	83	60	96	88
More than one factor assigned	4	12	17	16	13	20	9	9	9	7	4
No factor assigned	1	0	0	0	0	0	0	0	0	0	9

Data extracted February 18, 2019.

Federally regulated railway occurrences.

TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. Occurrences are normally only reported to TSB with one assigned factor. The TSB may assign additional factors.

Some factors are assigned by highest category (e.g. Actions), therefore the breakdowns may not sum up to the category total.

Table 6a
Non-main-track derailment accidents (province, number of derailed cars)
2008-2018

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Non-main-track derailment accidents by province	589	510	576	522	530	549	481	523	434	541	600
Newfoundland & Labrador	0	2	0	0	1	1	0	6	12	11	9
Nova Scotia	3	5	4	3	4	2	4	3	2	5	6
New Brunswick	17	8	10	14	8	4	12	13	9	9	5
Quebec	71	52	61	64	75	55	48	81	66	85	60
Ontario	141	110	116	108	95	93	93	109	85	115	119
Manitoba	65	75	89	75	68	70	68	71	58	70	65
Saskatchewan	51	44	62	79	68	87	50	49	55	49	83
Alberta	117	131	151	103	144	145	125	91	68	93	132
British Columbia	124	81	83	74	67	91	80	100	79	103	121
Northwest Territories/Yukon	0	2	0	2	0	1	1	0	0	1	0
Derailements by number of derailed cars	589	510	576	522	530	549	481	523	434	541	600
1 car	308	291	316	291	301	334	260	319	265	333	383
2 cars	138	105	141	113	123	102	97	91	81	91	94
3 cars	56	40	56	47	39	48	49	53	30	46	54
4 cars	24	32	17	29	22	25	23	26	22	25	28
5 to 10 cars	54	41	43	37	40	37	46	29	31	43	35
11 cars or more	9	1	3	5	5	3	6	5	5	3	6

Data extracted February 18, 2019.

Federally regulated railway occurrences.

New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable.

Table 6b
Non main-track derailment accidents (assigned factors)
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total number of assigned factors	622	547	639	578	563	622	517	560	464	572	560
Environmental	47	24	29	58	29	82	30	36	40	59	74
Equipment	41	50	54	57	51	39	41	31	31	34	28
Axle	1	0	0	0	1	0	0	0	0	0	0
Brakes	12	18	14	14	6	7	9	7	4	6	9
Draft system	9	15	16	11	10	5	8	3	5	5	5
Superstructure	7	5	5	11	8	7	7	5	4	8	9
Truck	4	4	9	7	17	14	11	8	11	12	5
Wheel	5	8	9	13	8	6	6	8	7	3	0
Track	238	209	237	175	207	205	202	194	163	162	169
Appurtenances	1	1	0	0	4	1	2	1	1	3	2
Geometry	90	95	107	71	80	73	77	61	71	67	65
Object on track	6	5	1	2	3	2	0	2	1	1	3
Other track material	8	11	14	7	6	5	3	5	6	6	7
Rail	31	26	24	19	30	38	30	30	19	38	23
Roadbed	9	5	15	25	13	10	8	9	4	6	6
Signals	1	0	0	0	0	1	0	1	0	0	0
Switch	58	37	52	35	54	58	59	64	50	30	48
Turnouts	27	25	19	13	12	12	19	16	4	8	10
Actions	264	225	293	255	255	269	226	276	216	301	284
Failure to protect	170	152	176	147	140	140	130	158	109	163	193
Failure to secure	9	3	7	3	11	6	5	2	1	9	10
Failure to use equipment properly	49	47	70	76	77	84	67	72	81	98	62
Improper loading/lifting	8	2	8	8	4	7	3	8	1	7	2
Improper placement/position for task	4	9	8	8	11	8	7	7	6	11	4
Inadequate/Inappropriate communications	6	2	3	2	2	3	1	4	1	2	3
Inadequate/Inappropriate maintenance of equipment	0	0	2	0	0	1	0	3	0	0	0
Operating at improper speed	11	6	14	4	3	10	13	16	8	8	5
Vandalism	5	4	5	6	3	5	0	5	6	3	4
Other actions	2	0	0	1	4	5	0	1	3	0	1
Other assigned factors	32	39	26	33	21	27	18	23	14	16	5
Derailments by number of assigned factors	589	510	576	522	530	549	481	523	434	541	600
One factor assigned	557	478	516	458	497	479	450	498	413	517	534
More than one factor assigned	31	32	60	60	33	70	31	25	21	24	12
No factor assigned	1	0	0	4	0	0	0	0	0	0	54

Data extracted February 18, 2019.

Federally regulated railway occurrences.

TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. Occurrences are normally only reported to TSB with one assigned factor. The TSB may assign additional factors.

Some factors are assigned by highest category (e.g. Equipment or Track), therefore the breakdowns may not sum up to the category total.

New TSB regulations came into effect on July 1, 2014. Under the new reporting requirements all derailments are reportable.

Table 7
Crossing accidents by type and protection
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Crossing accidents	223	188	180	171	192	184	185	165	133	143	167
Public crossings	178	157	154	148	170	172	154	131	105	117	138
Passive warnings	63	56	67	59	73	65	68	52	36	47	52
Automated warnings	115	101	87	89	97	107	86	79	69	70	86
Flashing lights & bells	73	55	56	52	48	56	47	37	39	30	44
Gates	40	44	30	36	49	44	38	42	29	38	41
Other automated warnings	2	2	1	1	0	7	1	0	1	2	1
Private crossings	39	30	24	15	18	10	27	28	24	21	28
Farm crossings	6	1	2	8	4	2	4	6	4	5	1
Fatal accidents	26	17	19	24	28	22	20	15	16	19	18
Fatalities	28	19	24	25	33	30	21	15	19	19	19
Public crossings	26	18	23	21	32	30	20	13	19	19	18
Passive warnings	5	6	5	5	14	3	2	2	7	4	2
Automated warnings	21	12	18	16	18	27	18	11	12	15	16
Flashing lights & bells	9	6	8	9	7	7	3	2	5	3	4
Gates	12	6	10	7	11	20	15	9	7	12	12
Other automated warnings	0	0	0	0	0	0	0	0	0	0	0
Private crossings	1	1	1	1	0	0	1	1	0	0	0
Farm crossings	1	0	0	3	1	0	0	1	0	0	1
Serious injuries	37	21	28	22	32	27	29	18	24	22	42
Public crossings	31	20	25	20	29	26	22	18	21	18	37
Passive warnings	13	9	14	3	15	7	11	4	5	9	17
Automated warnings	18	11	11	17	14	19	11	14	16	9	20
Flashing lights & bells	16	8	5	9	6	4	6	4	8	3	6
Gates	2	3	6	8	8	13	5	10	8	6	14
Other automated warnings	0	0	0	0	0	2	0	0	0	0	0
Private crossings	4	1	3	1	3	0	7	0	3	3	5
Farm crossings	2	0	0	1	0	1	0	0	0	1	0
Number of public crossings (a)	n/a	17,425	16,718	16,413	16,229	16,113	15,950	15,724	15,656	16,524	16,447
Passive warnings	n/a	11,722	11,112	10,826	10,628	10,548	10,397	10,173	10,109	10,833	10,671
Automated warnings	n/a	5,703	5,606	5,587	5,601	5,565	5,553	5,551	5,547	5,691	5,776
Flashing lights & bells	n/a	3,526	3,365	3,308	3,288	3,235	3,189	3,156	3,118	3,268	3,267
Gates	n/a	2,116	2,181	2,220	2,254	2,275	2,317	2,351	2,386	2,399	2,484
Other automated warnings	n/a	61	61	59	59	55	47	44	43	24	25

Data extracted February 18, 2019.

Federally regulated railway occurrences.

a. Source: Transport Canada IRIS database. The data for 2018 was provided on March 27, 2019. Figures for previous years are snapshots provided historically by Transport Canada.

Table 8
Crossing accidents by province
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Crossing accidents	223	188	180	171	192	184	185	165	133	143	167
Newfoundland &	0	0	0	2	0	0	0	0	0	0	0
Nova Scotia	0	3	3	0	1	0	0	2	1	3	3
New Brunswick	2	4	5	6	3	2	6	7	4	1	3
Quebec	28	28	21	27	18	16	23	28	29	26	24
Ontario	66	48	52	39	41	40	44	29	26	26	43
Manitoba	13	18	20	7	26	19	17	19	14	15	15
Saskatchewan	28	24	24	23	32	37	34	23	19	26	22
Alberta	55	36	37	47	49	50	40	38	21	28	35
British Columbia	31	25	18	20	22	19	21	19	19	18	22
Northwest	0	2	0	0	0	1	0	0	0	0	0
Crossing accidents on	213	180	174	167	182	171	173	159	122	136	156
Crossing accidents per	2.6	2.5	2.2	2.1	2.3	2.2	2.1	2.0	1.6	1.7	1.9
Crossing accidents with	6	6	3	4	3	6	9	6	6	5	7
Fatalities	28	19	24	25	33	30	21	15	19	19	19
Newfoundland &	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	1	0	0	0	0	0	0	0	0
New Brunswick	0	0	1	2	1	1	0	0	2	0	0
Quebec	7	1	1	4	1	2	9	4	3	7	3
Ontario	12	3	6	9	12	13	5	5	3	7	7
Manitoba	2	3	2	2	3	0	1	1	2	2	0
Saskatchewan	3	5	5	1	8	3	2	0	4	0	1
Alberta	3	3	6	5	6	7	2	3	3	2	3
British Columbia	1	3	2	2	2	4	2	2	2	1	5
Northwest	0	0	0	0	0	0	0	0	0	0	0
Serious injuries	37	21	28	22	32	27	29	18	24	22	42
Newfoundland &	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	2	0	0	0	0	0	0	0	0
New Brunswick	1	0	0	0	0	0	0	0	0	0	0
Quebec	3	3	3	4	1	1	3	2	8	3	10
Ontario	11	3	5	7	8	15	3	0	4	2	8
Manitoba	4	3	5	1	7	0	7	2	3	3	8
Saskatchewan	5	4	2	2	6	5	7	2	2	2	9
Alberta	8	5	8	4	7	5	5	6	6	5	2
British Columbia	5	3	3	4	3	1	4	6	1	7	5
Northwest	0	0	0	0	0	0	0	0	0	0	0
Number of public	n/a	17,425	16,718	16,413	16,229	16,113	15,950	15,724	15,656	16,524	16,447
Newfoundland &	n/a	5	5	5	5	5	5	5	5	4	5
Nova Scotia	n/a	180	180	180	180	182	182	182	182	181	181
New Brunswick	n/a	347	340	340	340	342	343	344	344	471	472
Quebec	n/a	1,958	1,964	1,966	1,968	1,967	1,921	1,902	1,902	1,694	1,693
Ontario	n/a	4,312	3,996	3,915	3,884	3,792	3,782	3,743	3,728	4,126	4,131
Manitoba	n/a	2,027	2,003	2,002	1,939	1,929	1,914	1,862	1,858	2,046	2,006
Saskatchewan	n/a	4,065	3,933	3,710	3,656	3,652	3,597	3,509	3,504	3,607	3,573
Alberta	n/a	3,009	2,786	2,783	2,777	2,767	2,731	2,724	2,707	2,881	2,894
British Columbia	n/a	1,507	1,485	1,486	1,454	1,451	1,449	1,432	1,404	1,498	1,476
Northwest	n/a	15	26	26	26	26	26	21	22	16	16

Data extracted February 18, 2019.

Federally regulated railway occurrences.

a. Includes crossing accidents on main-track or on spurs.

b. The source for million main-track (i.e., non-yard) train-miles is Transport Canada. Data is estimated.

c. Source: Transport Canada IRIS database. The data for 2018 was provided on March 27, 2019. Figures for previous years are

Table 9
Trespasser accidents by province
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Trespasser accidents	71	71	81	66	71	56	54	50	70	80	69
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	1	0	0	0	0	1	1	0
New Brunswick	2	3	1	2	1	0	0	1	1	0	0
Quebec	12	12	13	8	11	7	6	5	3	12	12
Ontario	37	35	35	32	31	30	21	23	25	36	31
Manitoba	4	1	3	1	2	2	2	1	4	4	3
Saskatchewan	3	4	3	2	6	2	2	4	3	1	1
Alberta	6	4	9	7	9	7	10	4	11	8	10
British Columbia	6	12	17	13	11	8	13	12	22	18	12
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0	0
Fatal accidents	45	52	53	43	43	42	31	30	46	52	34
Fatalities	45	52	55	43	44	42	32	30	47	53	34
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	0	0	0	0	0	0	2	1	0
New Brunswick	2	3	0	1	1	0	0	1	0	0	0
Quebec	9	7	10	6	8	4	2	5	2	9	7
Ontario	24	30	27	26	18	26	15	13	19	26	14
Manitoba	2	1	2	1	2	2	1	1	2	1	2
Saskatchewan	2	2	2	1	4	2	1	1	2	1	0
Alberta	3	3	6	2	6	4	5	3	5	5	4
British Columbia	3	6	8	6	5	4	8	6	15	10	7
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0	0
Serious injuries	20	15	19	21	22	10	21	17	20	22	30
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	0	0	0	0	0	0	0	0
New Brunswick	0	0	0	1	0	0	0	0	1	0	0
Quebec	0	3	4	2	2	3	4	0	1	3	5
Ontario	12	5	5	6	13	3	6	8	6	8	13
Manitoba	2	0	1	0	0	0	1	0	2	2	1
Saskatchewan	1	1	1	1	0	0	0	4	1	0	1
Alberta	2	1	3	4	2	1	4	1	4	2	6
British Columbia	2	5	5	7	5	3	6	4	5	7	4
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0	0

Data extracted February 18, 2019.
 Federally regulated railway occurrences.

Table 10
Reportable incidents (incident type, assigned factors)
2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Reportable incidents	216	209	188	233	238	224	408	371	302	235	283
Main-track train derailments - 1-2 cars* (no	n/a	n/a	n/a	n/a	n/a	n/a	2	3	6	3	4
Non-main-track train collisions* (no	n/a	n/a	n/a	n/a	n/a	n/a	8	4	4	2	2
Non-main-track train derailments - 1-2	n/a	n/a	n/a	n/a	n/a	n/a	166	125	97	67	94
Dangerous goods leaker**	64	78	68	79	93	94	63	33	7	0	0
Main-track switch in abnormal position	13	4	5	10	5	7	6	12	7	12	7
Movement exceeds limits of authority	111	106	101	118	120	98	129	142	133	122	137
Uncontrolled movement of rolling stock	16	13	5	16	13	14	11	14	10	14	15
Signal less restrictive than required	3	1	4	3	1	1	2	5	1	1	2
Unprotected overlap of authorities	7	7	4	7	5	4	5	6	4	2	11
Crew member incapacitated	2	0	1	0	1	6	2	2	1	4	5
Derailment involving track unit (no	n/a	n/a	n/a	n/a	n/a	n/a	7	10	13	5	5
Rolling Stock collision with abandoned	n/a	n/a	n/a	n/a	n/a	n/a	1	5	5	0	1
Rolling Stock collision with object (no	n/a	n/a	n/a	n/a	n/a	n/a	6	10	14	3	0
Total assigned factors	225	214	195	240	245	229	425	392	325	245	272
Dangerous goods leaker	61	77	68	78	92	92	61	32	9	0	0
Equipment	5	2	2	1	2	4	13	8	10	9	8
Individual/Personal	3	0	0	0	1	4	1	3	0	3	4
Track	2	2	1	5	2	2	25	36	30	7	11
Actions	148	131	114	144	139	116	250	264	241	191	192
Failure to protect	55	34	35	55	38	33	95	94	88	73	86
Failure to secure	10	7	4	11	4	7	5	11	4	9	1
Failure to use equipment properly	3	4	3	5	1	9	30	25	34	20	16
Inadequate/Inappropriate communication	6	8	8	11	14	8	18	13	14	8	12
Lap of authority	65	72	59	59	75	54	83	98	82	74	67
Vandalism	1	3	1	2	5	1	4	6	6	1	2
Other actions	8	3	4	1	2	4	15	17	13	6	8
Other assigned factors	6	2	10	12	9	11	75	49	35	35	57
Incidents by number of assigned factors	216	209	188	233	238	224	408	371	302	235	283
One factor assigned	206	204	181	226	230	220	392	357	280	225	264
More than one factor assigned	9	5	7	7	7	4	16	14	21	9	4
No factor assigned	1	0	0	0	1	0	0	0	1	1	15

Data extracted February 18, 2019.

Federally regulated railway occurrences.

TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. Occurrences are normally only Some factors are assigned by highest category (e.g. Actions), therefore the breakdowns may not sum up to the category total.

*New TSB regulations came into effect on July 1, 2014. The TSB has reviewed derailments and collisions back to January 1, 2014 and

** TSB Regulations have been harmonized with Section 8.4 of the Transportation of Dangerous Goods Regulations, under which TSB DG

Definitions

The following definitions apply to rail transportation 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 which results in any of the events listed in subsection 8.4(2) of the Transportation of Dangerous Goods Regulations, under which TSB DG leaker incidents are only reportable if they result in death or serious injury, evacuation, or the closure of a DG loading facility, a road, a main railway line, or a main waterway.
- Derailment or non-main track collision (involving one to two cars) occurs without damage or injury

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. 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 one 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.