

Foreword

This document provides users of Canadian railway safety data with an annual summary of selected statistics on rail occurrences. It covers federally regulated railways only. Provincial data reported to the TSB are not included in this report.

Users of these statistics are advised that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics can change slightly over time. Further, as many occurrences are not formally investigated, information recorded on some occurrences may not have been verified. Therefore, caution should be used when utilizing these statistics. The 2008 statistics presented here reflect the TSB database updated as of 13 May 2009.

To enhance awareness and increase the safety value of the material presented in the TSB Statistical Summary, Railway Occurrences 2008, readers are encouraged to copy or reprint in whole, or in part, for further distribution of the data presented (with acknowledgement of the source).

The TSB is an independent agency operating under its own Act of Parliament. Its sole aim is the advancement of transportation safety.

Comments on this document can be forwarded to the following address:

Transportation Safety Board of Canada
Communications Division
Place du Centre
200 Promenade du Portage
4th Floor
Gatineau, Quebec
K1A 1K8

Telephone: (819) 994-3741
Facsimile: (819) 997-2239
E-mail: communications@bst-tsb.gc.ca

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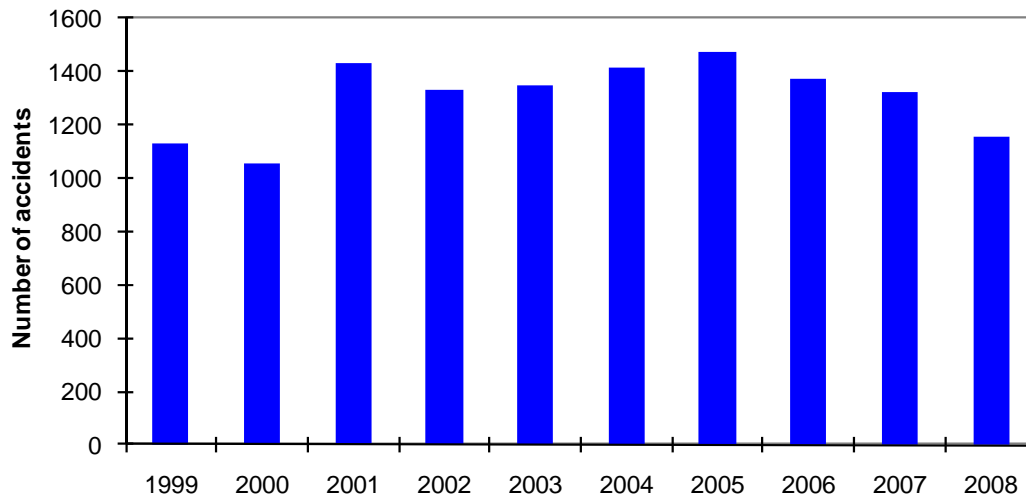
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ACCIDENTS

Overview of Accidents and Casualties (Tables 1 to 3 - Appendix A)

In 2008, 1,159 rail accidents¹ were reported to the TSB (Figure 1), a 12% decrease from the 2007 total of 1,323 and a 16% decrease from the 2003-2007 average of 1,387.

Figure 1 - Rail Accidents, 1999-2008



Freight trains accounted for 78% of all trains involved in rail accidents in 2008, followed by single cars/cuts of cars and passenger trains in proportions of 7% and 6% respectively.

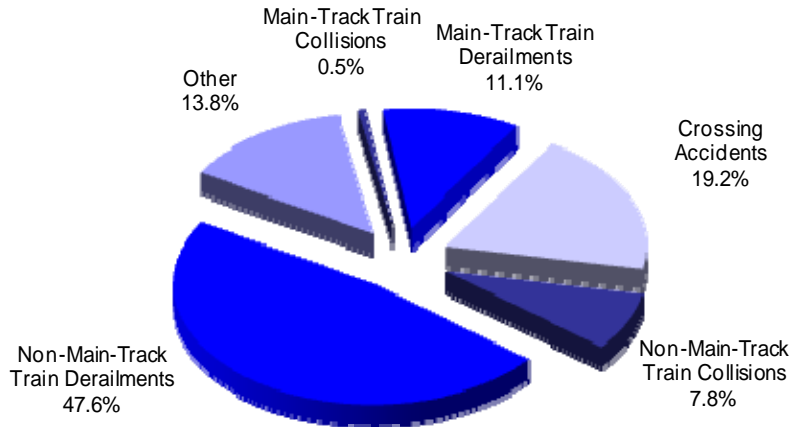
The largest proportion of reported rail accidents are non-main-track related. In 2008, these accounted for more than half of the total (Figure 2). Typically, most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

Main-track derailments and collisions accounted for 12% of all accidents in 2008, down from 19% in the previous year.

In 2008, 19% of rail accidents involved vehicles or pedestrians at highway-rail crossings, down from 9% over the previous five years.

¹ Refer to Appendix B for a definition of reportable railway accident.

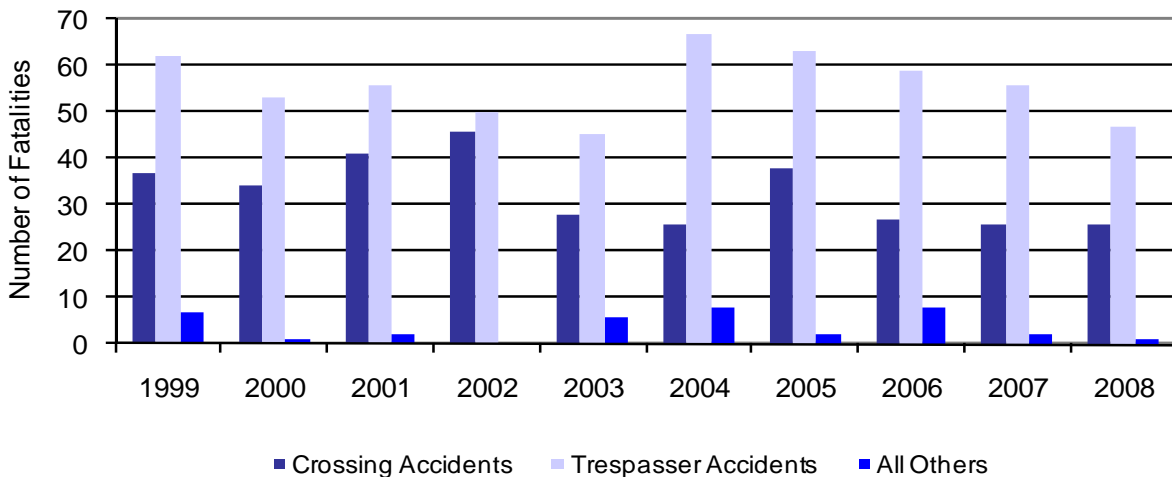
Figure 2 - Rail Accidents by Type, 2008



In 2008, 149 accidents involved dangerous goods (either rail cars or road vehicles carrying or having recently carried dangerous goods), down from the 2007 total of 190, and also down from the five-year average of 204. Of these, 78% were non-main-track accidents. Two accidents resulted in a dangerous goods release, down from the 2007 total of three, and also down from the five-year average of six.

Rail fatalities totalled 74 in 2008, down from 84 in 2007 and the five-year average of 92. Of the rail fatalities, trespasser² fatalities was the largest fatality category with 47 in 2008, down 19% from the last five-year average (Figure 3). Crossing fatalities totalled 26 in 2008, unchanged from the last year and down 10% from the five-year average of 29. In 2008, one employee was fatally injured, down from the five-year average of three.

Figure 3 - Fatalities by Type of Occurrence, 1999-2008



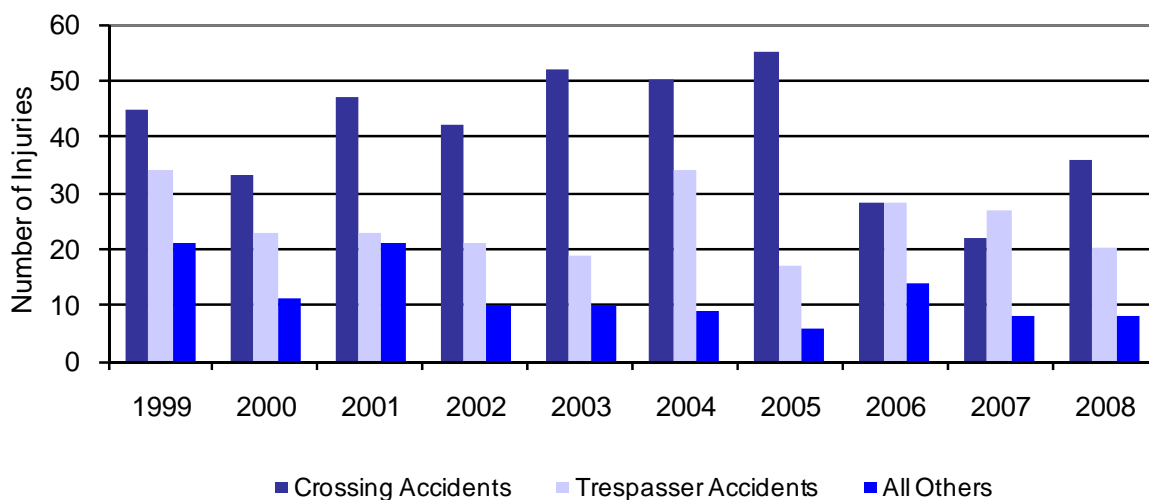
A total of 64 serious injuries resulted from rail occurrences in 2008 (Figure 4), up from 57 in 2007 and down from the five-year average of 76. Trespasser injuries totalled 20 in 2008, down 26% from the 2007 total of 27 and down 20% from the five-year average of 25. Crossing accidents³ resulted in 36 injuries, up from 22 in

² 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.

³ Crossing accident is when a railway rolling stock is involved in a grade-crossing collision with a motor vehicle or pedestrian, resulting in death, serious

2007 and down from the five-year average of 41. The remaining eight injuries occurred in other types of accidents.

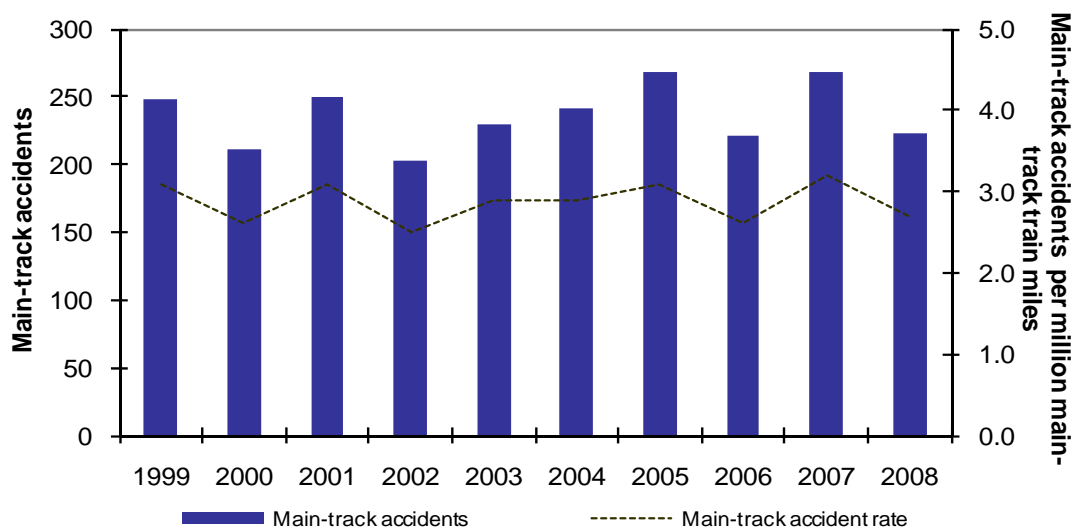
Figure 4 - Serious Injuries by Type of Occurrence, 1999-2008



Accidents By Type (Tables 4a to 9)

Main-track accidents: The number of main-track accidents (accidents other than crossing and trespasser accidents which occur on main-track or spurs) totaled 223 in 2008 (Figure 5), down from 268 in 2007 and from the five-year average of 246. Rail activity on main-track decreased by 2%⁴ from the previous year, and the main-track accident rate decreased 16%, from 3.2 main-track accidents per million main-track train-miles in 2007 to 2.7 in 2008.

Figure 5 - Main-Track Accidents and Accident Rates, 1999-2008



injury, or property damage.

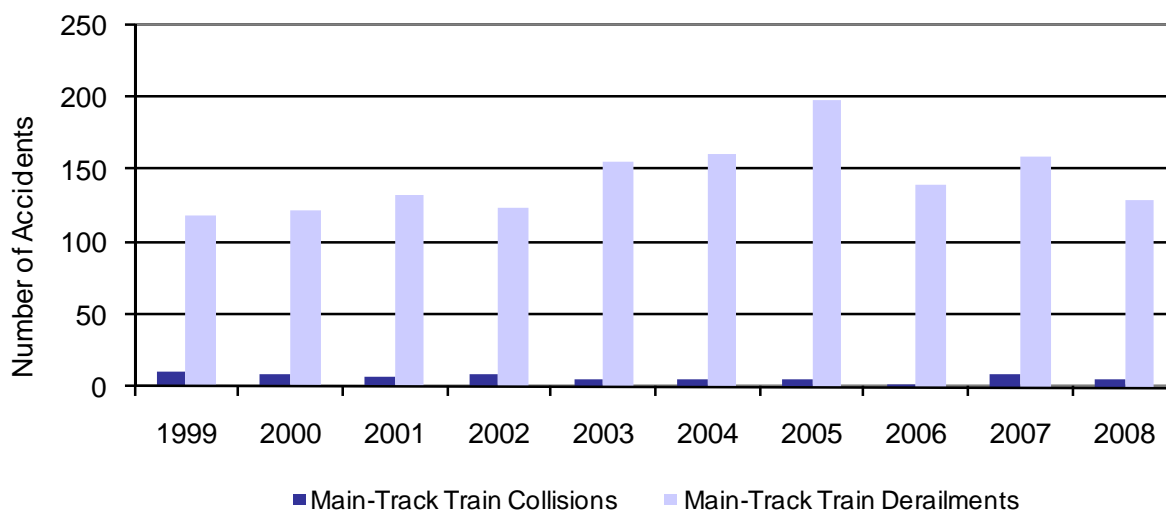
⁴ As provided to TSB by the Strategic Information Branch of Transport Canada.

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

There were six main-track collisions in 2008, down two from the 2007 total (Figure 6) and up 11% from the five-year average of five. No fatalities or serious injuries resulted from main-track collisions in 2008, and none resulted in the release of dangerous goods.

A total of 129 main-track derailments were reported in 2008, a 19% decrease from the 2007 total of 159 and a 21% decrease from the five-year average of 162. The number of main-track derailments per million main-track train-miles decreased to 1.56 in 2008 compared to 1.88 recorded in 2007 and the five-year average of 1.93.

Figure 6 - Main-Track Collisions and Derailments, 1999-2008



No fatalities or serious injuries resulted from main-track derailments in 2008.

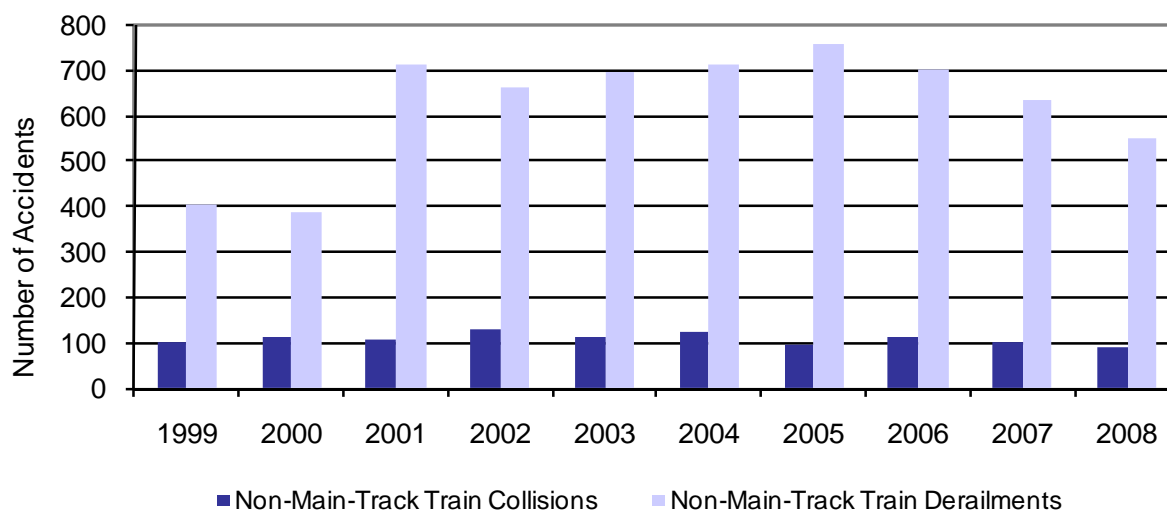
In 2008, 23 main-track derailments involved dangerous goods, down from 35 in 2007 and down from the five-year average of 32. None of these resulted in a release of dangerous goods.

In 2008, 28% of assigned factors⁵ for main-track derailments were equipment-related compared to 34% in 2007 and the five-year average of 35%. Track-related represents 39% of assigned factors in 2008, compared to 32% in 2007 and 37% for the five-year average.

Non-main-track accidents: Non-main-track collisions totalled 90 in 2008, down from 102 in 2007 (Figure 7) and down from the five-year average of 109. Derailments occurred in 64% of non-main-track collisions, and 59% of these non-main-track collisions involved the derailment of one or two cars.

⁵ Occurrences are normally only reported to TSB with one assigned factor. Since multiple factors can contribute to an occurrence, the TSB may assign additional factors to an occurrence.

Figure 7 - Non-Main-Track Collisions and Derailments, 1999-2008



No fatalities or serious injuries resulted from non-main-track collisions in 2008.

Dangerous goods were involved in 37% of non-main-track collisions, none of which resulted in a release of product.

Factors assigned to non-main-track collisions are mostly rules-related (73%) (e.g., non-compliance with prescribed procedures). Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often as a factor.

There were 552 non-main-track derailments in 2008 (Figure 7), down 13% from last year and down 21% from the five-year average of 700. 74% of these accidents involved the derailment of one or two cars.

No fatalities or serious injuries resulted from non-main-track derailments in 2008.

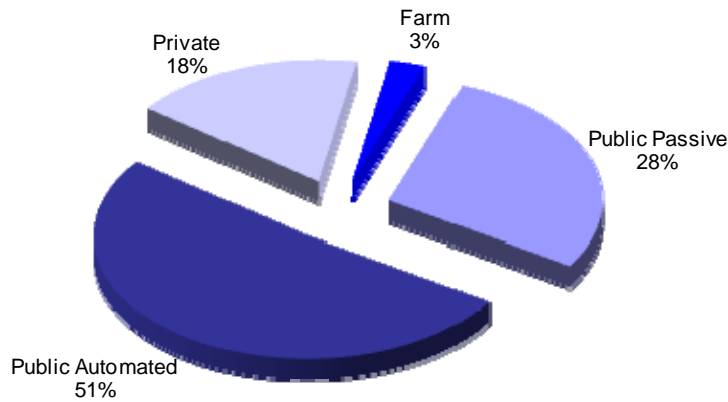
Dangerous goods cars were involved in 15% of non-main-track derailments, but none resulted in a release of dangerous goods.

In 2008, there was a 13% decrease in rules-related factors (e.g., non-compliance with prescribed procedures) assigned to non-main-track derailments compared to the five-year average; as well as, a 4% decrease in track-related factors assigned. Factors assigned in an accident are considered to have acted in combination to contribute to the occurrence.

Crossing accidents: Crossing accidents represent one of the most serious types of rail accidents in terms of casualties; typically, 25% result in either serious or fatal injuries. Although crossing accidents do not usually result in substantial damage to railway property or equipment, the motor vehicles involved are usually heavily damaged or destroyed.

There were 222 crossing accidents in 2008, up from 221 recorded in 2007 but down from the five-year average of 245. Accidents at public automated crossings (114) increased 8% from the 2007 total of 106 and decreased 10% from the five-year average of 127. Accidents at public passive crossing (63) decreased 15% from the 2007 total of 74. Accidents at private crossings decreased 3% from the five-year average of 40. The proportion of crossing accidents that occurred at public automated crossings in 2008 increased 3% from 2007 to 51% (Figure 8). Although there are nearly twice as many public passive crossings as public automated ones, the higher number of accidents occurring at automated crossings is due in part to higher vehicle and train traffic volumes at these crossings.

Figure 8 - Crossing Accidents by Type of Crossing, 2008

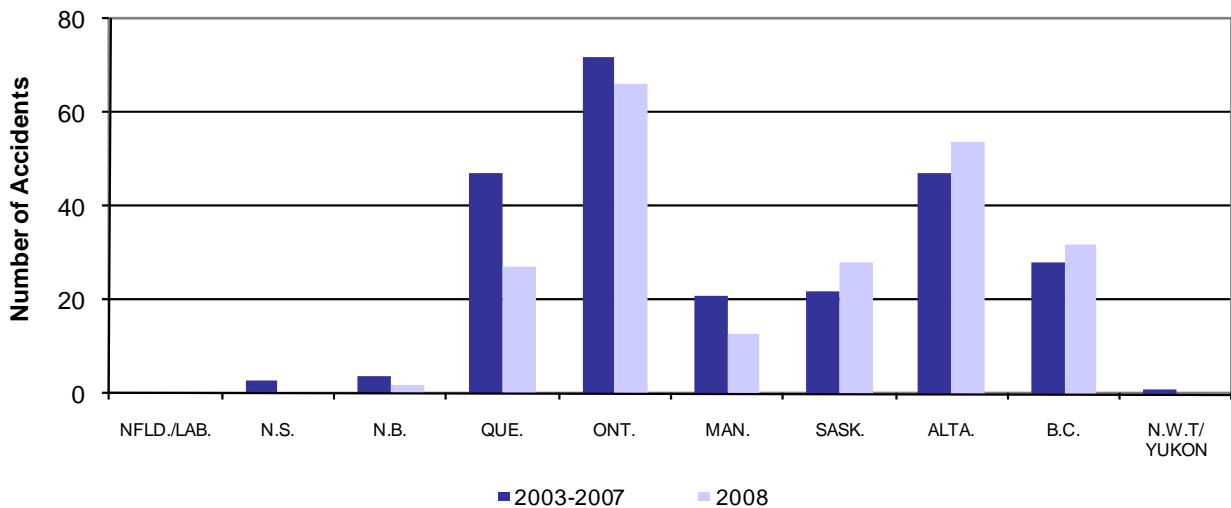


There were 24 fatal crossing accidents in 2008, up from 23 in 2007 and down from the five-year average of 26. Although crossing accidents involving pedestrians accounted for only 7% of crossing accidents in 2008, they accounted for 38% of fatal crossing accidents. Crossing-related fatalities totaled 26 in 2008, the same as the 2007 total and a decrease of 10% from the five-year average of 29.

In 2008, 6 crossing accidents resulted in derailments, the same as the 2007 total, but down from the five-year average of 7. Although heavy vehicles (e.g., dump trucks, tractor trailers) were involved in 17% of crossing accidents in 2008, they were involved in 67% of those resulting in a derailment.

Crossing accidents in Quebec, Ontario and Manitoba were lower than their respective five-year averages (Figure 9), while accidents in Saskatchewan, Alberta, and British Columbia showed an increase.

Figure 9 - Crossing Accidents by Province

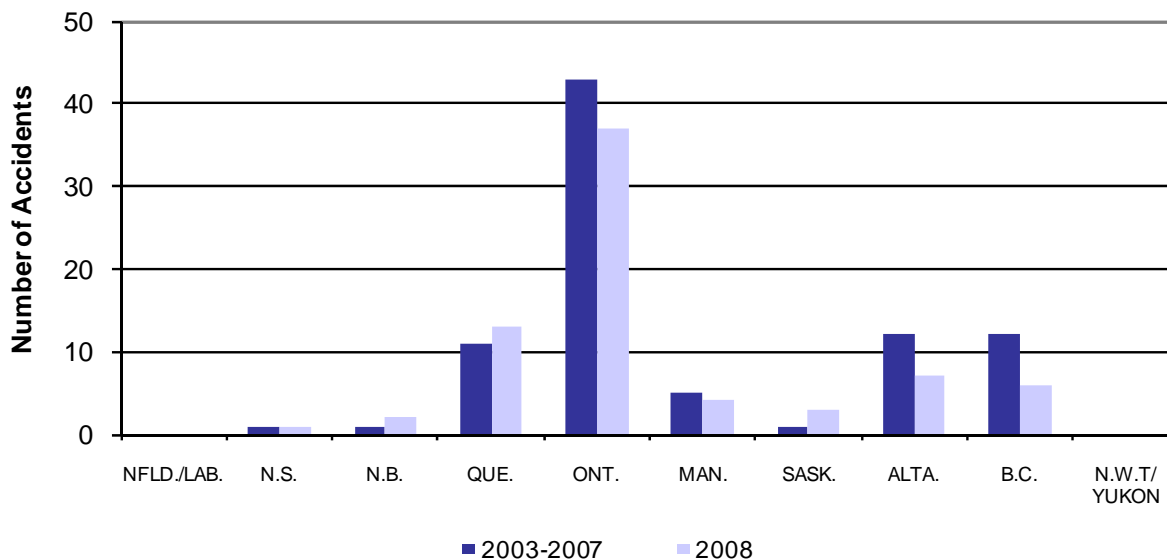


Trespasser accidents: Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock other than at railway crossings. They totaled 73 in 2008, down from the 2007 total of 101 and down from the five-year average of 88.

In 2008, Ontario represented 51% of trespasser accidents with a total of 37, Quebec represented 18%, Alberta 10% and British Columbia 8% of all trespasser accidents.

In 2008, the proportion of fatal trespasser accidents (64%) was lower than the five-year average of 70%. In addition, the proportion of trespasser accidents resulting in serious injuries (26%) was lower than the five-year average of 30%.

Figure 10 - Trespasser Accidents by Province



INCIDENTS

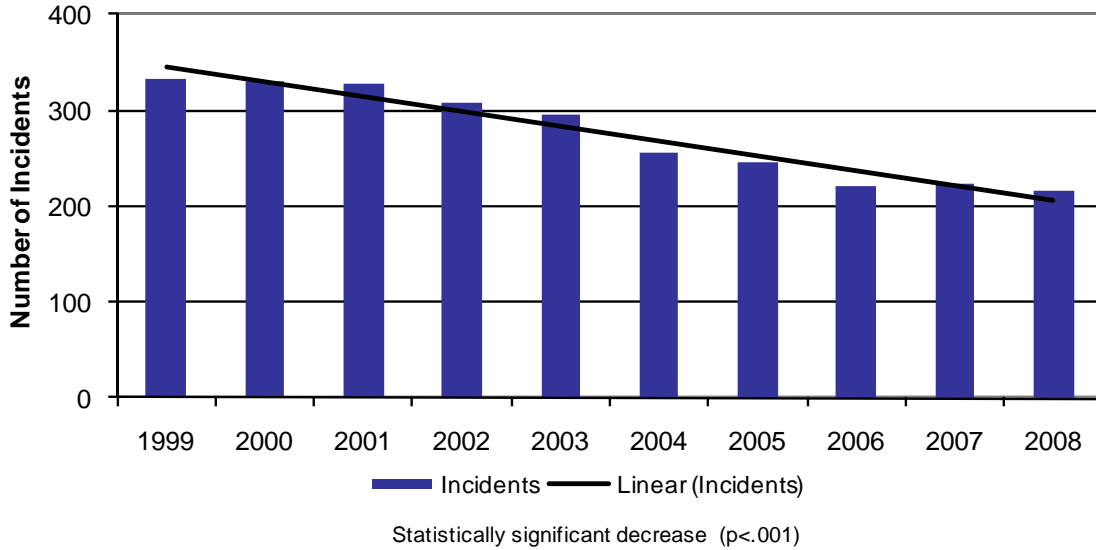
Overview of Incidents (Tables 10 and 11)

In 2008, there were 216 reported rail incidents, down from 223 in 2007 and down from the five-year average of 248.

There has been a significant downward trend ($p < .001$)⁶ of reported railway incidents over the last 10 years (Figure 11), due mainly to the considerable decrease in the number of reported dangerous goods (DG) leaker incidents.

⁶ It is agreed by convention that, for a result to be considered statistically significant, its probability must be lower than 1 in 20 (i.e. $p < .05$).

Figure 11 - Rail Incidents, 1999-2008

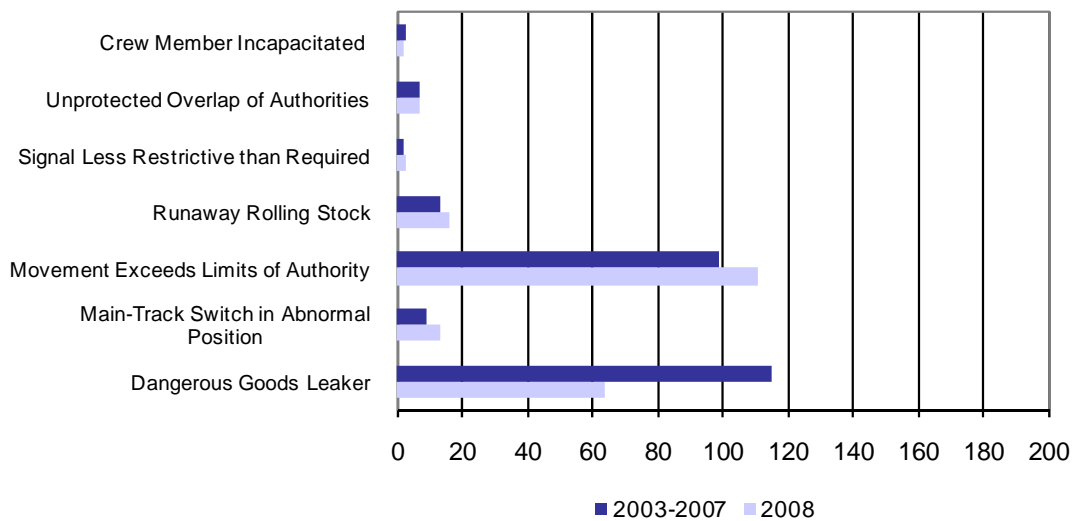


DG leaker incident involves the unintentional release of a hazardous material while in transportation and does not involve an accident. The vast majority of these incidents involve small quantities of products. In 1999, DG leaker incidents represented 50% of all incidents. In 2008, DG leaker incidents accounted for 30% of reported rail incidents, which is a 27% decrease from the 2007 total of 88 and a 44% decrease from the five-year average of 115 (Figure 12).

In 2008, there were 111 incidents where the movement exceeded the limit of authority⁷, compared to 106 in 2007 and the five-year average of 99.

Factors assigned in non-dangerous goods incidents were primarily operational or rules-related, most frequently involving an overlap of authorities or a failure to protect.

Figure 12 - Rail Incidents by Type



⁷ Movement exceeds limits of authority is when a train or track unit movement occupies a main track (including signalled sidings, signalled yard tracks and station tracks) or portion thereof without the required authorization.

APPENDIX A - RAIL OCCURRENCE TABLES

Table 1
Railway Occurrences¹ and Casualties
1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Accidents										
Main-Track Train Collisions	10	9	7	9	6	5	6	2	8	6
Main-Track Train Derailments - 1-2 cars ²	64	54	71	66	83	96	102	83	76	67
Main-Track Train Derailments - 3 or more cars ²	55	68	61	58	73	64	96	56	83	62
Crossing Accidents	283	265	280	263	251	237	270	246	221	222
Non-Main-Track Train Collisions	100	113	108	131	111	123	98	110	102	90
Non-Main-Track Train Derailments - 1-2 cars ²	268	270	533	482	525	562	588	567	456	409
Non-Main-Track Train Derailments - 3 or more cars ²	135	117	181	182	170	151	170	136	175	143
Collisions/Derailments Involving Track Units	27	16	19	11	23	26	19	17	31	27
Employee/Passenger Accidents	13	13	8	8	6	12	8	15	18	12
Trespasser Accidents	95	78	80	73	65	99	82	91	101	73
Fires/Explosions	53	32	36	25	23	15	17	25	25	12
Other	26	19	48	26	16	23	20	24	27	36
Total	1129	1054	1432	1334	1352	1413	1476	1372	1323	1159
Reportable Incidents										
Dangerous Goods Leaker	167	188	194	167	151	131	123	83	88	64
Main-Track Switch in Abnormal Position	15	17	9	9	11	12	10	7	7	13
Movement Exceeds Limits of Authority	115	102	101	99	102	95	91	101	106	111
Runaway Rolling Stock	15	9	10	18	13	11	16	12	13	16
Other	21	14	15	15	18	8	5	18	9	12
Total	333	330	329	308	295	257	245	221	223	216
Million Main-Track Train-Miles (MMTTM)³										
	78.8	80.1	79.9	81.3	80.6	82.6	85.8	86.9	84.5	82.8
Main-Track Accidents⁴/MMTTM										
	3.1	2.6	3.1	2.5	2.9	2.9	3.1	2.6	3.2	2.7
Accidents Involving Dangerous Goods										
Main-Track Train Derailments	19	30	17	25	38	37	32	18	35	23
Crossing Accidents	8	12	7	6	3	11	15	4	6	4
Non-Main-Track Train Collisions	48	50	40	48	37	44	44	41	41	33
Non-Main-Track Train Derailments	133	149	128	129	139	106	112	109	100	83
All Others	16	8	13	13	8	10	9	11	8	6
Total	224	249	205	221	225	208	212	183	190	149
Accidents with a Dangerous Goods Release										
	9	7	5	5	9	7	7	4	3	2
Fatalities										
Crossing Accidents	37	34	41	46	28	26	38	27	26	26
Trespasser Accidents	62	53	56	50	45	67	63	59	56	47
All Others	7	1	2	0	6	8	2	8	2	1
Total	106	88	99	96	79	101	103	94	84	74
Serious Injuries										
Crossing Accidents	45	33	47	42	52	50	55	28	22	36
Trespasser Accidents	34	23	23	21	19	34	17	28	27	20
All Others	20	11	21	10	10	9	6	14	8	8
Total	99	67	91	73	81	93	78	70	57	64

¹ For federally-regulated railways only.

² Data from 2001 to 2007 have been adjusted in light of clarifications to industry of TSB's reporting requirements.

³ Main-track train-miles are estimated. (Source: Railways Annual Reports submitted to Transport Canada.)

⁴ Accidents which occurred on main-track or spurs, excluding crossing and trespasser accidents.

Table 2**Fatalities and Serious Injuries by Type of Occurrence and Person Type
1999-2008**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Main-Track Train Collisions										
Fatalities	0	0	0	0	0	1	0	0	0	0
Serious Injuries	0	0	0	2	0	0	0	0	0	0
Main-Track Train Derailments										
Fatalities	4	0	0	0	2	2	0	3	0	0
Serious Injuries	6	1	9	0	2	0	0	2	0	0
Crossing Accidents										
Fatalities	37	34	41	46	28	26	38	27	26	26
Serious Injuries	45	33	47	42	52	50	55	28	22	36
Non-Main-Track Train Collisions										
Fatalities	0	0	1	0	0	0	0	0	0	0
Serious Injuries	2	0	0	0	0	0	0	0	0	0
Non-Main-Track Train Derailments										
Fatalities	0	0	1	0	1	0	0	0	0	0
Serious Injuries	0	0	0	0	0	0	1	0	0	0
Coll./Derail. Involving Track Units										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	1	0	0	0	0	1	0	0	0
Employee/Passenger Accidents										
Fatalities	3	1	0	0	1	5	2	4	1	1
Serious Injuries	10	8	8	6	3	7	4	9	8	7
Trespasser Accidents										
Fatalities	62	53	56	50	45	67	63	59	56	47
Serious Injuries	34	23	23	21	19	34	17	28	27	20
Fires/Other										
Fatalities	0	0	0	0	0	0	0	0	1	0
Serious Injuries	0	0	1	0	1	0	0	0	0	0
Dangerous Goods Leaker										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	0	0	0	1	0	0	1	0	0
Other Incidents										
Fatalities	0	0	0	0	2	0	0	1	0	0
Serious Injuries	2	1	3	2	3	2	0	2	0	1
Fatalities by Person Type										
Employees	7	1	2	0	6	6	2	6	1	1
Passengers	0	0	0	0	0	0	0	2	0	1
Pedestrians	7	8	6	10	6	4	11	9	11	13
Vehicle Occupants	30	28	34	38	23	23	28	15	18	14
Trespassers	61	51	56	48	44	68	62	60	54	43
Other Persons	1	0	1	0	0	0	0	2	0	2
Total	106	88	99	96	79	101	103	94	84	74
Serious Injuries by Person Type										
Employees	18	10	16	10	11	9	6	14	9	11
Passengers	7	1	7	0	0	0	1	1	0	1
Pedestrians	5	7	5	6	6	2	3	5	6	3
Vehicle Occupants	38	27	42	36	44	48	51	24	18	30
Trespassers	32	21	20	21	20	32	17	25	24	19
Other Persons	0	1	1	0	0	2	0	1	0	0
Total	100	67	91	73	81	93	78	70	57	64

Table 3
Rail Accidents by Train Type¹
1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Freight Train										
Main-track train collisions	15	13	9	16	10	7	6	2	12	9
Main-track train derailments	109	114	125	123	153	149	189	134	155	118
Non-main-track train collisions	132	121	101	133	104	119	88	117	96	99
Non-main-track train derailments	367	327	348	319	339	413	486	447	476	479
Crossing	240	229	245	235	221	194	220	200	181	186
Trespasser	70	49	56	44	47	73	58	70	69	50
Other	82	54	55	45	41	36	32	49	58	51
Total	1015	907	939	915	915	991	1079	1019	1047	992
Passenger Train										
Main-track train collisions	2	1	1	0	1	1	0	0	0	2
Main-track train derailments	8	3	5	0	2	3	5	3	0	3
Non-main-track train collisions	0	0	0	0	8	5	4	1	4	3
Non-main-track train derailments	3	4	8	7	11	10	10	10	8	16
Crossing	31	19	26	23	18	33	38	34	28	24
Trespasser	23	28	23	29	18	25	23	18	32	21
Other	8	8	13	8	1	3	4	6	11	10
Total	75	63	76	67	59	80	84	72	83	79
Track Unit										
Main-track train collisions	0	0	0	0	0	0	0	0	0	0
Main-track train derailments	0	0	0	0	0	0	0	0	0	0
Non-main-track train collisions	0	0	0	0	1	0	0	0	0	0
Non-main-track train derailments	1	0	1	0	0	0	0	0	0	0
Crossing	7	5	5	1	5	8	8	7	3	6
Trespasser	1	0	1	0	0	1	0	1	0	0
Other	38	22	28	17	35	46	33	33	47	44
Total	47	27	35	18	41	55	41	41	50	50
Single car/Cut of cars										
Main-track train collisions	0	0	0	0	0	0	0	0	0	0
Main-track train derailments	2	2	1	2	1	0	2	1	3	2
Non-main-track train collisions	42	55	35	51	49	61	49	63	61	49
Non-main-track train derailments	20	17	23	22	32	20	35	73	76	31
Crossing	0	1	0	1	0	0	0	1	1	1
Trespasser	1	0	0	0	0	0	0	0	0	0
Other	8	5	10	5	10	12	8	6	4	4
Total	73	80	69	81	92	93	94	144	145	87
Other²										
Main-track train collisions	0	1	0	0	0	0	1	0	2	0
Main-track train derailments	3	4	1	2	3	8	4	1	4	6
Non-main-track train collisions	3	20	26	26	14	18	12	13	10	8
Non-main-track train derailments	17	42	341	324	322	283	243	182	85	37
Crossing	6	11	4	4	7	2	4	6	10	8
Trespasser	0	1	0	0	0	0	1	2	0	2
Other	5	5	19	5	3	3	6	6	12	3
Total	34	84	391	361	349	314	271	210	123	64

¹ As some accidents may involve more than one train, the number of trains involved may differ from the total number of accidents.

² Category "Other" includes otherwise uncategorized data submitted in June 2007 as a result of clarification to industry of TSB reporting requirements.

Table 4a
Main-Track Train Derailments
1999-2008

By Province

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Newfoundland & Labrador	0	2	3	1	0	0	2	1	1	1
Nova Scotia	3	2	3	1	0	2	0	1	2	1
New Brunswick	0	2	3	0	2	3	3	0	6	1
Quebec	22	15	19	26	27	23	26	21	12	16
Ontario	30	28	37	39	59	52	60	41	39	35
Manitoba	11	17	14	12	6	10	11	9	12	13
Saskatchewan	10	14	12	10	14	15	24	12	18	14
Alberta	16	15	17	16	19	23	29	20	30	30
British Columbia	26	27	24	19	29	32	43	34	39	18
Northwest Territories/Yukon	1	0	0	0	0	0	0	0	0	0
Canada	119	122	132	124	156	160	198	139	159	129
Derailments per MMTM ¹	1.51	1.52	1.65	1.53	1.93	1.94	2.31	1.60	1.88	1.56
Derailments per BGTM ²	0.31	0.30	0.33	0.31	0.38	0.36	0.43	0.30	0.34	

¹ MMTM - Million main-track train-miles (Source: Transport Canada)

² BGTM - Billion gross ton-miles; (Source: Railway Association of Canada)

By Total Number of Derailed Cars per Accident

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Derailed Cars										
1	14	11	15	13	8	15	16	17	14	12
2	8	11	8	4	8	6	9	3	10	6
3	5	6	9	6	5	7	9	0	8	5
4	24	24	22	26	35	22	40	23	26	24
5-10	18	27	22	22	25	29	38	30	39	27
10+	119	122	132	124	156	160	198	139	159	129
Total	188	201	208	195	237	239	310	212	256	203

Table 4b**Main-Track Train Derailments by Assigned Factors¹
1999-2008****Assigned factors**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Environmental	10	0	5	2	5	7	11	8	17	11
Equipment - Total²	40	52	50	62	61	70	83	54	60	41
Axle	15	21	17	18	20	14	21	5	14	11
Brakes	2	7	5	10	6	9	13	8	8	3
Draft System	7	8	6	5	5	13	9	5	9	4
Superstructure	2	7	6	7	6	3	7	6	8	5
Truck	8	2	3	12	13	11	8	8	5	5
Wheel	6	7	13	10	11	18	23	21	16	12
Track - Total²	56	49	50	46	67	71	86	64	56	57
Geometry	32	22	22	26	31	23	34	23	22	22
Object on track	1	2	3	2	1	0	4	2	1	1
Other track material (OTM)	5	3	5	2	1	8	2	4	2	4
Rail	10	19	9	10	21	25	35	25	18	24
Roadbed	6	0	6	1	4	7	2	6	3	4
Switch	0	2	3	1	1	2	2	2	0	2
Turnouts	2	0	2	4	7	3	4	0	6	0
Actions - Total	22	22	34	19	24	23	28	22	19	20
Failure to Protect	6	6	6	3	5	4	4	3	4	8
Failure to Secure	0	0	1	0	0	1	0	0	0	0
Failure to use Equipment Properly	7	6	13	12	11	6	11	6	6	6
Improper Loading/Lifting	1	1	1	1	0	1	0	2	3	1
Improper Placement/Position for Task	2	6	2	1	2	6	5	1	2	0
Inadequate/Inappropriate Maint. of Equipment	3	1	5	1	2	3	4	4	1	3
Operating at Improper Speed	0	1	5	1	3	1	2	4	0	2
Vandalism	2	0	1	0	0	0	0	0	2	0
Other actions	1	1	0	0	1	1	2	2	1	0
Other assigned factors	29	13	7	15	13	17	17	19	25	16
Assigned factors - Total	157	136	146	144	170	188	225	167	177	145

Main-track train derailments by number of assigned factors

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
One factor assigned	103	108	120	108	136	140	174	123	148	118
More than one factor assigned	16	12	10	14	13	18	21	14	9	8
No factor assigned	0	2	2	2	7	2	3	2	2	3
Main-track train derailments - Total	119	122	132	124	156	160	198	139	159	129

¹

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.

²

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

Table 5a
Non-Main-Track Train Collisions
1999-2008

By Province

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	3	0	0	0	0	1
New Brunswick	1	1	2	1	2	1	1	5	1	3
Quebec	19	14	17	19	15	20	17	19	11	5
Ontario	31	42	42	53	47	28	28	25	29	25
Manitoba	13	11	12	14	7	14	11	7	13	9
Saskatchewan	6	4	5	5	10	4	5	8	10	10
Alberta	19	26	17	20	20	33	20	24	23	27
British Columbia	11	14	13	19	7	23	16	21	14	10
Northwest Territories/Yukon	0	0	0	0	0	0	0	1	1	0
Canada	100	113	108	131	111	123	98	110	102	90

By Total Number of Derailed Cars per Accident

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Derailed Cars										
0 ¹	49	55	65	79	68	69	63	56	41	32
1	23	25	22	21	20	26	14	28	23	23
2	13	19	10	16	13	14	12	10	15	11
3	7	7	5	8	1	9	5	7	8	9
4	1	2	3	3	4	2	1	4	8	8
5-10	6	4	3	2	4	3	3	5	5	5
10+	1	1	0	2	1	0	0	0	2	2
Total	100	113	108	131	111	123	98	110	102	90

¹ Number of collisions with no derailment.

Table 5b**Non-Main-Track Train Collisions by Assigned Factors¹
1999-2008**

Assigned factors	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Environmental	2	1	5	3	1	3	4	1	3	1
Equipment	4	1	5	2	6	1	1	1	4	1
Track	4	3	3	5	6	4	10	2	2	4
Actions - Total	64	90	90	111	85	114	83	107	88	69
Failure to Protect	36	48	58	78	62	70	52	64	59	47
Failure to Secure	11	23	21	15	11	30	16	26	17	6
Failure to use Equipment Properly	5	8	6	10	4	8	4	6	5	10
Improper Placement/Position for Task	2	1	0	0	0	1	1	0	0	0
Inadequate/Inappropriate communications	4	2	1	3	3	1	2	2	3	0
Inadequate/Inappropriate Maint. of Equipment	1	0	0	0	1	0	0	1	0	0
Operating at Improper Speed	4	5	2	1	2	3	6	7	4	6
Vandalism	0	0	1	2	1	0	0	1	0	0
Other actions	1	3	1	2	1	1	2	0	0	0
Other assigned factors	60	46	28	31	22	26	20	15	19	20
Assigned factors - Total	134	141	131	152	120	148	118	126	116	95

Non-Main-Track Train Collisions by number of assigned factors

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
One factor assigned	69	86	86	108	98	99	78	93	92	83
More than one factor assigned	31	27	22	22	11	23	19	16	10	4
No factor assigned	0	0	0	1	2	1	1	1	0	3
Non-Main-Track Train Collision - Total	100	113	108	131	111	123	98	110	102	90

¹

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.

Table 6a
Non-Main-Track Train Derailments
1999-2008

By Province

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Newfoundland & Labrador	0	1	0	0	0	0	1	1	0	0
Nova Scotia	3	2	11	21	39	23	13	14	6	3
New Brunswick	15	7	24	26	26	19	16	24	11	16
Quebec	74	69	124	116	140	150	133	117	67	70
Ontario	117	108	239	246	227	227	233	201	164	136
Manitoba	37	38	53	53	63	58	56	52	48	46
Saskatchewan	32	26	56	34	45	57	70	48	68	50
Alberta	64	88	89	81	75	94	125	143	146	109
British Columbia	61	48	118	86	80	85	110	103	120	122
Northwest Territories/Yukon	0	0	0	1	0	0	1	0	1	0
Canada	403	387	714	664	695	713	758	703	631	552

By Total Number of Derailed Cars per Accident

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Derailed Cars										
1	175	177	377	340	372	406	420	397	327	275
2	93	93	156	142	153	156	168	170	129	134
3	44	37	80	70	76	61	60	44	79	56
4	34	22	44	35	34	38	34	40	40	24
5-10	54	53	53	71	57	46	69	44	53	54
10+	3	5	4	6	3	6	7	8	3	9
Total	403	387	714	664	695	713	758	703	631	552

Table 6b**Non-Main-Track Train Derailments by Assigned Factors¹
1999-2008****Assigned factors**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Environmental	15	6	33	14	45	38	32	18	40	44
Equipment - Total²	39	27	53	56	63	71	73	52	52	36
Axle	0	2	2	1	0	0	1	1	3	1
Brakes	5	8	12	11	11	12	21	13	9	11
Draft System	10	5	10	18	11	15	12	8	11	7
Superstructure	1	2	9	9	15	10	11	9	9	7
Truck	12	2	11	9	13	15	13	11	7	4
Wheel	11	8	9	8	12	17	15	10	9	5
Track - Total²	169	166	243	224	205	251	292	282	232	222
Appurtenances	1	1	2	3	1	1	3	2	1	1
Geometry	60	64	93	69	81	91	112	97	98	80
Object on track	5	5	11	1	6	8	8	14	1	6
Other track material (OTM)	14	24	32	25	19	22	21	25	14	8
Rail	22	18	22	30	24	24	24	32	29	30
Roadbed	5	4	7	8	4	13	13	6	7	7
Signals	0	0	1	2	1	1	0	0	1	1
Switch	4	21	38	32	31	42	51	48	34	55
Turnouts	56	26	33	52	35	41	54	48	31	27
Actions - Total	162	196	379	369	347	334	346	329	274	238
Failure to Protect	99	121	195	182	197	176	202	193	178	158
Failure to Secure	4	10	13	16	22	26	22	6	5	8
Failure to use Equipment Properly	18	24	114	123	78	81	84	93	65	43
Improper Loading/Lifting	1	12	5	5	5	1	8	3	0	6
Improper Placement/Position for Task	2	9	10	8	10	8	12	10	6	4
Inadequate/Inappropriate communications	1	2	7	3	2	5	4	4	1	3
Inadequate/Inappropriate Maint. of Equipment	17	6	11	11	4	9	2	5	7	0
Operating at Improper Speed	5	6	10	7	10	10	3	6	4	9
Vandalism	12	6	9	10	12	12	6	7	5	5
Other actions	3	0	5	4	7	6	3	2	3	2
Other assigned factors	121	54	67	43	65	58	49	57	48	20
Assigned factors - Total	506	449	775	706	725	752	792	738	646	560

Non-Main-Track train derailments by number of assigned factors

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
One factor assigned	313	324	656	612	621	643	698	631	599	520
More than one factor assigned	90	59	54	42	50	50	46	50	23	20
No factor assigned	0	4	4	10	24	20	14	22	9	12
Non-Main-Track train derailment- Total	403	387	714	664	695	713	758	703	631	552

¹ 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.

²

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

Table 7
Crossing Accidents and Casualties by Type of Crossing and Protection
1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Accidents											
Public Crossings ¹											
Total Passive Warnings	(11.722)	97	84	77	95	72	63	71	81	74	63
Flashing Lights & Bells	(3.526)	91	95	100	88	85	75	103	72	64	73
Gates	(2.116)	36	42	43	39	50	42	53	36	36	39
Other Automated Warnings	(61)	0	2	1	0	1	0	3	8	6	2
Total Automated Warnings	(5.703)	127	139	144	127	136	117	159	116	106	114
Sub-total	(17.425)	224	223	221	222	208	180	230	197	180	177
Private Crossings		49	37	48	33	36	51	34	46	34	39
Farm Crossings		10	3	8	5	6	4	5	2	5	6
Total		283	263	277	260	250	235	269	245	219	222
Fatal Accidents											
	32	31	35	41	24	22	35	24	23	24	
Fatalities											
Public Crossings											
Total Passive Warnings	19	10	14	16	8	6	7	8	5	5	
Flashing Lights & Bells	5	12	11	14	9	10	13	9	8	9	
Gates	10	10	10	13	7	8	12	7	9	11	
Other Automated Warnings	0	0	0	0	0	0	0	0	1	0	
Total Automated Warnings	15	22	21	27	16	18	25	16	18	20	
Sub-total	34	32	35	43	24	24	32	24	23	25	
Private Crossings	3	1	5	3	2	0	4	3	3	0	
Farm Crossings	0	0	1	0	2	0	1	0	0	1	
Total	37	33	41	46	28	24	37	27	26	26	
Serious Injuries											
Public Crossings											
Total Passive Warnings	13	6	12	18	15	15	9	9	14	12	
Flashing Lights & Bells	21	16	20	13	23	21	23	11	4	16	
Gates	6	7	6	6	8	11	15	6	3	2	
Other Automated Warnings	0	0	0	0	0	0	1	0	0	0	
Total Automated Warnings	27	23	26	19	31	32	39	17	7	18	
Sub-total	40	29	38	37	46	47	48	26	21	30	
Private Crossings	5	3	7	5	6	3	6	2	1	4	
Farm Crossings	0	1	2	0	0	0	1	0	0	2	
Total	45	33	47	42	52	50	55	28	22	36	

¹ Figures in brackets denote the number of public grade crossings for federally-regulated railways in Canada by warning type as of November 2009.

(There are approximately 3,500 private and farm crossings in Canada.) (Source: Transport Canada.)

Table 8
Crossing Accidents and Related Casualties by Province
1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Accidents¹											
Newfoundland & Labrador	(5)	0	0	0	0	0	0	1	1	0	0
Nova Scotia	(180)	7	3	10	1	2	2	5	4	3	0
New Brunswick	(347)	5	2	8	1	9	2	3	2	2	2
Quebec	(1,958)	51	45	43	44	36	63	57	39	40	27
Ontario	(4,312)	94	88	80	78	80	69	92	67	52	66
Manitoba	(2,027)	19	22	25	36	28	19	18	20	20	13
Saskatchewan	(4,065)	30	32	29	24	24	16	19	26	23	28
Alberta	(3,009)	52	45	54	55	38	38	56	56	48	54
British Columbia	(1,507)	24	28	30	24	33	26	18	31	33	32
Northwest Territories/Yukon	(15)	1	0	1	0	1	2	1	0	0	0
Canada	(17,425)	283	265	280	263	251	237	270	246	221	222
Crossing Accidents per MMTM ²	3.59	3.31	3.51	3.24	3.11	2.87	3.15	2.83	2.62	2.68	
Crossing Accidents with Derailment	8	9	12	9	4	9	12	4	6	6	
Fatalities											
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0	
Nova Scotia	0	1	2	0	0	0	0	0	0	0	
New Brunswick	0	0	0	0	0	0	1	0	0	0	
Quebec	6	9	4	9	4	10	8	7	1	6	
Ontario	20	12	17	15	15	12	16	12	12	12	
Manitoba	2	2	3	5	2	1	2	2	1	2	
Saskatchewan	1	5	8	3	4	1	2	1	2	3	
Alberta	5	3	5	10	3	2	6	4	5	2	
British Columbia	3	2	2	4	0	0	3	1	5	1	
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0	
Canada	37	34	41	46	28	26	38	27	26	26	
Serious Injuries											
Newfoundland & Labrador	0	0	0	0	0	0	1	1	0	0	
Nova Scotia	0	0	0	0	0	0	2	0	0	0	
New Brunswick	0	0	2	1	1	2	0	0	1	1	
Quebec	4	6	4	6	5	14	11	4	2	3	
Ontario	19	7	15	14	19	11	21	8	7	11	
Manitoba	3	4	3	3	4	6	1	4	2	4	
Saskatchewan	7	3	5	4	4	3	4	2	4	5	
Alberta	11	8	13	12	11	9	12	8	4	7	
British Columbia	1	5	4	2	8	5	3	1	2	5	
Northwest Territories/Yukon	0	0	1	0	0	0	0	0	0	0	
Canada	45	33	47	42	52	50	55	28	22	36	

¹ Figures in brackets denote the estimated number of public crossings for federally-regulated railways in each province as of November 2009.

The Canada total is the actual figure. (Source: Transport Canada.)

² Includes crossing accidents on main track or on spurs per MMTM - Million main-track train-miles. (Source: Transport Canada)

Table 9
Trespasser Accidents and Related Casualties by Province
1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Accidents										
Newfoundland & Labrador	0	0	0	0	0	1	0	0	0	0
Nova Scotia	0	0	1	0	0	2	2	0	2	1
New Brunswick	0	1	0	2	0	0	2	1	4	2
Quebec	26	13	10	13	6	15	13	9	12	13
Ontario	46	41	42	43	38	45	43	43	47	37
Manitoba	1	1	7	3	3	3	6	5	7	4
Saskatchewan	3	2	3	0	2	3	0	2	0	3
Alberta	10	6	9	3	7	16	6	17	14	7
British Columbia	9	14	8	9	9	14	10	14	15	6
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	95	78	80	73	65	99	82	91	101	73
Fatal Accidents										
	61	53	56	50	45	66	63	58	56	47
Fatalities										
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	0	0	1	1	0	1	0
New Brunswick	0	1	0	2	0	0	1	0	3	2
Quebec	19	9	9	9	4	9	11	6	7	10
Ontario	31	30	29	33	30	32	33	31	32	24
Manitoba	0	0	2	1	2	3	4	1	2	2
Saskatchewan	1	1	3	0	0	4	0	1	0	2
Alberta	7	4	7	1	5	11	5	11	7	4
British Columbia	4	8	5	4	4	7	8	9	4	3
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	62	53	56	50	45	67	63	59	56	47
Serious Injuries										
Newfoundland & Labrador	0	0	0	0	0	1	0	0	0	0
Nova Scotia	0	0	0	0	0	1	1	0	0	1
New Brunswick	0	0	0	0	0	0	1	1	1	0
Quebec	7	3	1	3	2	6	2	3	3	0
Ontario	16	9	12	9	7	13	9	13	7	12
Manitoba	1	1	5	2	1	0	1	3	4	2
Saskatchewan	2	1	0	0	2	0	0	1	0	1
Alberta	3	5	2	2	2	5	1	3	4	2
British Columbia	5	4	3	5	5	8	2	4	8	2
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	34	23	23	21	19	34	17	28	27	20

Table 10**Reportable Incidents by Type and Assigned Factor¹
1999-2008****Incidents by type**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Dangerous Goods Leaker	167	188	194	167	151	131	123	83	88	64
Main-Track Switch in Abnormal Position	15	17	9	9	11	12	10	7	7	13
Movement Exceeds Limits of Authority	115	102	101	99	102	95	91	101	106	111
Runaway Rolling Stock	15	9	10	18	13	11	16	12	13	16
Signal Less Restrictive than Required	8	2	7	3	2	1	1	6	0	3
Unprotected Overlap of Authorities	11	11	4	6	10	5	3	7	8	7
Crew Member Incapacitated	2	1	4	6	6	2	1	5	1	2
Incidents - Total	333	330	329	308	295	257	245	221	223	216

Assigned factors²

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Equipment	4	1	4	3	4	0	1	1	0	2
Individual/Personal	109	57	35	29	40	20	17	13	4	3
Track	3	3	5	3	3	0	2	3	0	1
Actions	104	125	108	104	117	110	108	112	90	141
Failure to Protect	34	45	42	39	40	39	35	31	38	55
Failure to Secure	14	4	6	9	7	6	10	6	1	8
Failure to use Equipment Properly	2	6	1	3	5	6	2	5	1	3
Inadequate/Inappropriate Communication	4	8	6	3	5	5	7	11	4	6
Lap of Authority	40	56	49	45	58	48	50	55	41	63
Vandalism	9	4	2	3	1	2	0	4	2	6
Other actions	1	2	2	2	1	4	4	0	3	0
Other assigned factors	17	4	4	7	3	3	1	6	3	4
Assigned Factors¹ - Total	237	190	156	146	167	133	129	135	97	151

Incidents by number of assigned factors²

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
One factor assigned	98	76	78	82	91	87	81	88	87	139
More than one factor assigned	68	56	37	32	37	23	24	21	5	6
No factor assigned	0	10	20	27	16	16	17	29	43	7
Incidents - Total	166	142	135	141	144	126	122	138	135	152

¹ 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.

² Excluding dangerous good incidents. See table 11 for dangerous good incidents.

Table 11
DG Leaker Incidents by Province and Leak Location/Component¹
1999-2008

DG Leaker Incidents by Province

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	0	0	0	1	0	0	1
New Brunswick	8	3	5	6	10	7	1	1	0	1
Quebec	14	12	8	8	9	7	8	8	6	6
Ontario	65	59	74	65	46	34	29	30	30	19
Manitoba	11	24	8	9	9	17	3	5	2	4
Saskatchewan	4	2	8	4	2	4	4	4	5	3
Alberta	37	54	43	43	45	31	29	13	20	15
British Columbia	28	34	47	32	30	31	48	22	25	15
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	167	188	194	167	151	131	123	83	88	64

DG Leaker by Location/Component

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Structural	3	2	0	4	3	0	1	2	0	0
Safety Appurtenances	19	38	26	34	27	29	20	8	16	6
Operating Appurtenances	107	105	111	90	72	76	83	59	45	42
Auxiliary Appurtenances	32	28	34	26	26	16	12	3	6	2
Other Location/Component	11	15	21	8	16	8	8	7	6	7
Location/Component - Total	172	188	192	162	145	130	124	79	73	57
Factor other than location/component	6	9	4	2	4	2	2	2	3	4
Assigned factors - Total	178	197	196	164	149	132	126	81	76	61

DG Leaker Incidents by number of assigned factors

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
One factor assigned	156	177	186	162	143	127	119	79	76	57
More than one factor assigned	10	10	5	1	3	2	3	1	0	2
No factor assigned	1	1	3	4	5	2	1	3	12	5
DG Leaker Incident - Total	167	188	194	167	151	131	123	83	88	64

¹ 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.

² Some factors are assigned by highest category, therefore the breakdowns may not sum up to the category total.

APPENDIX B

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

- a) Any accident or incident associated with the operation of rolling stock on a railway, and
- b) Any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described in paragraph (a) above.

Reportable Railway Accident

An accident resulting directly from the operation of rolling stock, where:

- a) a person sustains a serious injury or is killed as a result of:
 - i) being on board or getting off the rolling stock, or
 - ii) coming into contact with any part of the rolling stock or its contents, or
- b) the rolling stock:
 - i) is involved in a grade-crossing collision,
 - ii) is involved in a collision or derailment and is carrying passengers,
 - iii) is involved in a collision or derailment and is carrying dangerous goods, or is known to have last contained dangerous goods the residue of which has not been purged from the rolling stock,
 - iv) sustains damage that affects its safe operation, or
 - v) causes or sustains a fire or explosion, or causes damage to the railway, that poses a threat to the safety of any person, property or the environment.

Reportable Railway Incident

An incident resulting directly from the operation of rolling stock, where:

- a) a risk of collision occurs;
- b) an unprotected main track switch is left in an abnormal position;
- c) a railway signal displays a less restrictive indication than that required for the intended movement of rolling stock;
- d) an unprotected overlap of operating authorities occurs;
- e) a movement of rolling stock exceeds the limits of its authority;
- f) there is runaway rolling stock;
- g) any crew member whose duties are directly related to the safe operation of the rolling stock is unable to perform the crew member's duties as a result of a physical incapacitation that poses a threat to the safety of any person, property or the environment; or
- h) any dangerous goods are released on board or from the rolling stock.

Serious Injury

An injury that is likely to require admission to a hospital.

Dangerous Goods Involvement

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.

EXPLANATORY NOTES

Accidents by Railway

Accident totals are not presented by railway. The track, train and personnel in an occurrence may all belong to different companies; also an occurrence may have several contributing factors. Presenting data based purely on one of these criteria or factors would be misleading, and misinterpretation of data by readers could unfairly affect a company's competitive position.