

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 Transportation Safety Board of Canada (TSB) are not included in this report. Information in this summary is also posted on the TSB Web site at www.tsb.gc.ca.

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 using these statistics. The 2004 statistics presented here reflect the TSB database updated as of 01 March 2005.

To enhance awareness and increase the safety value of the material presented in the TSB *Statistical Summary, Railway Occurrences 2004*, readers are encouraged to copy or reprint the data presented, in whole or in part, for further distribution (with acknowledgements 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.

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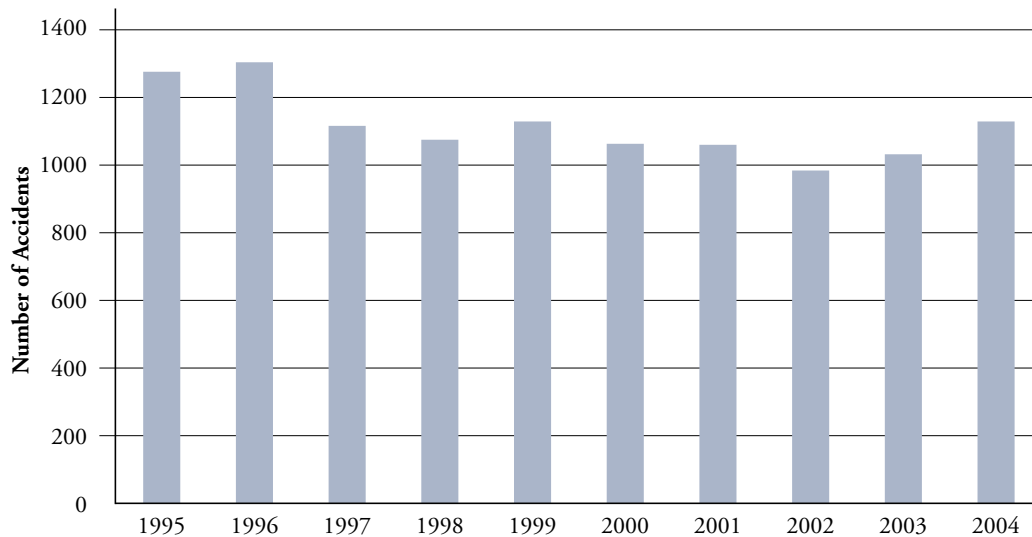
RAILWAY OCCURRENCES IN 2004

ACCIDENTS

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

In 2004, 1129 rail accidents were reported to the TSB (Figure 1), a 9% increase from the 2003 total of 1032 and a 7% increase from the 1999–2003 average of 1054.

Figure 1 – Rail Accidents, 1995–2004

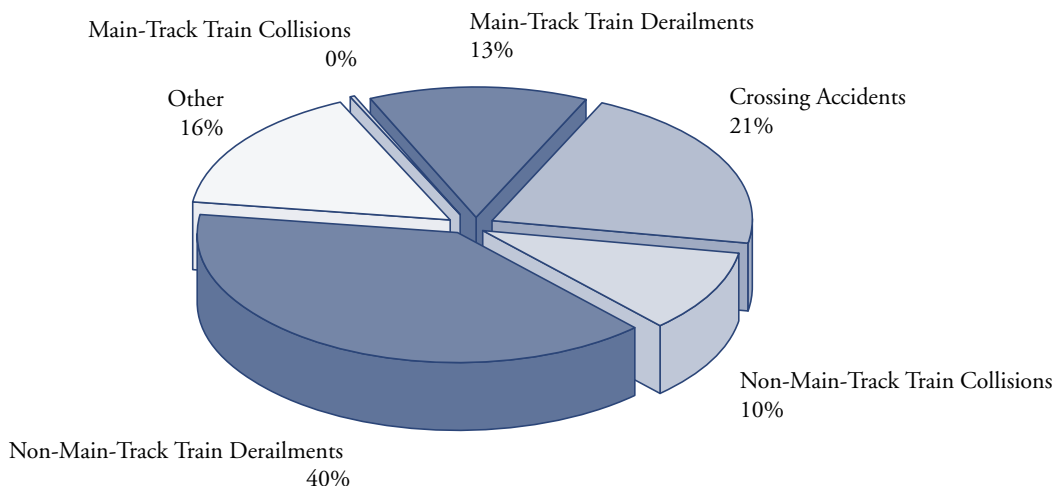


The largest proportion of reported rail accidents are non-main-track related. In 2004, these accounted for half of the total (Figure 2). Typically, most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

Main-track derailments and collisions accounted for 13% of all accidents in 2004, down from 15% last year.

In 2004, one out of five rail accidents involved vehicles or pedestrians at highway-rail crossings, compared to one out of four in the past five years.

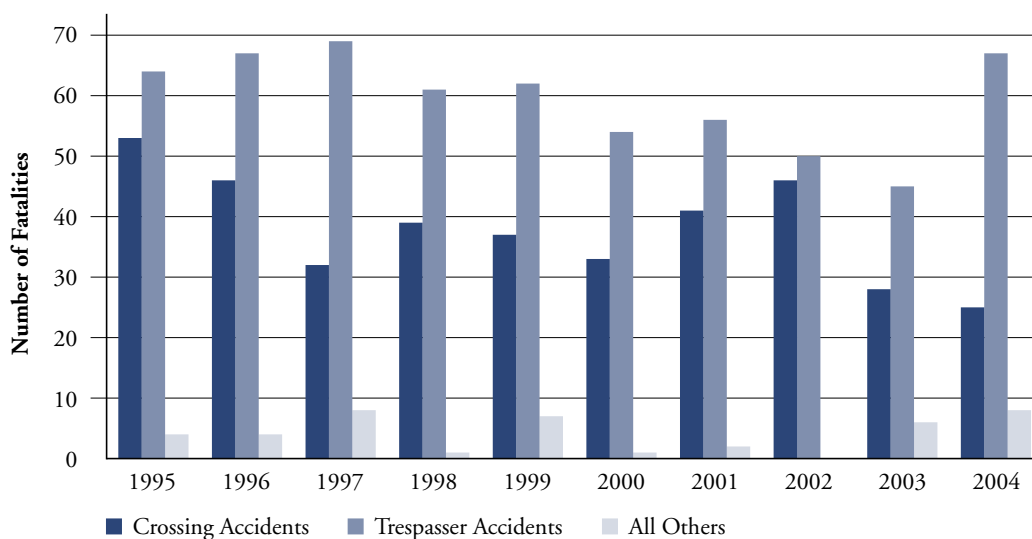
Figure 2 – Rail Accidents by Type, 2004



In 2004, 210 accidents involved rolling stock or vehicles carrying (or having recently carried) dangerous goods, down from both the 2003 total and the five-year average of 225. Of these, 72% were non-main-track accidents. Five accidents resulted in a dangerous goods release, compared to nine in 2003 and the five-year average of seven.

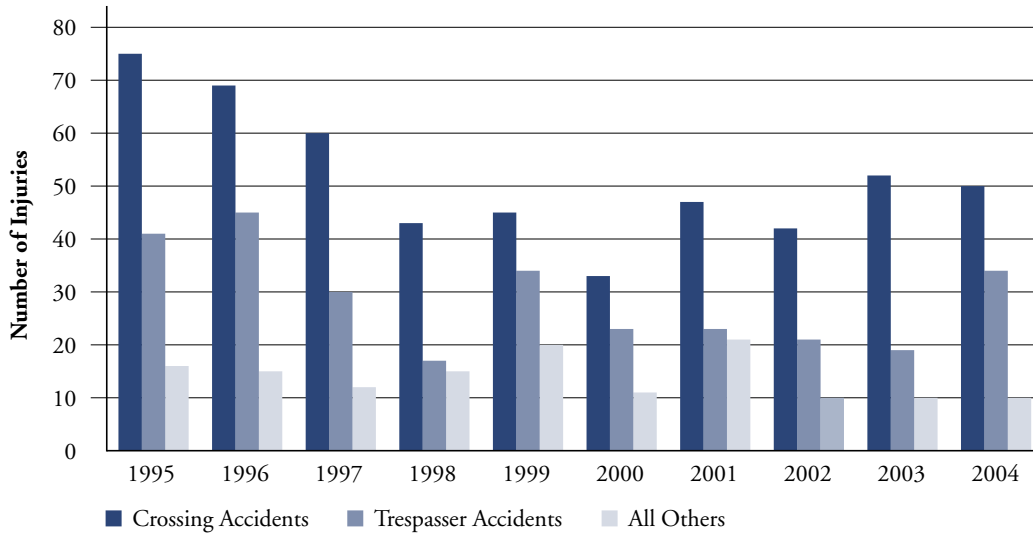
Rail fatalities totalled 100 in 2004, up from a 21-year low of 79 in 2003 and the five-year average of 94. This increase consisted mainly of trespasser fatalities with 67 in 2004, a 49% increase from the 2003 total of 45 and a 26% increase from the five-year average of 53 (Figure 3). Crossing fatalities totalled 25 in 2004, down from 28 in 2003 and the five-year average of 37. In 2004, six employees were fatally injured, up from the five-year average of three.

Figure 3 – Fatalities by Type of Occurrence, 1995–2004



A total of 94 serious injuries resulted from rail occurrences in 2004 (Figure 4), up from 81 in 2003 and up from the five-year average of 82. Trespasser injuries totalled 34 in 2004, up from the 2003 total of 19 and up from the five-year average of 24. Crossing accidents resulted in 50 injuries, down 2 from the 2003 total but up 6 from the five-year average.

Figure 4 – Serious Injuries by Type of Occurrence, 1995–2004

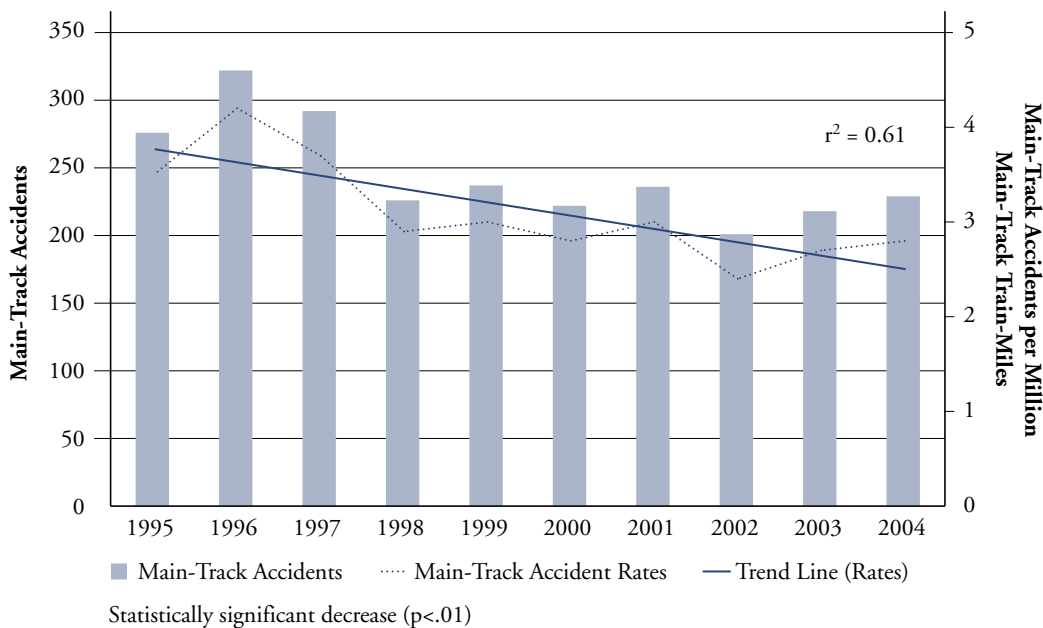


Freight trains accounted for 78% of trains involved in rail accidents in 2004, followed by single cars/cuts of cars and passenger trains with proportions of 7% and 6% respectively. The increase in passenger train accidents in 2004 consisted mainly in an increase in crossing and trespasser accidents.

Accidents by Type (Tables 4a to 9 in Appendix A)

Main-Track Accidents: Main-track accidents (accidents other than crossing and trespasser accidents that occur on main tracks or spurs) reached a peak of 322 in 1996 (Figure 5). Since 1998, the number of main-track accidents has been relatively constant, with an annual average of 224. Rail activity on main tracks increased by less than 1% over last year, which resulted in a 4% increase in the accident rate from 2.7 main-track accidents per million main-track train-miles in 2003 to 2.8 in 2004. Notwithstanding, an analysis of main-track accident rates using linear regression indicates a statistically significant downward trend¹ ($p < .01$) over the past 10 years.

Figure 5 – Main-Track Accidents and Accident Rates, 1995–2004



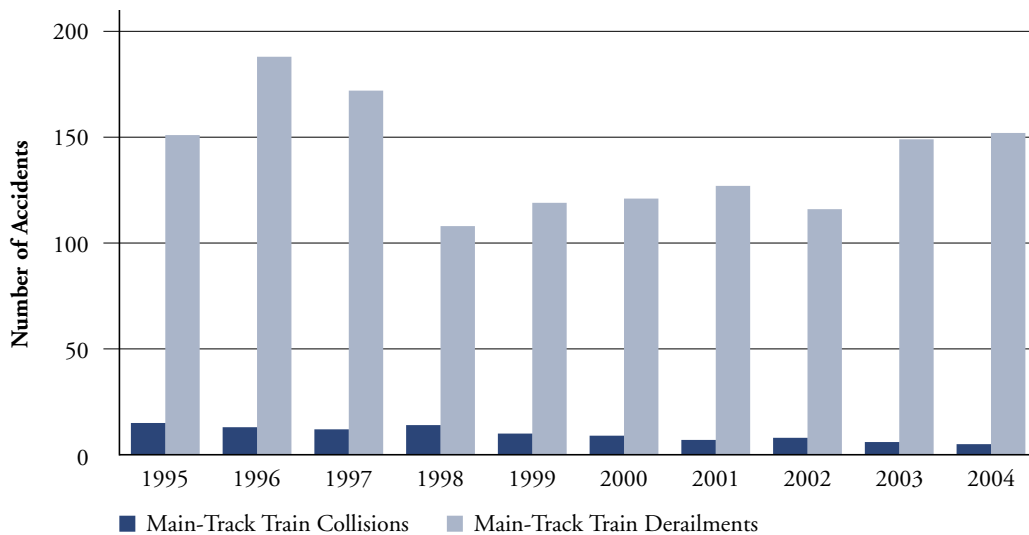
¹ It is agreed by convention that, for a result to be considered statistically significant, its probability must be lower than 1 in 20 (that is, $p < .05$).

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

There were five main-track collisions in 2004, down from the 2003 total of six (Figure 6) and the five-year average of eight. One employee sustained fatal injuries in a main-track collision in 2004, when the lead car he was riding was struck by runaway cars.

A total of 152 main-track derailments were reported in 2004, comparable to the 2003 total of 149 but a 21% increase from the five-year average of 126. Nearly half of main-track derailments in 2004 involved the derailment of a single car, while 19% involved the derailment of more than 10 cars.

Figure 6 – Main-Track Collisions and Derailments, 1995–2004



In January 2004, two vehicle occupants were fatally injured when a freight train derailed in Whitby, Ontario, and some of the platforms with containers fell to the roadway below.

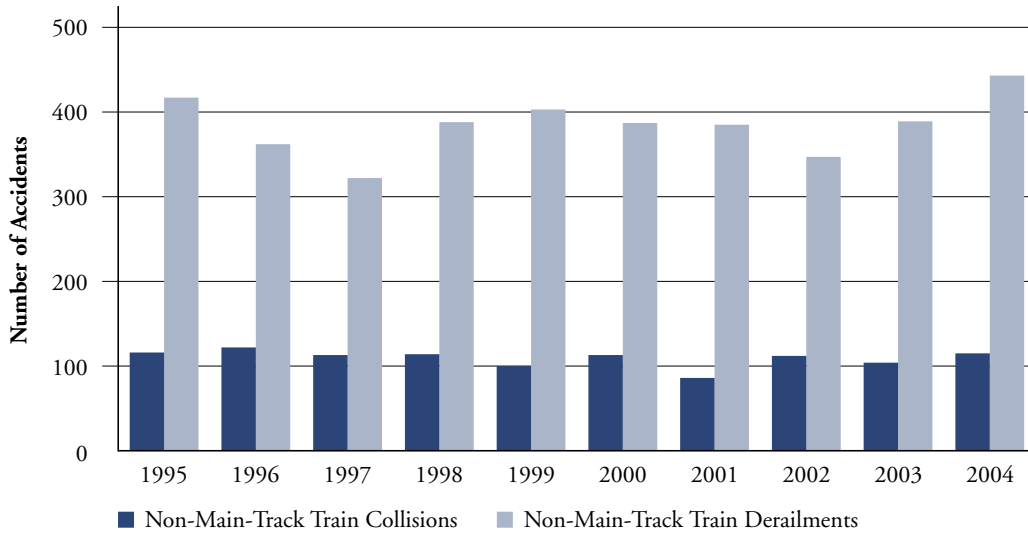
In 2004, 37 main-track derailments involved dangerous goods, compared to 38 in 2003 and the five-year average of 26. One of these resulted in a release of dangerous goods.

In 2004, 38% of factors assigned² to main-track derailments were equipment-related. Track-related factors, mainly track geometry and rail, accounted for 39% of assigned factors, down from 41% last year but up from the five-year average of 38%. Factors assigned in an accident are considered to have acted in combination to contribute to the occurrence.

² Factors assigned are conditions and/or acts that may have played a role in an occurrence.

Non-Main-Track Accidents: Non-main-track collisions totalled 115 in 2004, up from 104 in 2003 (Figure 7) and from the five-year average of 103. Non-main-track collisions in Alberta and British Columbia increased by 74% and 58% respectively from the five-year average. Derailments occurred in 46% of non-main-track collisions, 73% of which involved the derailment of one or two cars.

Figure 7 – Non-Main-Track Collisions and Derailments, 1995–2004



No fatalities or serious injuries resulted from non-main-track collisions in 2004.

Dangerous goods were involved in 39% of non-main-track collisions, two of which resulted in a release of product.

Factors assigned to non-main-track collisions are primarily rules-related (93%) (for example, non-compliance with prescribed procedures). Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often.

There were 443 non-main-track derailments in 2004, up 14% from 2003 (Figure 7) and 16% from the five-year average of 382. Three-quarters of these accidents involved the derailment of one or two cars.

No fatalities or serious injuries resulted from non-main-track derailments in 2004.

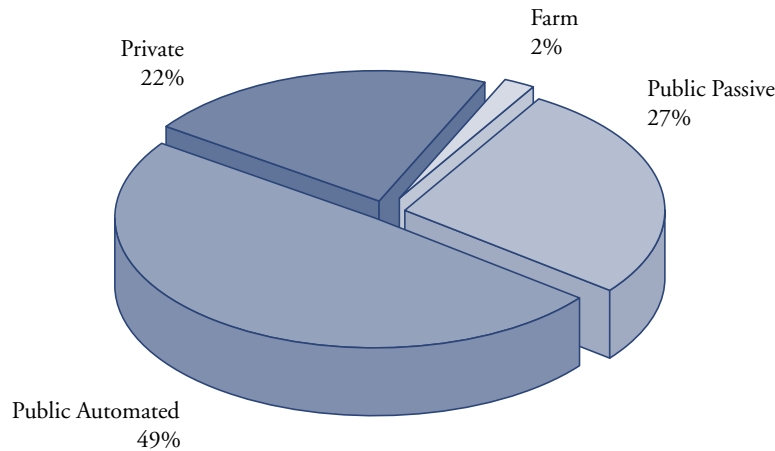
Dangerous goods cars were involved in 24% of non-main-track derailments, one of which resulted in a release of product and evacuation of the surrounding area.

In 2004, 44% of factors assigned to non-main-track derailments were rules-related, comparable to 2003 and the five-year average. Track-related factors accounted for 37% of assigned factors, a proportion that has been relatively stable over the past 10 years. In 2004, the proportion of environmental factors assigned to non-main-track derailments doubled from that of the past five years, consisting mainly of ice and snow flange buildup.

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.

Crossing accidents reached a 22-year low of 237 in 2004, down from 250 in 2003 and the five-year average of 267. Only private crossings showed an increase in the number of accidents, from 36 in 2003 to 51 in 2004. The proportion of accidents occurring at public automated crossings decreased from 54% in 2003 to 49% in 2004 (Figure 8). Although there are more than twice as many public passive crossings as public automated ones, half of the accidents occurred at automated crossings due in part to higher vehicle and train traffic volumes at these crossings.

Figure 8 – Crossing Accidents by Type of Crossing, 2004

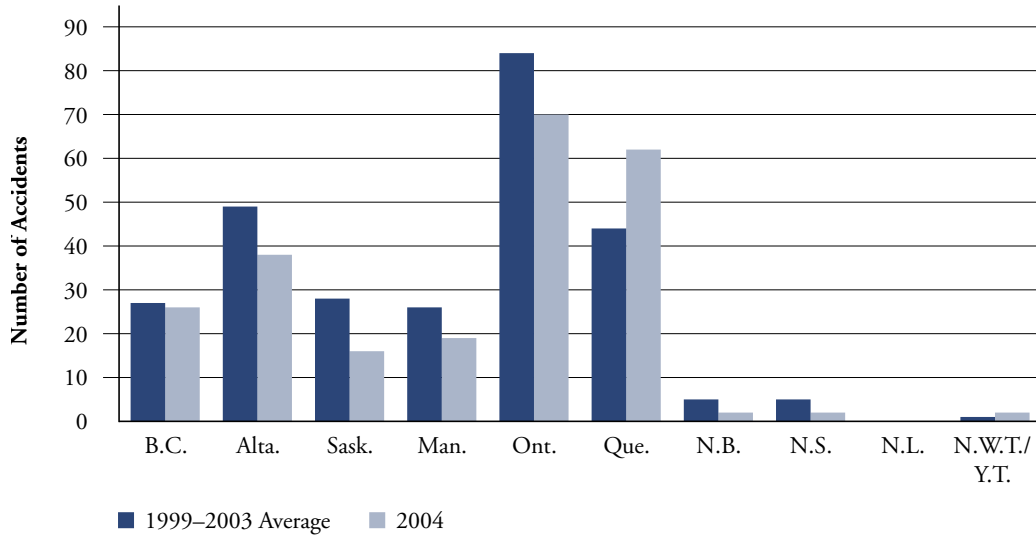


Fatal crossing accidents totalled 21 in 2004, down from 24 in 2003 and the five-year average of 32. Although crossing accidents involving pedestrians accounted for 3% of crossing accidents in 2004, they accounted for 20% of fatal crossing accidents. Crossing-related fatalities totalled 25 in 2004, down 11% from the 2003 total of 28 and 32% from the five-year average of 37. In 2004, accidents at public automated crossings accounted for nearly three-quarters of fatalities.

Failing to stop was the most common motor vehicle driver behaviour contributing to crossing accidents (75%), followed by vehicles stopped, stalled or stuck on the track (8%). Eleven accidents involved drivers driving around gates, up from three in 2003 and the five-year average of eight.

Crossing accidents were equal to, or lower than, respective five-year averages in most provinces (Figure 9), particularly in Ontario and the Prairies. Crossing accidents in Quebec reached a 10-year high of 62, up from 36 in 2003 and the five-year average of 44. This increase consisted mainly of an increase in accidents at automated and private crossings. As a result, serious injuries in Quebec increased to 14 in 2004, up from the 2003 total and the five-year average of 5.

Figure 9 – Crossing Accidents by Province

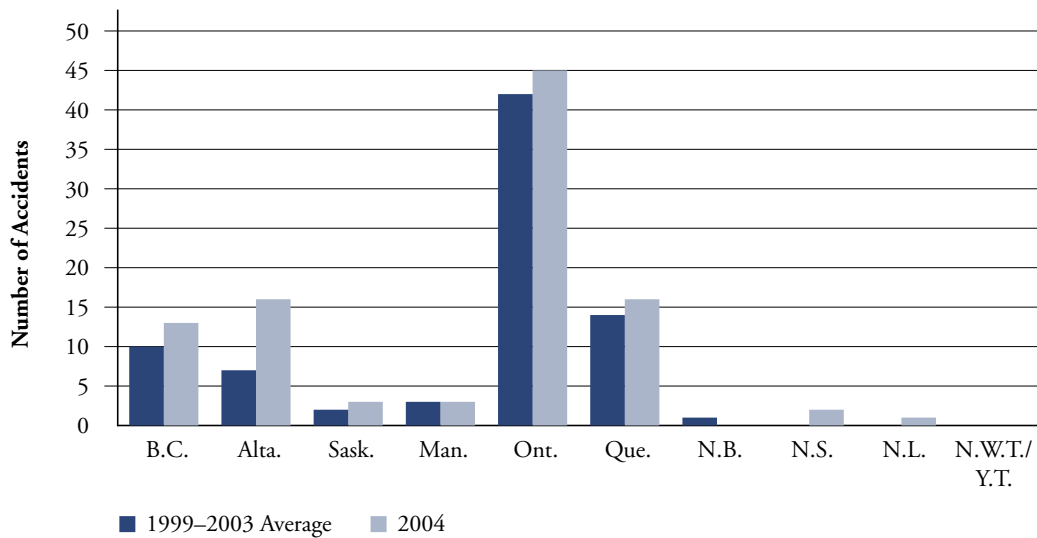


Trespasser accidents: Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock other than at railway crossings. They totalled 99 in 2004, up 52% from the 2003 total of 65 and up 27% from the five-year average of 78.

In all, 90% of trespasser accidents occurred in Ontario, Quebec, Alberta and British Columbia, accounting for 45%, 16%, 16% and 13% of accidents respectively (Figure 10). While the number of trespasser accidents in most provinces has shown a slight increase over the five-year average, accidents in Alberta more than doubled, from an average of 7 to 16 in 2004.

In 2004, all trespasser accidents resulted in casualties (that is, 67% in fatalities and 33% in serious injuries).

Figure 10 – Trespasser Accidents by Province



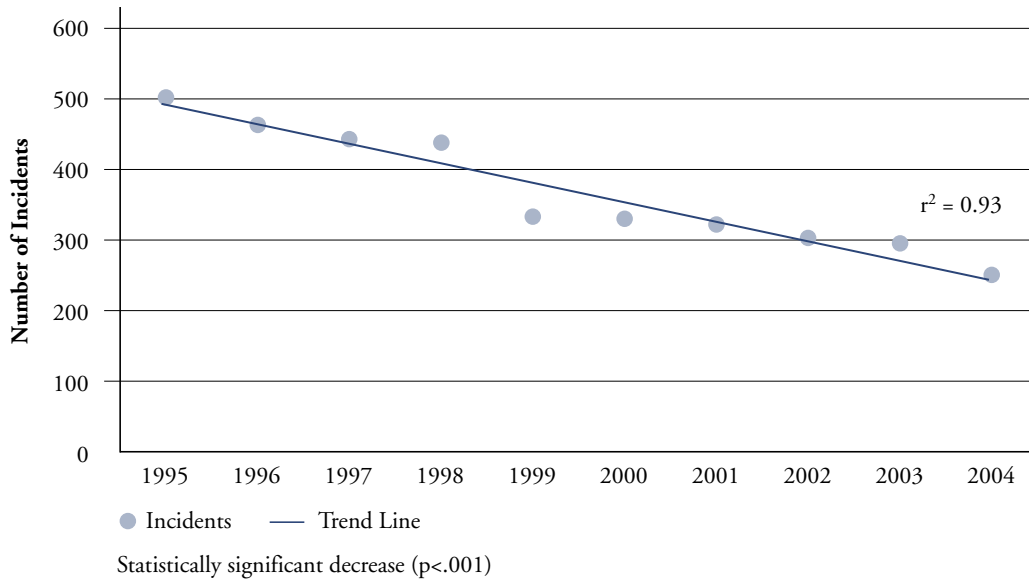
INCIDENTS

Overview of Incidents (Tables 10 and 11 in Appendix A)

In 2004, reported rail incidents reached a 22-year low of 251, down from 295 in 2003 and the five-year average of 317.

Statistical analysis using linear regression indicates that there has been a significant downward trend ($p < .001$)³ of reported railway incidents over the past 10 years (Figure 11), due mainly to the large decrease in the number of reported dangerous goods (DG) leaker incidents.

Figure 11 – Rail Incidents, 1995–2004



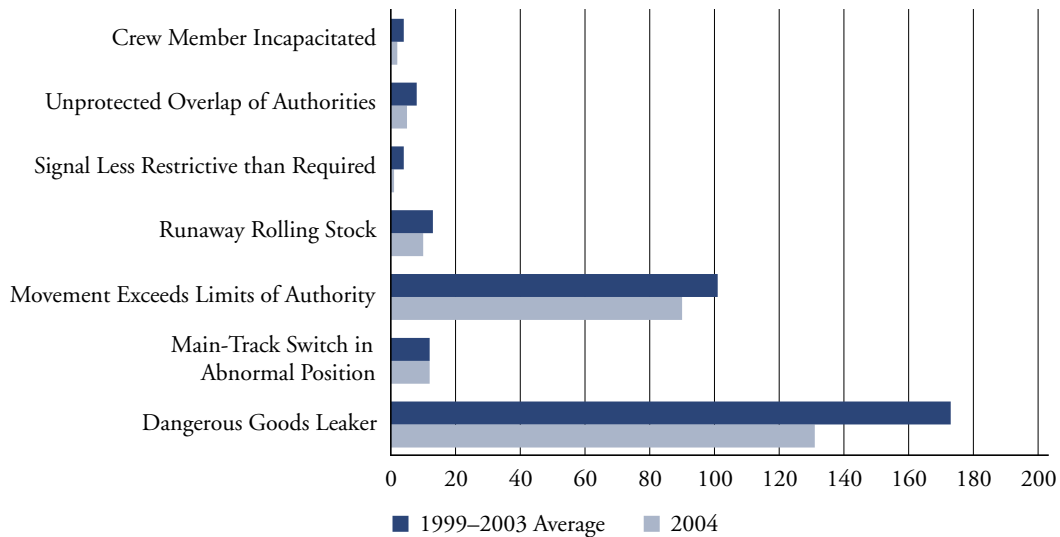
³ It is agreed by convention that, for a result to be considered statistically significant, its probability must be lower than 1 in 20 (that is, $p < .05$).



A DG leakage is 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. There were 131 DG leaker incidents in 2004, accounting for 52% of reported incidents. This total represents a 13% and 24% decrease respectively from the 2003 total of 151 and the five-year average of 173 (Figure 12). In 2004, there were 90 incidents where the movement exceeded the limit of authority, down from 102 in 2003 and the five-year average of 101.

Factors assigned in non-dangerous goods incidents were primarily operational or rules-related (78%), with the most frequent involving an overlap of authorities or a failure to protect.

Figure 12–Rail Incidents by Type



APPENDIX A – RAIL OCCURRENCE TABLES

Table 1

Railway Occurrences* and Casualties
1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Accidents										
Main-Track Train Collisions	15	13	12	14	10	9	7	8	6	5
Main-Track Train Derailments	151	188	172	108	119	121	127	116	149	152
Crossing Accidents	379	365	307	273	283	263	278	261	250	237
Non-Main-Track Train Collisions	116	122	113	114	100	113	86	112	104	115
Non-Main-Track Train Derailments	417	362	322	388	403	387	385	347	389	443
Collisions/Derailments Involving Track Units	14	22	19	13	27	16	18	11	23	26
Employee/Passenger Accidents	6	6	6	10	13	13	8	8	6	12
Trespasser Accidents	112	126	98	78	95	79	80	73	65	99
Fires/Explosions	39	61	44	51	53	32	36	24	23	15
Other	27	39	23	26	26	30	35	24	17	25
Total	1276	1304	1116	1075	1129	1063	1060	984	1032	1129
Reportable Incidents										
Dangerous Goods Leaker	352	330	285	272	167	188	194	167	151	131
Main-Track Switch in Abnormal Position	15	8	12	14	15	17	9	9	11	12
Movement Exceeds Limits of Authority	101	71	104	107	115	102	95	93	102	90
Runaway Rolling Stock	11	18	16	20	15	9	9	19	13	10
Other	23	36	26	25	21	14	15	15	18	8
Total	502	463	443	438	333	330	322	303	295	251
Million Main-Track Train-Miles (MMTTM)**										
	78.4	76.0	79.5	79	78.8	80.1	79.9	82.5	80.6	81.1
Main-Track Accidents***/MMTTM										
	3.5	4.2	3.7	2.9	3.0	2.8	3.0	2.4	2.7	2.8
Accidents Involving Dangerous Goods										
Main-Track Train Derailments	35	51	32	25	19	30	17	24	38	37
Crossing Accidents	7	9	4	8	8	12	7	6	3	11
Non-Main-Track Train Collisions	62	85	61	56	48	50	40	48	37	45
Non-Main-Track Train Derailments	190	190	172	136	133	149	128	130	139	107
All Others	14	33	18	15	16	8	13	13	8	10
Total	308	368	287	240	224	249	205	221	225	210
Accidents with a Dangerous Goods Release										
	5	15	8	5	9	7	5	5	9	5
Fatalities										
Crossing Accidents	53	46	32	39	37	33	41	46	28	25
Trespasser Accidents	64	67	69	61	62	54	56	50	45	67
All Others	4	4	8	1	7	1	2	0	6	8
Total	121	117	109	101	106	88	99	96	79	100
Serious Injuries										
Crossing Accidents	75	69	60	43	45	33	47	42	52	50
Trespasser Accidents	41	45	30	17	34	23	23	21	19	34
All Others	16	15	12	15	20	11	21	10	10	10
Total	132	129	102	75	99	67	91	73	81	94

* For federally regulated railways only.

** 2004 main-track train-miles are estimated. (Source: railways annual reports submitted to Transport Canada)

*** Accidents that occurred on main tracks or spurs, excluding crossing and trespasser accidents.

Table 2**Fatalities and Serious Injuries by Type of Occurrence and Person Type
1995–2004**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Main-Track Train Collisions										
Fatalities	0	3	0	0	0	0	0	0	0	1
Serious Injuries	4	1	0	2	0	0	0	2	0	0
Main-Track Train Derailments										
Fatalities	2	0	3	0	4	0	0	0	2	2
Serious Injuries	0	0	5	0	6	1	9	0	2	0
Crossing Accidents										
Fatalities	53	46	32	39	37	33	41	46	28	25
Serious Injuries	75	69	60	43	45	33	47	42	52	50
Non-Main-Track Train Collisions										
Fatalities	0	0	1	0	0	0	1	0	0	0
Serious Injuries	2	3	1	0	2	0	0	0	0	0
Non-Main-Track Train Derailments										
Fatalities	1	0	1	0	0	0	1	0	1	0
Serious Injuries	0	0	0	0	0	0	0	0	0	0
Collisions/Derailments Involving Track Units										
Fatalities	0	1	1	0	0	0	0	0	0	0
Serious Injuries	4	4	0	3	0	1	0	0	0	0
Employee/Passenger Accidents										
Fatalities	0	0	2	1	3	1	0	0	1	5
Serious Injuries	6	6	4	10	10	8	8	6	3	7
Trespasser Accidents										
Fatalities	64	67	69	61	62	54	56	50	45	67
Serious Injuries	41	45	30	17	34	23	23	21	19	34
Fires/Other										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	1	1	0	0	0	1	0	1	1
Dangerous Goods Leaker										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	0	0	0	0	0	0	0	1	0
Other Incidents										
Fatalities	1	0	0	0	0	0	0	0	2	0
Serious Injuries	0	0	1	0	2	1	3	2	3	2
Fatalities by Person Type										
Employees	5	3	7	0	7	1	2	0	6	6
Passengers	0	0	2	0	0	0	0	0	0	0
Pedestrians	8	8	7	8	7	8	6	10	6	4
Vehicle Occupants	45	38	24	31	30	28	34	38	23	23
Trespassers	63	67	69	61	61	51	56	48	44	67
Other Persons	0	1	0	1	1	0	1	0	0	0
Total	121	117	109	101	106	88	99	96	79	100
Serious Injuries by Person Type										
Employees	16	15	7	12	17	10	16	10	11	9
Passengers	0	1	5	3	7	1	7	0	0	0
Pedestrians	7	3	2	4	5	7	5	6	6	2
Vehicle Occupants	70	65	58	39	38	27	42	36	44	48
Trespassers	39	45	29	16	32	21	20	21	20	33
Other Persons	0	0	1	1	0	1	1	0	0	2
Total	132	129	102	75	99	67	91	73	81	94

Table 3
Rail Accidents by Train Type*
1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Freight Train										
Main-Track Train Collisions	24	19	11	19	15	13	9	19	10	7
Main-Track Train Derailments	140	178	164	106	111	114	120	115	151	142
Non-Main-Track Train Collisions	111	144	150	141	132	125	105	133	108	118
Non-Main-Track Train Derailments	372	330	306	351	367	325	346	319	339	404
Crossing	333	309	267	239	241	225	243	234	220	195
Trespasser	82	92	73	52	70	49	56	44	47	72
Other	46	80	63	70	82	63	59	47	44	38
Total	1108	1152	1034	978	1018	914	938	911	919	976
Passenger Train										
Main-Track Train Collisions	0	0	4	3	2	1	1	0	1	1
Main-Track Train Derailments	7	5	4	1	9	3	5	0	1	3
Non-Main-Track Train Collisions	0	2	1	4	0	0	0	0	8	5
Non-Main-Track Train Derailments	1	4	1	4	3	4	8	7	11	10
Crossing	27	40	30	29	32	18	26	23	18	32
Trespasser	24	29	24	25	23	28	23	29	18	26
Other	17	12	5	9	8	11	13	8	1	4
Total	76	92	69	75	77	65	76	67	58	81
Track Unit										
Main-Track Train Collisions	0	0	0	1	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	0	0	0	0	1	0
Non-Main-Track Train Derailments	0	0	0	0	1	0	1	0	0	0
Crossing	3	5	5	2	7	4	5	1	5	8
Trespasser	1	0	0	0	1	0	1	0	0	1
Other	23	33	22	24	40	28	28	17	37	48
Total	27	38	27	27	49	32	35	18	43	57
Single Car/Cut of Cars										
Main-Track Train Collisions	4	6	4	6	0	0	0	0	0	0
Main-Track Train Derailments	2	1	1	0	3	1	1	2	1	0
Non-Main-Track Train Collisions	98	80	41	39	42	56	35	51	49	59
Non-Main-Track Train Derailments	38	23	15	21	20	17	23	22	32	20
Crossing	0	0	0	0	0	1	0	1	0	0
Trespasser	1	1	0	0	1	0	0	0	0	0
Other	13	19	15	9	8	6	10	5	10	12
Total	156	130	76	75	74	81	69	81	92	91
Other										
Main-Track Train Collisions	1	0	0	2	0	1	0	0	0	0
Main-Track Train Derailments	2	4	4	1	3	4	1	2	1	8
Non-Main-Track Train Collisions	13	5	4	12	3	21	4	7	7	11
Non-Main-Track Train Derailments	14	11	10	21	17	42	14	7	16	21
Crossing	17	11	5	3	6	11	4	3	7	2
Trespasser	4	4	0	1	0	1	0	0	0	0
Other	5	6	4	1	5	5	1	0	1	2
Total	56	41	27	41	34	85	24	19	32	44

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

Table 4a
Main-Track Train Derailments
1995–2004

By Province

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Newfoundland and Labrador	0	3	1	1	0	2	3	1	0	0
Nova Scotia	0	3	0	1	3	2	2	1	0	2
New Brunswick	5	3	3	0	0	2	3	0	1	3
Quebec	24	24	25	21	22	14	19	23	26	21
Ontario	47	55	49	37	30	28	33	35	57	46
Manitoba	17	14	22	12	11	17	14	11	6	10
Saskatchewan	17	24	20	7	10	14	12	10	14	14
Alberta	16	29	18	15	16	15	17	16	17	24
British Columbia	25	33	34	14	26	27	24	19	28	32
Northwest Territories/Yukon	0	0	0	0	1	0	0	0	0	0
Canada	151	188	172	108	119	121	127	116	149	152
Derailments per MMTTM*	1.83	2.40	2.26	1.36	1.51	1.54	1.59	1.45	1.81	1.89
Derailments per BGTM**	0.46	0.58	0.49	0.32	0.33	0.32	0.33	0.31	0.38	

* MMTTM—million main-track train-miles. (Source: Transport Canada)

** BGTM—billion gross ton-miles; 2004 data not yet available. (Source: Railway Association of Canada)

By Total Number of Derailed Cars per Accident

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Derailed Cars										
1	67	77	71	43	50	43	51	45	68	73
2	21	16	20	20	14	11	15	13	8	14
3	15	10	5	3	8	11	8	4	8	6
4	1	11	5	8	5	6	9	6	5	8
5–10	24	33	37	18	24	24	22	26	35	22
10+	23	41	34	16	18	26	22	22	25	29
Total	151	188	172	108	119	121	127	116	149	152

Table 4b

Main-Track Train Derailments by Assigned Factors* 1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Environmental	13	21	11	4	10	0	5	2	4	6
Equipment – Total	66	80	69	43	40	50	46	53	53	45
Axle	26	25	16	9	15	20	16	15	20	12
Brakes	2	9	10	6	2	7	5	9	5	5
Draft System	4	9	5	4	7	8	6	4	3	10
Superstructure	6	7	9	5	2	7	6	7	5	2
Truck	11	10	15	12	8	1	3	10	12	7
Wheel	17	20	14	7	6	7	10	8	8	9
Track – Total	86	70	67	49	54	46	40	39	56	46
Geometry	42	29	38	31	31	20	15	20	26	15
Object on Track	0	1	3	1	1	2	3	1	1	0
Other Track Material (OTM)	8	6	3	4	5	3	5	2	1	6
Rail	26	21	11	9	9	19	7	10	18	18
Roadbed	3	7	9	3	6	0	5	1	4	3
Switch	0	0	0	0	0	2	3	1	0	1
Turnouts	7	6	3	1	2	0	2	4	6	3
Actions – Total	37	41	50	45	23	21	27	18	25	20
Failure to Protect	6	2	10	4	6	6	4	3	5	4
Failure to Secure	1	0	1	0	0	0	1	0	1	1
Failure to Use Equipment Properly	6	8	7	10	7	5	9	11	10	6
Improper Loading/Lifting	1	1	3	1	1	1	1	1	0	1
Improper Placement/Position for Task	1	2	2	4	2	6	2	1	2	3
Inadequate/Inappropriate Maintenance of Equipment	12	16	19	20	3	1	4	1	2	3
Operating at Improper Speed	9	6	7	5	1	1	5	1	4	1
Vandalism	1	4	0	0	2	0	1	0	0	0
Other	0	2	1	1	1	1	0	0	1	1
Total	202	212	197	141	127	117	118	112	138	117

* The TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. More than one factor may be assigned to each occurrence.

Table 5a
Non-Main-Track Train Collisions
1995–2004

By Province

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	1	2	0	0	1	0	0	2	0
New Brunswick	1	2	7	0	1	1	2	1	2	1
Quebec	15	26	22	20	19	14	14	15	15	19
Ontario	36	37	30	36	31	42	28	48	44	27
Manitoba	10	17	7	10	13	11	11	11	7	12
Saskatchewan	8	7	8	7	6	4	4	5	7	4
Alberta	26	20	19	31	19	26	15	17	20	33
British Columbia	19	12	18	10	11	14	12	15	7	19
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	116	122	113	114	100	113	86	112	104	115

By Total Number of Derailed Cars per Accident

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Derailed Cars										
0*	71	60	50	54	49	55	43	60	61	62
1	19	29	26	35	23	25	22	21	20	25
2	7	14	20	11	13	19	10	16	13	14
3	7	7	4	5	7	7	5	8	1	9
4	7	5	4	2	1	2	3	3	4	2
5–10	5	6	8	7	6	4	3	2	4	3
10+	0	1	1	0	1	1	0	2	1	0
Total	116	122	113	114	100	113	86	112	104	115

* Number of collisions with no derailment.

Table 5b

Non-Main-Track Train Collisions by Assigned Factors* 1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Environmental	1	2	0	1	2	1	1	3	1	3
Equipment – Total	5	1	1	0	4	1	2	2	3	1
Brakes	1	0	0	0	2	0	1	0	0	1
Draft System	4	0	1	0	2	1	1	1	1	0
Superstructure	0	1	0	0	0	0	0	1	2	0
Wheel	0	0	0	0	0	0	0	0	0	0
Track – Total	1	1	0	1	4	3	1	0	5	2
Appurtenances	1	1	0	1	2	1	1	0	3	1
Geometry	0	0	0	0	1	0	0	0	0	0
Others	0	0	0	0	1	2	0	0	2	1
Actions – Total	133	128	125	117	63	85	72	87	71	76
Failure to Protect	66	71	74	67	35	43	47	63	55	47
Failure to Secure	22	23	19	29	11	24	19	15	11	21
Failure to Use Equipment Properly	21	23	12	12	5	7	3	6	2	3
Improper Placement/Position for Task	7	0	1	4	2	1	0	0	0	1
Inadequate/Inappropriate Communications	5	2	3	2	4	2	1	0	0	1
Inadequate/Inappropriate Maintenance of Equipment	2	0	0	3	1	0	0	0	0	0
Operating at Improper Speed	8	8	14	0	4	5	1	1	2	3
Vandalism	0	0	1	0	0	0	0	2	1	0
Other	2	1	1	0	1	3	1	0	0	0
Total	140	132	126	119	73	90	76	92	80	82

* The TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. More than one factor may be assigned to each occurrence.

Table 6a

Non-Main-Track Train Derailments 1995–2004

By Province

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Newfoundland and Labrador	1	1	0	1	0	1	0	0	0	0
Nova Scotia	2	6	3	2	3	2	5	6	17	10
New Brunswick	16	20	16	11	15	7	15	19	20	13
Quebec	90	62	61	78	74	69	65	53	63	79
Ontario	139	116	102	118	117	108	138	126	126	158
Manitoba	57	61	31	42	37	38	27	17	25	30
Saskatchewan	28	24	21	34	32	26	30	19	30	27
Alberta	44	38	52	64	64	88	50	68	63	85
British Columbia	40	34	36	38	61	48	55	38	45	41
Northwest Territories/Yukon	0	0	0	0	0	0	0	1	0	0
Canada	417	362	322	388	403	387	385	347	389	443

By Total Number of Derailed Cars per Accident

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Derailed Cars										
1	196	173	128	152	175	177	188	136	184	236
2	98	80	79	101	93	93	80	82	87	102
3	51	38	40	52	44	37	49	44	48	36
4	21	28	27	27	34	22	28	26	27	26
5–10	42	39	39	47	54	53	38	53	40	37
10+	9	4	9	9	3	5	2	6	3	6
Total	417	362	322	388	403	387	385	347	389	443

Table 6b

Non-Main-Track Train Derailments by Assigned Factors* 1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Environmental	35	43	30	12	15	5	19	10	15	24
Equipment – Total	29	32	16	27	40	25	26	29	30	34
Axle	0	0	1	0	0	2	1	0	0	0
Brakes	1	4	3	5	5	7	6	7	3	6
Draft System	7	2	0	2	11	5	2	8	8	7
Superstructure	5	4	2	5	1	2	5	6	6	4
Truck	4	4	4	3	12	1	4	3	5	8
Wheel	12	18	6	12	11	8	8	5	8	9
Track – Total	169	145	138	192	161	154	145	118	121	115
Appurtenances	1	2	2	0	1	1	0	3	1	1
Geometry	58	54	67	73	60	62	48	29	43	37
Rail	17	12	11	22	21	17	14	14	16	11
Roadbed	17	13	8	4	5	4	5	2	2	6
Other Track Material	37	28	16	37	14	24	29	21	16	16
Turnouts	33	35	33	53	55	26	31	45	33	30
Object on Track	6	1	1	3	5	5	10	1	6	5
Switch	0	0	0	0	0	15	8	2	4	9
Other	0	0	0	0	0	0	0	1	0	0
Actions – Total	264	216	191	238	159	181	138	135	146	137
Failure to Protect	122	95	99	107	96	111	83	68	88	83
Failure to Secure	18	17	9	12	4	10	11	11	17	11
Failure to Use Equipment Properly	50	42	35	35	18	17	15	34	12	19
Improper Loading/Lifting	0	0	2	1	1	13	2	1	2	0
Improper Placement/Position for Task	6	1	6	8	2	9	5	0	3	4
Inadequate/Inappropriate Communications	10	4	1	1	1	2	1	1	1	1
Inadequate/Inappropriate Maintenance of Equipment	33	36	28	56	17	6	10	10	4	9
Operating at Improper Speed	6	9	3	2	5	7	4	2	9	4
Vandalism	19	12	7	15	12	6	6	7	10	5
Other	0	0	1	1	3	0	1	1	0	1
Total	497	436	375	469	375	365	328	292	312	310

* The TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings. More than one factor may be assigned to each occurrence.

Table 7**Crossing Accidents and Casualties by Type of Crossing and Protection
1995–2004**

		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Accidents											
Public Crossings*											
Total Passive Warnings	(12 501)	136	140	109	95	98	84	77	95	72	65
Flashing Lights and Bells	(4147)	136	135	113	96	91	95	101	89	85	75
Gates	(2007)	44	33	32	34	35	42	43	39	50	42
Other Automated Warnings	(23)	0	0	1	2	0	2	1	0	1	0
Total Automated Warnings	(6177)	180	168	146	132	126	139	145	128	136	117
Sub-total	(18 678)	316	308	255	227	224	223	222	223	208	182
Private Crossings		56	50	48	41	49	37	48	33	36	51
Farm Crossings		7	7	4	5	10	3	8	5	6	4
Total		379	365	307	273	283	263	278	261	250	237
Fatal Accidents											
		39	39	30	38	32	30	35	41	24	21
Fatalities											
Public Crossings											
Total Passive Warnings		17	14	10	14	20	10	14	16	8	7
Flashing Lights and Bells		26	17	11	11	5	12	11	14	9	10
Gates		7	10	8	9	9	10	10	13	7	8
Other Automated Warnings		0	0	0	0	0	0	0	0	0	0
Total Automated Warnings		33	27	19	20	14	22	21	27	15	18
Sub-total		50	41	29	34	34	32	35	43	23	25
Private Crossings		3	5	1	5	3	1	5	3	2	0
Farm Crossings		0	0	2	0	0	0	1	0	2	0
Total		53	46	32	39	37	33	41	46	28	25
Serious Injuries											
Public Crossings											
Total Passive Warnings		27	31	21	16	13	6	12	18	15	15
Flashing Lights and Bells		32	24	30	16	21	16	20	13	23	21
Gates		10	10	5	5	6	7	6	6	8	11
Other Automated Warnings		0	0	0	0	0	0	0	0	0	0
Total Automated Warnings		42	34	35	21	27	23	26	19	30	31
Sub-total		69	65	56	37	40	29	38	37	45	46
Private Crossings		4	3	3	5	5	3	7	5	6	3
Farm Crossings		2	1	1	1	0	1	2	0	0	0
Total		75	69	60	43	45	33	47	42	52	50

* Figures in parenthesis denote the number of public grade crossings for federally regulated railways in Canada by warning type as of February 2005. (There are approximately 28 500 private and farm crossings in Canada.) (Source: Transport Canada)

Table 8**Crossing Accidents and Related Casualties by Province
1995–2004**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Accidents*										
Newfoundland and Labrador (7)	1	1	0	0	0	0	0	0	0	0
Nova Scotia (119)	4	7	5	3	7	3	10	1	2	2
New Brunswick (190)	12	6	5	2	5	2	8	2	9	2
Quebec (1680)	58	61	51	48	51	44	43	44	36	62
Ontario (4772)	121	91	75	65	94	88	80	77	80	70
Manitoba (2372)	33	46	30	34	19	21	25	36	28	19
Saskatchewan (5764)	44	49	33	38	30	32	29	24	24	16
Alberta (2872)	66	71	70	54	52	45	54	55	38	38
British Columbia (883)	40	33	38	29	24	28	28	22	32	26
Northwest Territories/Yukon (19)	0	0	0	0	1	0	1	0	1	2
Canada (18 678)	379	365	307	273	283	263	278	261	250	237
Crossing Accidents per MMTTM**	4.55	4.51	3.43	3.25	3.17	2.90	3.05	2.84	2.89	2.71
Crossing Accidents with Derailment	6	6	5	5	8	9	12	9	4	9
Fatalities										
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	0	1	2	0	0	0
New Brunswick	1	1	2	0	0	0	0	0	0	0
Quebec	11	6	7	7	6	8	4	9	4	9
Ontario	14	19	10	14	20	12	17	15	15	12
Manitoba	4	1	2	7	2	2	3	5	2	1
Saskatchewan	14	5	1	5	1	5	8	3	4	1
Alberta	8	5	6	4	5	3	5	10	3	2
British Columbia	1	8	4	2	3	2	2	4	0	0
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	53	46	32	39	37	33	41	46	28	25
Serious Injuries										
Newfoundland and 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	1	1	1	1	0	0	2	1	1	2
Quebec	15	13	10	7	4	6	4	6	5	14
Ontario	26	13	11	7	19	7	15	14	19	11
Manitoba	3	13	5	6	3	4	3	3	4	6
Saskatchewan	13	8	6	6	7	3	5	4	4	3
Alberta	14	16	19	13	11	8	13	12	11	9
British Columbia	3	4	6	3	1	5	4	2	8	5
Northwest Territories/Yukon	0	0	0	0	0	0	1	0	0	0
Canada	75	69	60	43	45	33	47	42	52	50

* Figures in parenthesis denote the estimated number of public crossings for federally regulated railways in each province as of February 2005. (Source: Transport Canada)

** Includes crossing accidents on main tracks or on spurs per MMTTM—million main-track train-miles. (Source: Transport Canada)

Table 9

Trespasser Accidents and Related Casualties by Province 1995–2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Accidents										
Newfoundland and Labrador	0	1	0	0	0	0	0	0	0	1
Nova Scotia	0	3	0	0	0	0	1	0	0	2
New Brunswick	6	3	0	0	0	1	0	2	0	0
Quebec	27	31	15	12	26	14	10	13	6	16
Ontario	41	55	47	36	46	41	42	43	38	45
Manitoba	13	1	4	4	1	1	7	3	3	3
Saskatchewan	3	3	4	2	3	2	3	0	2	3
Alberta	13	8	7	10	10	6	9	3	7	16
British Columbia	9	21	21	14	9	14	8	9	9	13
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	112	126	98	78	95	79	80	73	65	99
Fatal Accidents										
	63	67	69	59	61	54	56	50	45	66
Fatalities										
Newfoundland and Labrador	0	1	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	0	0	1	0	0	1
New Brunswick	6	2	0	0	0	1	0	2	0	0
Quebec	16	14	10	11	19	10	9	9	4	10
Ontario	26	35	34	30	31	30	29	33	30	32
Manitoba	5	0	3	3	0	0	2	1	2	3
Saskatchewan	2	1	2	1	1	1	3	0	0	3
Alberta	7	2	3	8	7	4	7	1	5	11
British Columbia	2	11	17	8	4	8	5	4	4	7
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	64	67	69	61	62	54	56	50	45	67
Serious Injuries										
Newfoundland and Labrador	0	1	0	0	0	0	0	0	0	1
Nova Scotia	0	0	0	0	0	0	0	0	0	1
New Brunswick	0	1	0	0	0	0	0	0	0	0
Quebec	10	10	5	1	7	3	1	3	2	6
Ontario	13	15	13	8	16	9	12	9	7	13
Manitoba	5	1	1	0	1	1	5	2	1	0
Saskatchewan	1	2	3	1	2	1	0	0	2	1
Alberta	6	4	4	2	3	5	2	2	2	5
British Columbia	6	11	4	5	5	4	3	5	5	7
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	41	45	30	17	34	23	23	21	19	34

Table 10**Reportable Incidents by Type and Assigned Factor
1995–2004**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents										
Dangerous Goods Leaker	352	330	285	272	167	188	194	167	151	131
Main-Track Switch in Abnormal Position	15	8	12	14	15	17	9	9	11	12
Movement Exceeds Limits of Authority	101	71	104	107	115	102	95	93	102	90
Runaway Rolling Stock	11	18	16	20	15	9	9	19	13	10
Signal Less Restrictive than Required	0	4	1	9	8	2	7	3	2	1
Unprotected Overlap of Authorities	22	32	24	16	11	11	4	6	10	5
Crew Member Incapacitated	1	0	1	0	2	1	4	6	6	2
Total	502	463	443	438	333	330	322	303	295	251
Assigned Factors*										
Equipment	0	3	0	5	4	1	4	3	7	1
Track	4	4	2	6	3	3	5	3	3	0
Actions	147	124	159	174	110	134	112	105	117	99
Failure to Protect	14	7	12	14	34	44	42	39	39	36
Failure to Secure	8	11	9	11	16	11	6	10	8	5
Failure to Use Equipment Properly	1	3	0	8	2	7	1	3	5	5
Inadequate/Inappropriate										
Communications	2	5	6	16	4	8	6	3	5	4
Overlap of Authorities	115	92	120	113	40	56	49	45	58	42
Vandalism	4	4	9	6	1	2	5	2	1	4
Other	3	2	3	6	13	6	3	3	1	3
Total	151	131	161	185	117	138	121	111	127	100

* The TSB does not investigate all occurrences; therefore, assigned factors may not represent TSB findings.
More than one factor may be assigned to each occurrence.
For non-dangerous goods incidents only.

Table 11**Dangerous Goods Leaker Incidents by Province and Leak Location/Component
1995–2004**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents										
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	0	0	0	1	0	0	0
New Brunswick	4	2	9	10	8	3	5	6	10	7
Quebec	40	60	50	25	14	12	8	8	9	7
Ontario	119	110	100	89	65	59	74	65	46	34
Manitoba	31	10	6	9	11	24	8	9	9	17
Saskatchewan	10	8	13	10	4	2	8	4	2	4
Alberta	69	37	55	74	37	54	43	43	45	31
British Columbia	78	103	52	55	28	34	47	32	30	31
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	352	330	285	272	167	188	194	167	151	131
Leak by Location/Component*										
Structural	6	4	2	1	3	2	0	4	3	0
Safety Appurtenances	81	85	82	66	19	37	25	34	27	25
Operating Appurtenances	165	184	177	148	107	105	110	86	65	74
Auxiliary Appurtenances	48	41	31	46	32	28	34	25	25	13
Other	50	13	14	19	11	14	19	7	14	8
Total	350	327	306	280	172	186	188	156	134	120

* More than one leak location/component may be assigned to each occurrence.

APPENDIX B – DEFINITIONS AND EXPLANATORY NOTES

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., a 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.