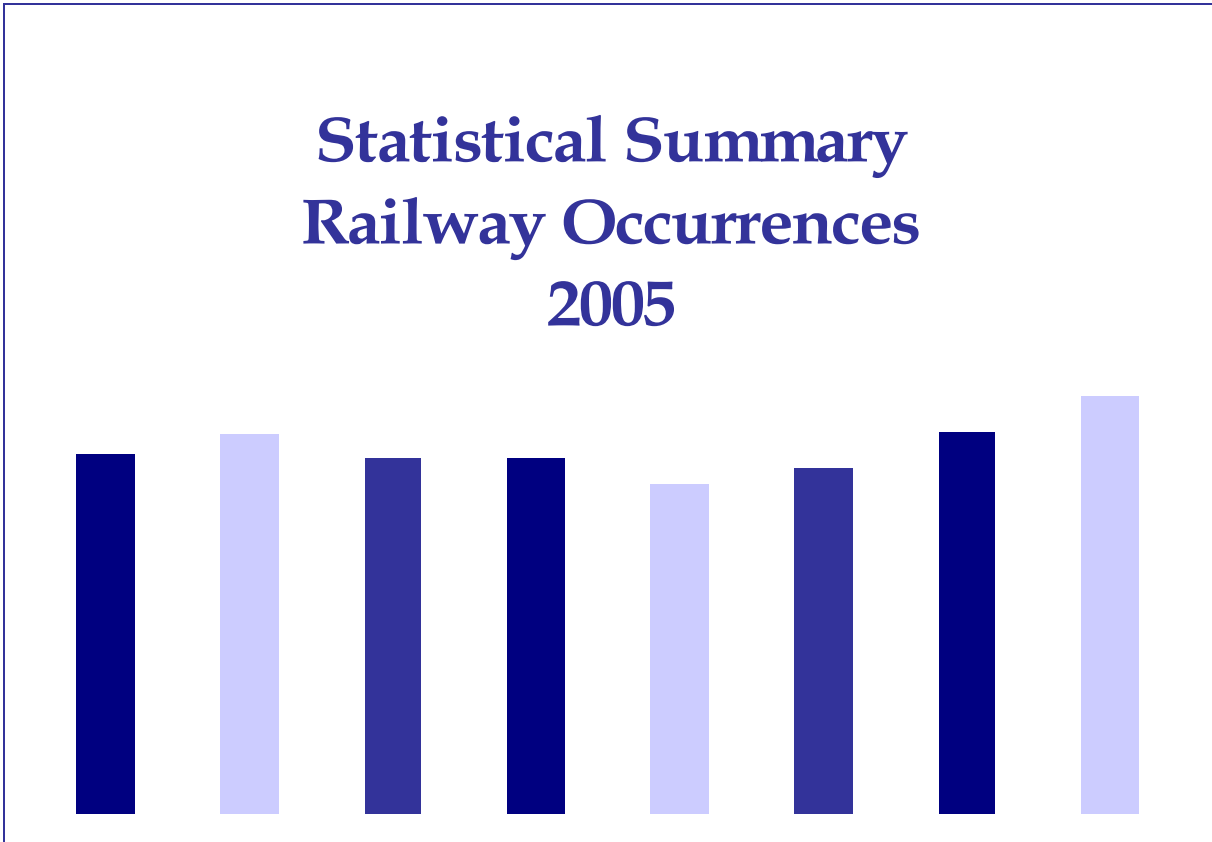




Statistical Summary Railway Occurrences 2005



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 utilizing these statistics. The 2005 statistics presented here reflect the TSB database updated as of 15 March 2006.

To enhance awareness and increase the safety value of the material presented in the *Statistical Summary, Railway Occurrences 2005*, readers are encouraged to copy or reprint the data presented (with acknowledgements of the source), in whole or in part, for further distribution.

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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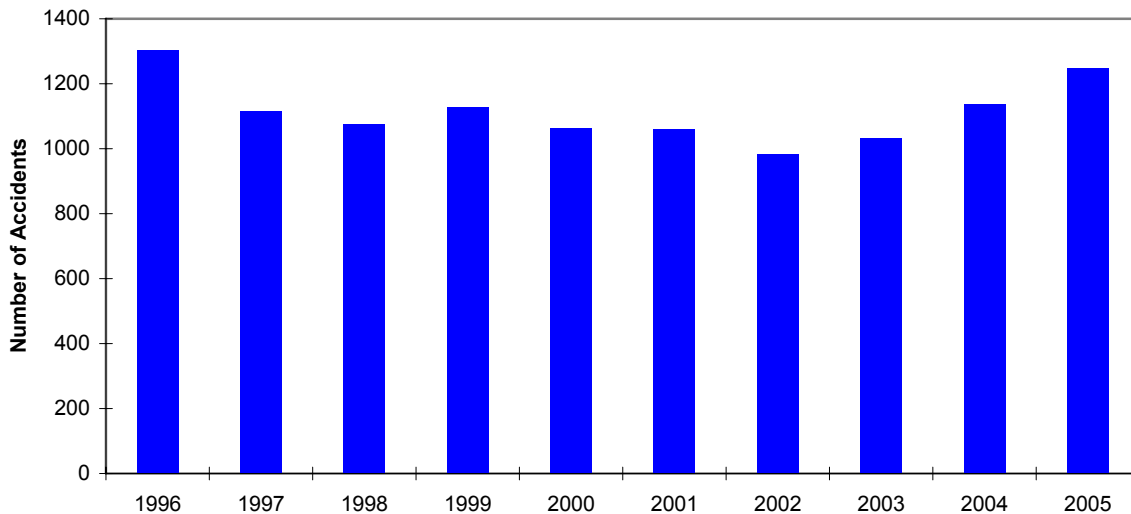
RAILWAY OCCURRENCES IN 2005

ACCIDENTS

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

In 2005, 1248 rail accidents were reported to the TSB (Figure 1), a 10% increase from the 2004 total of 1138 and an 18% increase from the 2000–2004 average of 1055.

Figure 1 - Rail Accidents, 1996–2005

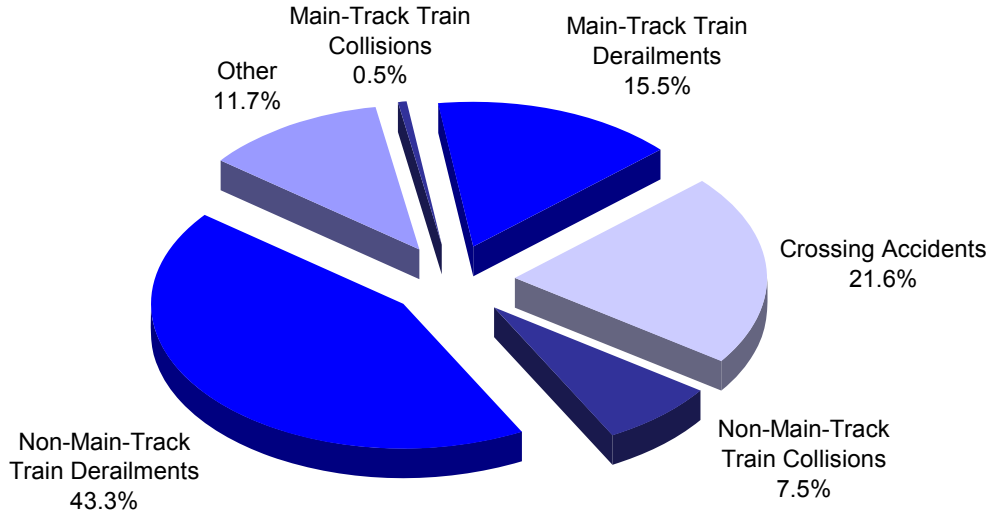


The largest proportion of reported rail accidents are non-main-track related. In 2005, these accounted for half of the total (Figure 2). Typically, most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

Main-track derailments and collisions accounted for 16% of all accidents in 2005, up from 14% last year.

In 2005, more than one out of five rail accidents involved vehicles or pedestrians at highway-rail crossings, down from one out of four in the past five years.

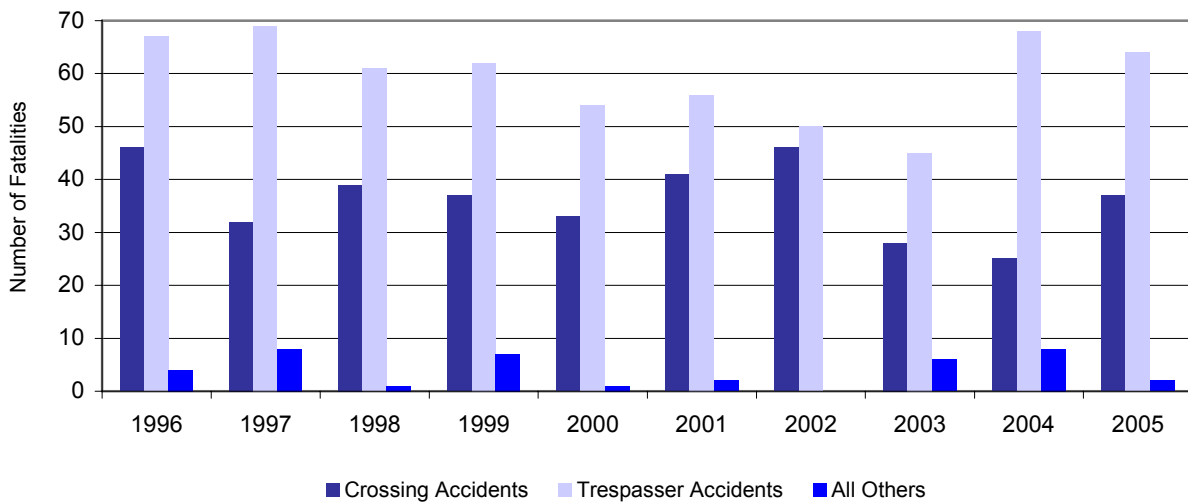
Figure 2 - Rail Accidents by Type, 2005



In 2005, 215 accidents involved dangerous goods (either rail cars or road vehicles carrying or having recently carried dangerous goods), up from the 2004 total of 208 but down from the five-year average of 222. Of these, 73% were non-main-track accidents. Seven accidents resulted in a dangerous goods release, up one from the 2004 total and the five-year average.

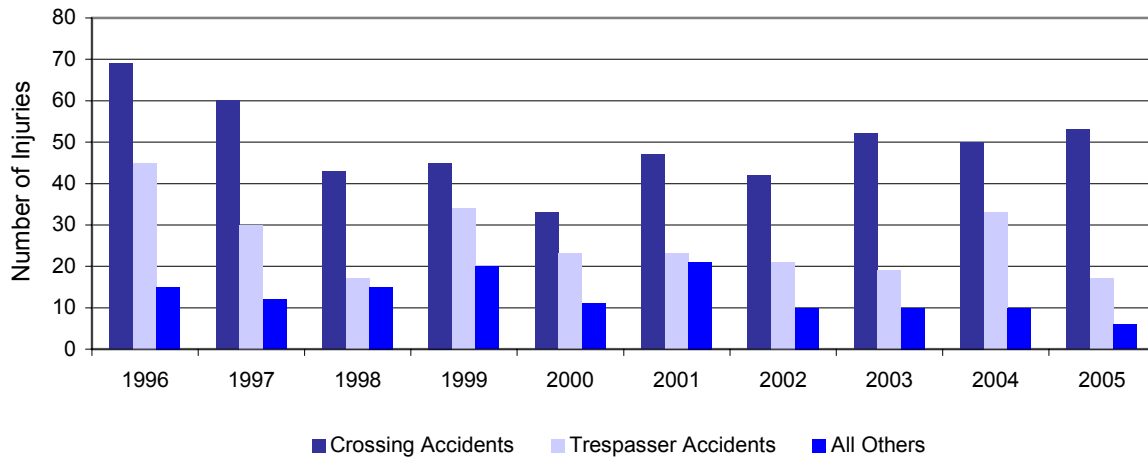
Rail fatalities totalled 103 in 2005, compared to 101 in 2004 and the five-year average of 93. This increase over the five-year average consisted mainly of trespasser fatalities with 64 in 2005, compared to the five-year average of 55 (Figure 3). Crossing fatalities totalled 37 in 2005, up from 25 in 2004 but comparable to the five-year average of 35. In 2005, two employees were fatally injured, down slightly from the five-year average of three.

Figure 3 - Fatalities by Type of Occurrence, 1996-2005



A total of 76 serious injuries resulted from rail occurrences in 2005 (Figure 4), down from 93 in 2004 and from the five-year average of 81. Trespasser injuries totalled 17 in 2005, a 48% decrease from the 2004 total of 33 and a 29% decrease from the five-year average of 24. Crossing accidents resulted in 53 injuries, compared to 50 in 2004 and the five-year average of 45.

Figure 4 - Serious Injuries by Type of Occurrence, 1996-2005



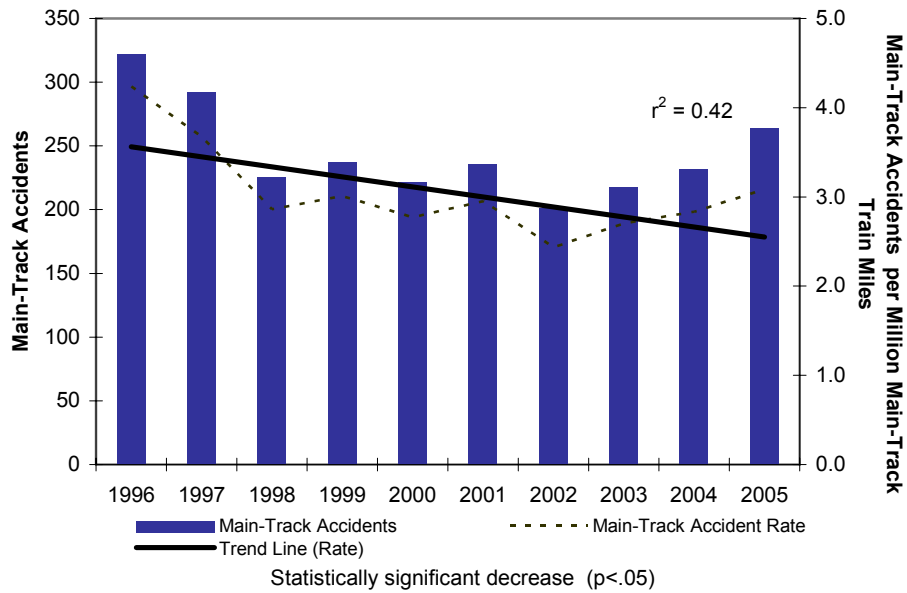
Freight trains accounted for 80% of all trains involved in rail accidents in 2005, followed by single cars/cuts of cars and passenger trains with proportions of 7% and 6% respectively. The increase in passenger train accidents over the five-year average consisted mainly in an increase in crossing accidents.

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

Main-Track Accidents: The number of main-track accidents (accidents that occur on main tracks or spurs, other than crossing and trespasser accidents) totalled 264 in 2005 (Figure 5), up from 232 in 2004 and the five-year average of 222. Rail activity on main tracks increased by 4% over last year, which resulted in an 11% increase in the accident rate, from 2.8 main-track accidents per million main-track train-miles in 2004 to 3.1 in 2005. Notwithstanding, an analysis of main-track accident rates using linear regression indicates a statistically significant downward trend¹ ($p < .05$) over the past 10 years.

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, $p < .05$).

Figure 5 - Main-Track Accidents and Accident Rate, 1996-2005

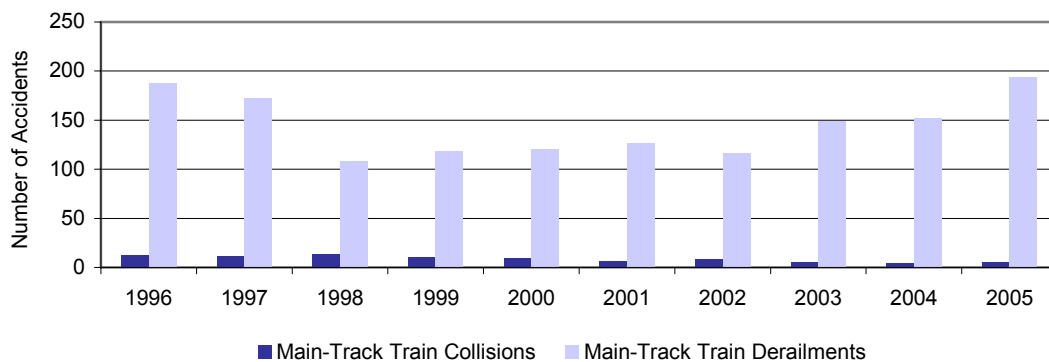


Main-track collisions and derailments are the most serious categories of rail accidents in terms of financial loss and potential risk to the public (for example, where passenger trains are involved or dangerous goods are released from trains that derail while travelling at high speeds in populated areas).

There were six main-track collisions in 2005, up one from the 2004 total (Figure 6) but down one from the five-year average. No fatalities or serious injuries resulted from main-track collisions in 2005; one collision resulted in the release of dangerous goods.

A total of 194 main-track derailments were reported in 2005, a 28% increase from the 2004 total of 152 and a 46% increase from the five-year average of 133. The number of main-track derailments per million main-track train-miles increased to 2.25 in 2005, up from 1.82 in 2004 and the five-year average of 1.63. The increase in main-track derailments in 2005 consisted mainly of derailments of five or more cars.

Figure 6 - Main-Track Collisions and Derailments, 1996-2005



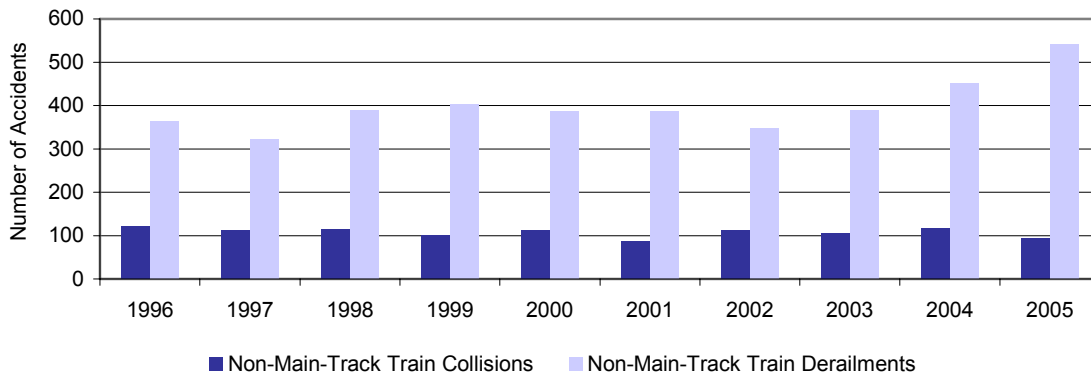
No fatalities or serious injuries resulted from main-track derailments in 2005.

In 2005, 33 main-track derailments involved dangerous goods, down from 37 in 2004 but up from the five-year average of 29. Two of these resulted in a release of dangerous goods, including the release of sodium hydroxide into the Cheakamus River in British Columbia.

In 2005, there was a 24% increase in equipment-related factors assigned² to main-track derailments compared to the five-year average, involving mainly brakes or wheels. There was also a 35% increase in track-related factors assigned to main-track derailments compared to the five-year average, related mainly to track geometry or rail. Factors assigned in an accident are considered to have acted in combination to contribute to the occurrence.

Non-Main-Track Accidents: Non-main-track collisions totalled 93 in 2005, down from 116 in 2004 (Figure 7) and from the five-year average of 106. Derailments occurred in 38% of non-main-track collisions, 74% of which involved the derailment of one or two cars.

Figure 7 - Non-Main-Track Collisions and Derailments, 1996-2005



No fatalities or serious injuries resulted from non-main-track collisions in 2005.

Dangerous goods were involved in 47% of non-main-track collisions, none of which resulted in a release of product.

Factors assigned to non-main-track collisions are primarily rules-related (91%) (for example, non-compliance with prescribed procedures). Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often.

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

There were 540 non-main-track derailments in 2005 (Figure 7), up 20% from 2004 and 38% from the five-year average of 392. Three-quarters of these accidents involved the derailment of one or two cars.

No fatalities resulted from non-main-track derailments in 2005; one employee was seriously injured while shoving cars.

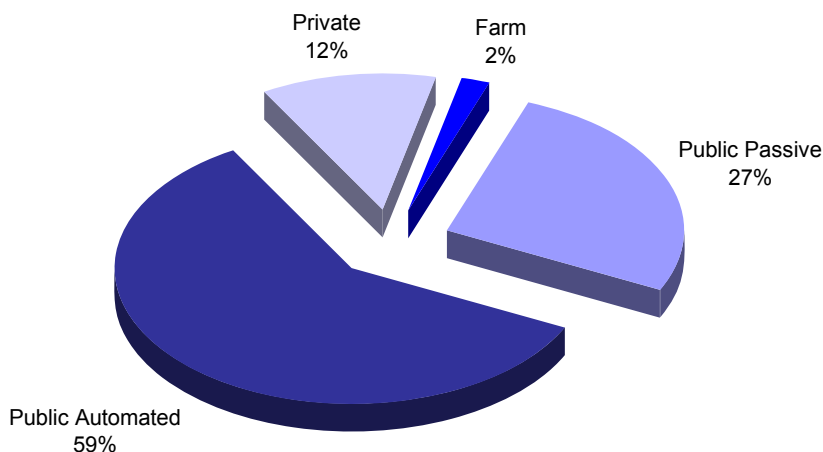
Dangerous goods cars were involved in 21% of non-main-track derailments, three of which resulted in a release of dangerous goods.

In 2005, there was a 29% increase in rules-related factors (for example, non-compliance with prescribed procedures) assigned to non-main-track derailments compared to the five-year average, as well as a 29% increase 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 269 crossing accidents in 2005, up from 237 in 2004 and from the five-year average of 258. This increase consisted mainly of accidents at public automated crossings. While accidents at public passive, private and farm crossings showed a decrease from the five-year average, accidents at public automated crossings (160) showed a 37% increase from the 2004 total of 117 and a 20% increase from the five-year average of 133. The proportion of accidents occurring at public automated crossings increased to 59% in 2005 (Figure 8), from 49% in 2004. Although there are more than twice as many public passive crossings as public automated ones, the higher proportion 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, 2005

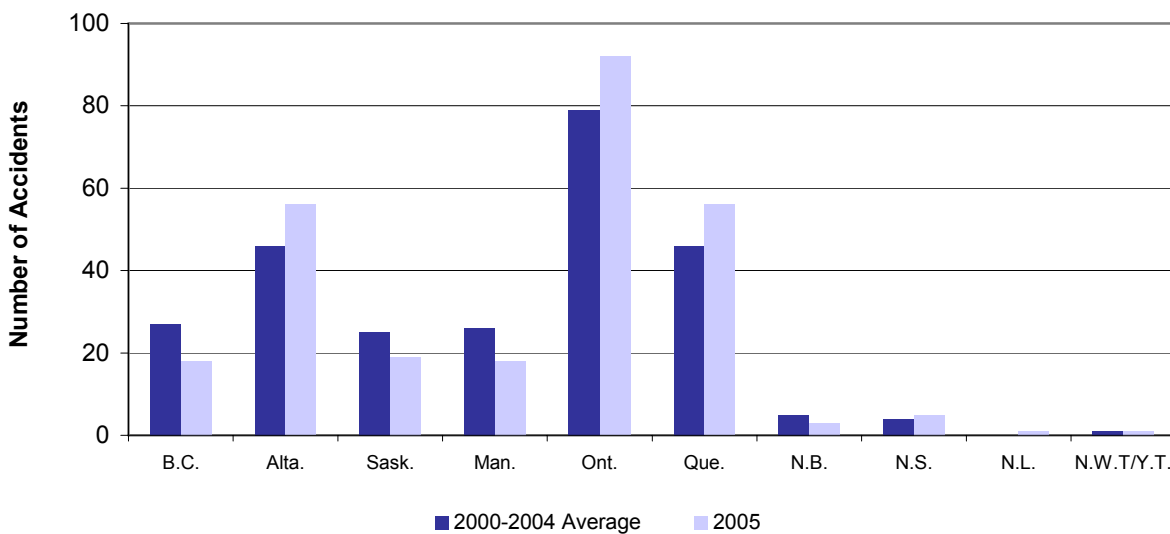


Fatal crossing accidents totalled 34 in 2005, up from 21 in 2004 and the five-year average of 30. Although crossing accidents involving pedestrians accounted for 6% of crossing accidents in 2005, they accounted for nearly 30% of fatal crossing accidents. Crossing-related fatalities totalled 37 in 2005, up 48% from the 2004 total of 25 but comparable to the five-year average of 35.

In 2005, 12 crossing accidents resulted in a derailment, up from the 2004 total and the five-year average of 9. Although heavy vehicles (for example, dump trucks, tractor-trailers) were involved in 17% of crossing accidents in 2005, they were involved in 75% of those resulting in a derailment.

Crossing accidents in Alberta, Ontario and Quebec were higher than their respective five-year averages (Figure 9), and crossing accidents in British Columbia, Saskatchewan and Manitoba showed a decrease.

Figure 9 – Crossing Accidents by Province

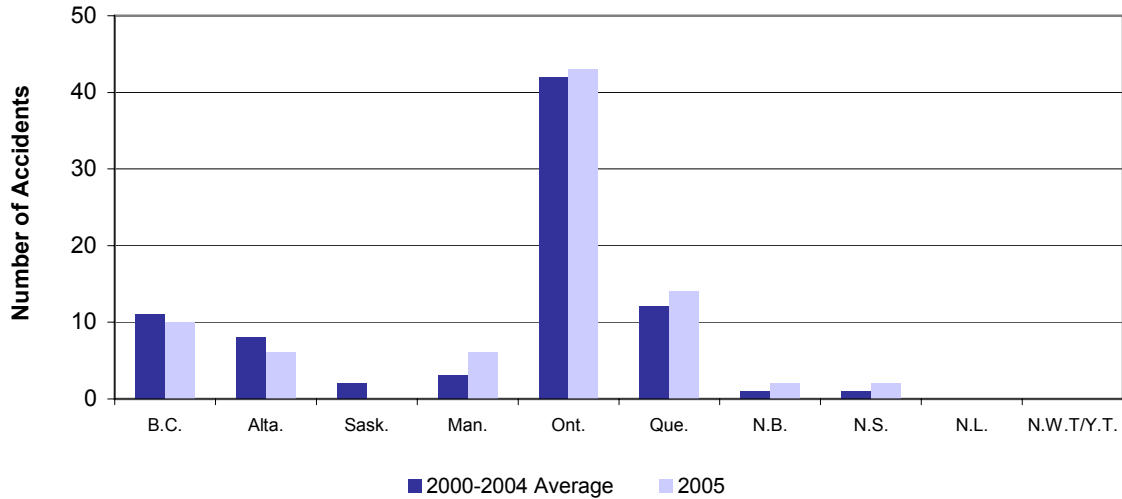


Trespasser Accidents: Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock other than at railway crossings. They totalled 83 in 2005, down from the 2004 total of 99 but up from the five-year average of 79.

Over 80% of trespasser accidents occurred in Ontario, Quebec and British Columbia, accounting for 52%, 17% and 12% of accidents respectively (Figure 10).

In 2005, the proportion of fatal trespasser accidents (77%) was higher than the five-year average proportion of 68%. Consequently, the proportion of trespasser accidents resulting in serious injuries (20%) was lower than the five-year average proportion of 29%.

Figure 10 - Trespasser Accidents by Province



INCIDENTS

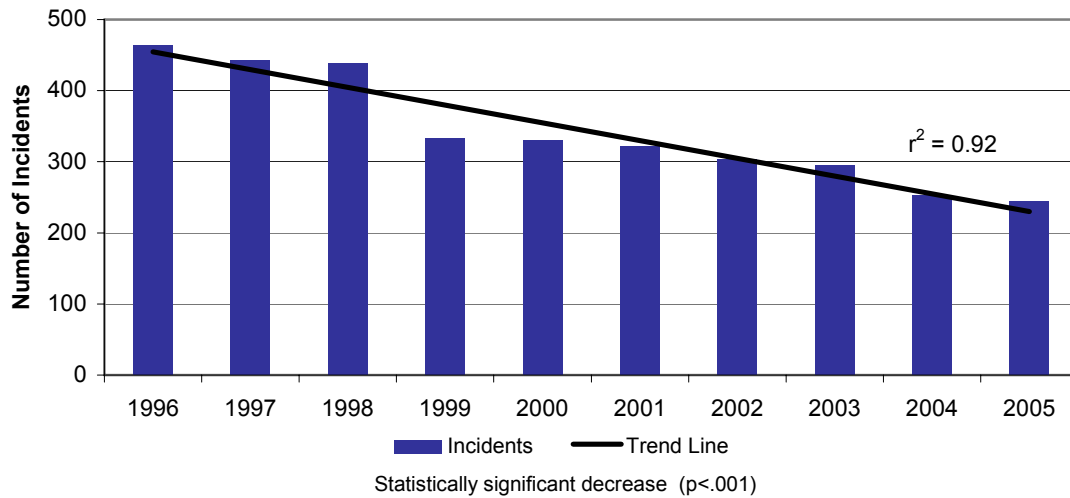
Overview of Incidents (Tables 10 and 11 in Appendix A)

In 2005, reported rail incidents reached a 23-year low of 244, down from 252 in 2004 and the five-year average of 300.

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 considerable decrease in the number of reported dangerous goods (DG) leaker incidents.

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, $p < .05$).

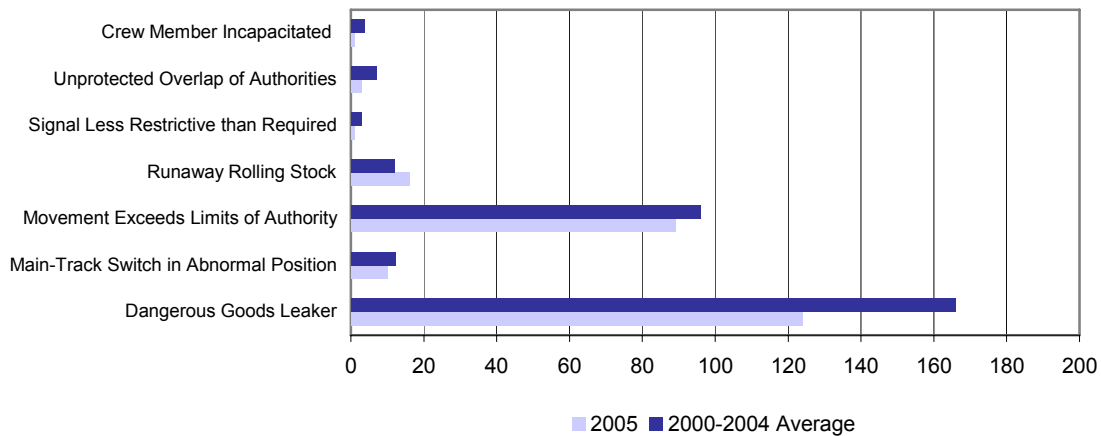
Figure 11 - Rail Incidents, 1996-2005



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. DG leaker incidents, which accounted for half of reported rail incidents in 2005, showed a 5% and 25% decrease respectively from the 2004 total of 131 and the five-year average of 166 (Figure 12). In 2005, there were 89 incidents where the movement exceeded the limits of authority, compared to 90 in 2004 and the five-year average of 96.

Factors assigned in non-dangerous goods incidents were primarily operational or rules-related, 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
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents										
Main-Track Train Collisions	13	12	14	10	9	7	8	6	5	6
Main-Track Train Derailments	188	172	108	119	121	127	116	149	152	194
Crossing Accidents	365	307	273	283	263	278	261	250	237	269
Non-Main-Track Train Collisions	122	113	114	100	113	86	112	104	116	93
Non-Main-Track Train Derailments	362	322	388	403	387	385	347	389	450	540
Collisions/Derailments Involving Track Units	22	19	13	27	16	18	11	23	26	19
Employee/Passenger Accidents	6	6	10	13	13	8	8	6	12	8
Trespasser Accidents	126	98	78	95	79	80	73	65	99	83
Fires/Explosions	61	44	51	53	32	36	24	23	15	17
Other	39	23	26	26	30	35	24	17	26	19
Total	1304	1116	1075	1129	1063	1060	984	1032	1138	1248
Reportable Incidents										
Dangerous Goods Leaker	330	285	272	167	188	194	167	151	131	124
Main-Track Switch in Abnormal Position	8	12	14	15	17	9	9	11	12	10
Movement Exceeds Limits of Authority	71	104	107	115	102	95	93	102	90	89
Runaway Rolling Stock	18	16	20	15	9	9	19	13	11	16
Other	36	26	25	21	14	15	15	18	8	5
Total	463	443	438	333	330	322	303	295	252	244
Million Main-Track Train-Miles (MMTTM)**										
	76.0	79.5	79.0	78.8	80.1	79.9	81.3	80.6	82.6	85.8
Main-Track Accidents***/MMTTM										
	4.2	3.7	2.9	3.0	2.8	3.0	2.5	2.7	2.8	3.1
Accidents Involving Dangerous Goods										
Main-Track Train Derailments	51	32	25	19	30	17	24	38	37	33
Crossing Accidents	9	4	8	8	12	7	6	3	11	15
Non-Main-Track Train Collisions	85	61	56	48	50	40	48	37	44	44
Non-Main-Track Train Derailments	190	172	136	133	149	128	130	139	106	114
All Others	33	18	15	16	8	13	13	8	10	9
Total	368	287	240	224	249	205	221	225	208	215
Accidents with a Dangerous Goods Release										
	15	8	5	9	7	5	5	9	6	7
Fatalities										
Crossing Accidents	46	32	39	37	33	41	46	28	25	37
Trespasser Accidents	67	69	61	62	54	56	50	45	68	64
All Others	4	8	1	7	1	2	0	6	8	2
Total	117	109	101	106	88	99	96	79	101	103
Serious Injuries										
Crossing Accidents	69	60	43	45	33	47	42	52	50	53
Trespasser Accidents	45	30	17	34	23	23	21	19	33	17
All Others	15	12	15	20	11	21	10	10	10	6
Total	129	102	75	99	67	91	73	81	93	76

* For federally regulated railways only.

** 2005 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, and accidents on former BC Rail subdivisions between July 1, 2004 and March 31, 2005)

Table 2**Fatalities and Serious Injuries by Type of Occurrence and Person Type
1996–2005**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Main-Track Train Collisions										
Fatalities	3	0	0	0	0	0	0	0	1	0
Serious Injuries	1	0	2	0	0	0	2	0	0	0
Main-Track Train Derailments										
Fatalities	0	3	0	4	0	0	0	2	2	0
Serious Injuries	0	5	0	6	1	9	0	2	0	0
Crossing Accidents										
Fatalities	46	32	39	37	33	41	46	28	25	37
Serious Injuries	69	60	43	45	33	47	42	52	50	53
Non-Main-Track Train Collisions										
Fatalities	0	1	0	0	0	1	0	0	0	0
Serious Injuries	3	1	0	2	0	0	0	0	0	0
Non-Main-Track Train Derailments										
Fatalities	0	1	0	0	0	1	0	1	0	0
Serious Injuries	0	0	0	0	0	0	0	0	0	1
Collisions/Derailments Involving Track Units										
Fatalities	1	1	0	0	0	0	0	0	0	0
Serious Injuries	4	0	3	0	1	0	0	0	0	1
Employee/Passenger Accidents										
Fatalities	0	2	1	3	1	0	0	1	5	2
Serious Injuries	6	4	10	10	8	8	6	3	7	4
Trespasser Accidents										
Fatalities	67	69	61	62	54	56	50	45	68	64
Serious Injuries	45	30	17	34	23	23	21	19	33	17
Fires/Other										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	1	1	0	0	0	1	0	1	1	0
Dangerous Goods Leaker										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	0	0	0	0	0	0	1	0	0
Other Incidents										
Fatalities	0	0	0	0	0	0	0	2	0	0
Serious Injuries	0	1	0	2	1	3	2	3	2	0
Fatalities by Person Type										
Employees	3	7	0	7	1	2	0	6	6	2
Passengers	0	2	0	0	0	0	0	0	0	0
Pedestrians	8	7	8	7	8	6	10	6	4	11
Vehicle Occupants	38	24	31	30	28	34	38	23	23	28
Trespassers	67	69	61	61	51	56	48	44	68	62
Other Persons	1	0	1	1	0	1	0	0	0	0
Total	117	109	101	106	88	99	96	79	101	103
Serious Injuries by Person Type										
Employees	15	7	12	17	10	16	10	11	9	6
Passengers	1	5	3	7	1	7	0	0	0	1
Pedestrians	3	2	4	5	7	5	6	6	2	2
Vehicle Occupants	65	58	39	38	27	42	36	44	48	50
Trespassers	45	29	16	32	21	20	21	20	32	17
Other Persons	0	1	1	0	1	1	0	0	2	0
Total	129	102	75	99	67	91	73	81	93	76

Table 3
Rail Accidents by Train Type*
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Freight Train										
Main-Track Train Collisions	19	11	19	15	13	9	19	10	7	7
Main-Track Train Derailments	178	164	106	111	114	120	115	150	142	185
Non-Main-Track Train Collisions	144	150	141	132	125	105	133	108	119	88
Non-Main-Track Train Derailments	330	306	351	367	325	346	319	339	411	485
Crossing	309	267	239	241	225	243	234	220	195	220
Trespasser	92	73	52	70	49	56	44	47	72	58
Other	80	63	70	82	63	59	47	44	39	34
Total	1152	1034	978	1018	914	938	911	918	985	1077
Passenger Train										
Main-Track Train Collisions	0	4	3	2	1	1	0	1	1	0
Main-Track Train Derailments	5	4	1	9	3	5	0	2	3	5
Non-Main-Track Train Collisions	2	1	4	0	0	0	0	8	5	4
Non-Main-Track Train Derailments	4	1	4	3	4	8	7	11	10	10
Crossing	40	30	29	32	18	26	23	18	32	37
Trespasser	29	24	25	23	28	23	29	18	26	24
Other	12	5	9	8	11	13	8	1	4	5
Total	92	69	75	77	65	76	67	59	81	85
Track Unit										
Main-Track Train Collisions	0	0	1	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	0	0	0	1	0	0
Non-Main-Track Train Derailments	0	0	0	1	0	1	0	0	0	0
Crossing	5	5	2	7	4	5	1	5	8	8
Trespasser	0	0	0	1	0	1	0	0	1	0
Other	33	22	24	40	28	28	17	37	48	31
Total	38	27	27	49	32	35	18	43	57	39
Single Car/Cut of Cars										
Main-Track Train Collisions	6	4	6	0	0	0	0	0	0	0
Main-Track Train Derailments	1	1	0	3	1	1	2	1	0	2
Non-Main-Track Train Collisions	80	41	39	42	56	35	51	49	61	49
Non-Main-Track Train Derailments	23	15	21	20	17	23	22	32	20	35
Crossing	0	0	0	0	1	0	1	0	0	0
Trespasser	1	0	0	1	0	0	0	0	0	0
Other	19	15	9	8	6	10	5	10	12	7
Total	130	76	75	74	81	69	81	92	93	93
Other										
Main-Track Train Collisions	0	0	2	0	1	0	0	0	0	2
Main-Track Train Derailments	4	4	1	3	4	1	2	1	8	4
Non-Main-Track Train Collisions	5	4	12	3	21	4	7	7	11	7
Non-Main-Track Train Derailments	11	10	21	17	42	14	7	16	21	26
Crossing	11	5	3	6	11	4	3	7	2	4
Trespasser	4	0	1	0	1	0	0	0	0	1
Other	6	4	1	5	5	1	0	1	2	3
Total	41	27	41	34	85	24	19	32	44	47

* 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
1996–2005

By Province

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newfoundland and Labrador	3	1	1	0	2	3	1	0	0	2
Nova Scotia	3	0	1	3	2	2	1	0	2	0
New Brunswick	3	3	0	0	2	3	0	1	3	3
Quebec	24	25	21	22	14	19	23	26	21	25
Ontario	55	49	37	30	28	33	35	57	46	60
Manitoba	14	22	12	11	17	14	11	6	10	11
Saskatchewan	24	20	7	10	14	12	10	14	14	22
Alberta	29	18	15	16	15	17	16	17	24	29
British Columbia	33	34	14	26	27	24	19	28	32	42
Northwest Territories/Yukon	0	0	0	1	0	0	0	0	0	0
Canada	188	172	108	119	121	127	116	149	152	194
Derailments per MMTM*	2.47	2.16	1.37	1.51	1.51	1.59	1.41	1.85	1.82	2.25
Derailments per BGTM**	0.58	0.49	0.32	0.33	0.32	0.33	0.31	0.38	0.36	

* MMTM - million main-track train-miles (Source: Transport Canada)

The derailment rate excludes three main-track derailments on former BC Rail subdivisions between July 1, 2004 and March 31, 2005.

** BGTM - billion gross ton-miles; 2005 data not yet available (Source: Railway Association of Canada)

By Total Number of Derailed Cars per Accident

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Derailed Cars										
1	77	71	43	50	43	51	45	68	73	80
2	16	20	20	14	10	15	13	8	14	16
3	10	5	3	8	11	8	4	8	6	9
4	11	5	8	5	6	9	6	5	8	9
5–10	33	37	18	24	24	22	26	35	22	41
10+	41	34	16	18	27	22	22	25	29	39
Total	188	172	108	119	121	127	116	149	152	194

Table 4b
Main-Track Train Derailments by Assigned Factors*
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Environmental	21	11	4	10	0	5	2	4	7	9
Equipment – Total	80	69	43	40	50	46	53	53	52	63
Axle	25	16	9	15	20	16	15	20	12	15
Brakes	9	10	6	2	7	5	9	5	6	13
Draft System	9	5	4	7	8	6	4	3	11	5
Superstructure	7	9	5	2	7	6	7	5	2	5
Truck	10	15	12	8	1	3	10	12	8	7
Wheel	20	14	7	6	7	10	8	8	13	18
Track – Total	70	67	49	54	46	40	39	56	59	65
Geometry	29	38	31	31	20	15	20	26	20	29
Object on Track	1	3	1	1	2	3	1	1	0	2
Other Track Material (OTM)	6	3	4	5	3	5	2	1	7	0
Rail	21	11	9	9	19	7	10	18	24	28
Roadbed	7	9	3	6	0	5	1	4	4	1
Switch	0	0	0	0	2	3	1	0	1	1
Turnouts	6	3	1	2	0	2	4	6	3	4
Actions – Total	41	50	45	23	21	27	18	25	20	19
Failure to Protect	2	10	4	6	6	4	3	5	4	4
Failure to Secure	0	1	0	0	0	1	0	1	1	0
Failure to Use Equipment Properly	8	7	10	7	5	9	11	10	6	6
Improper Loading/Lifting	1	3	1	1	1	1	1	0	1	0
Improper Placement/Position for Task	2	2	4	2	6	2	1	2	3	4
Inadequate/Inappropriate Maintenance of Equipment	16	19	20	3	1	4	1	2	3	4
Operating at Improper Speed	6	7	5	1	1	5	1	4	1	0
Vandalism	4	0	0	2	0	1	0	0	0	0
Other	2	1	1	1	1	0	0	1	1	1
Total	212	197	141	127	117	118	112	138	138	156

* 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
1996–2005

By Province

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	2	0	0	1	0	0	2	0	0
New Brunswick	2	7	0	1	1	2	1	2	1	1
Quebec	26	22	20	19	14	14	15	15	19	13
Ontario	37	30	36	31	42	28	48	44	28	28
Manitoba	17	7	10	13	11	11	11	7	12	11
Saskatchewan	7	8	7	6	4	4	5	7	4	5
Alberta	20	19	31	19	26	15	17	20	33	20
British Columbia	12	18	10	11	14	12	15	7	19	15
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	122	113	114	100	113	86	112	104	116	93

By Total Number of Derailed Cars per Accident

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Derailed Cars										
0*	60	50	54	49	55	43	60	61	62	58
1	29	26	35	23	25	22	21	20	26	14
2	14	20	11	13	19	10	16	13	14	12
3	7	4	5	7	7	5	8	1	9	5
4	5	4	2	1	2	3	3	4	2	1
5–10	6	8	7	6	4	3	2	4	3	3
10+	1	1	0	1	1	0	2	1	0	0
Total	122	113	114	100	113	86	112	104	116	93

* Number of collisions with no derailment.

Table 5b
Non-Main-Track Train Collisions by Assigned Factors*
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Environmental	2	0	1	2	1	1	3	1	3	3
Equipment – Total	1	1	0	4	1	2	2	3	1	0
Brakes	0	0	0	2	0	1	0	0	1	0
Draft System	0	1	0	2	1	1	1	1	0	0
Superstructure	1	0	0	0	0	0	1	2	0	0
Wheel	0	0	0	0	0	0	0	0	0	0
Track – Total	1	0	1	4	3	1	0	5	2	3
Appurtenances	1	0	1	2	1	1	0	3	1	3
Geometry	0	0	0	1	0	0	0	0	0	0
Others	0	0	0	1	2	0	0	2	1	0
Actions – Total	128	125	117	63	85	72	87	71	84	60
Failure to Protect	71	74	67	35	43	47	63	55	52	38
Failure to Secure	23	19	29	11	24	19	15	11	24	14
Failure to Use Equipment Properly	23	12	12	5	7	3	6	2	3	1
Improper Placement/Position for Task	0	1	4	2	1	0	0	0	1	0
Inadequate/Inappropriate Communications	2	3	2	4	2	1	0	0	1	2
Inadequate/Inappropriate Maintenance of Equipment	0	0	3	1	0	0	0	0	0	0
Operating at Improper Speed	8	14	0	4	5	1	1	2	3	4
Vandalism	0	1	0	0	0	0	2	1	0	0
Other	1	1	0	1	3	1	0	0	0	1
Total	132	126	119	73	90	76	92	80	90	66

* 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
1996–2005

By Province

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newfoundland and Labrador	1	0	1	0	1	0	0	0	0	1
Nova Scotia	6	3	2	3	2	5	6	17	10	6
New Brunswick	20	16	11	15	7	15	19	20	13	15
Quebec	62	61	78	74	69	65	53	63	79	91
Ontario	116	102	118	117	108	138	126	126	162	152
Manitoba	61	31	42	37	38	27	17	25	30	38
Saskatchewan	24	21	34	32	26	30	19	30	27	47
Alberta	38	52	64	64	88	50	68	63	85	119
British Columbia	34	36	38	61	48	55	38	45	44	70
Northwest Territories/Yukon	0	0	0	0	0	0	1	0	0	1
Canada	362	322	388	403	387	385	347	389	450	540

By Total Number of Derailed Cars per Accident

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Derailed Cars										
1	173	128	152	175	177	188	136	184	242	284
2	80	79	101	93	93	80	82	87	102	120
3	38	40	52	44	37	49	44	48	37	45
4	28	27	27	34	22	28	26	27	27	28
5–10	39	39	47	54	53	38	53	40	36	56
10+	4	9	9	3	5	2	6	3	6	7
Total	362	322	388	403	387	385	347	389	450	540

Table 6b
Non-Main-Track Train Derailments by Assigned Factors*
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Environmental	43	30	12	15	5	19	10	15	24	16
Equipment – Total	32	16	27	39	25	26	29	30	38	40
Axle	0	1	0	0	2	1	0	0	0	1
Brakes	4	3	5	5	7	6	7	3	6	10
Draft System	2	0	2	10	5	2	8	8	9	10
Superstructure	4	2	5	1	2	5	6	6	4	5
Truck	4	4	3	12	1	4	3	5	9	9
Wheel	18	6	12	11	8	8	5	8	10	5
Track – Total	145	138	192	161	154	145	118	121	134	173
Appurtenances	2	2	0	1	1	0	3	1	1	1
Geometry	54	67	73	60	62	48	29	43	44	56
Rail	12	11	22	21	17	14	14	16	12	16
Roadbed	13	8	4	5	4	5	2	2	7	5
Other Track Material	28	16	37	14	24	29	21	16	19	17
Turnouts	35	33	53	55	26	31	45	33	33	49
Object on Track	1	1	3	5	5	10	1	6	5	8
Switch	0	0	0	0	15	8	2	4	13	21
Other	0	0	0	0	0	0	1	0	0	0
Actions – Total	216	191	238	159	181	138	135	146	155	195
Failure to Protect	95	99	107	96	111	83	68	88	97	119
Failure to Secure	17	9	12	4	10	11	11	17	11	20
Failure to Use Equipment Properly	42	35	35	18	17	15	34	12	20	35
Improper Loading/Lifting	0	2	1	1	13	2	1	2	0	4
Improper Placement/Position for Task	1	6	8	2	9	5	0	3	4	8
Inadequate/Inappropriate Communications	4	1	1	1	2	1	1	1	3	2
Inadequate/Inappropriate Maintenance of Equipment	36	28	56	17	6	10	10	4	9	2
Operating at Improper Speed	9	3	2	5	7	4	2	9	4	1
Vandalism	12	7	15	12	6	6	7	10	6	4
Others	0	1	1	3	0	1	1	0	1	0
Total	436	375	469	374	365	328	292	312	351	424

* 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
1996–2005

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents											
Public Crossings*											
Total Passive Warnings	(12 060)	140	109	95	98	84	77	95	72	65	72
Flashing Lights and Bells	(4059)	135	113	96	91	95	101	89	85	75	104
Gates	(2073)	33	32	34	35	42	43	39	50	42	53
Other Automated Warnings	(24)	0	1	2	0	2	1	0	1	0	3
Total Automated Warnings	(6156)	168	146	132	126	139	145	128	136	117	160
Sub-total	(18 216)	308	255	227	224	223	222	223	208	182	232
Private Crossings		50	48	41	49	37	48	33	36	51	32
Farm Crossings		7	4	5	10	3	8	5	6	4	5
Total		365	307	273	283	263	278	261	250	237	269
Fatal Accidents		39	30	38	32	30	35	41	24	21	34
Fatalities											
Public Crossings											
Total Passive Warnings		14	10	14	20	10	14	16	8	7	7
Flashing Lights and Bells		17	11	11	5	12	11	14	9	10	13
Gates		10	8	9	9	10	10	13	7	8	12
Other Automated Warnings		0	0	0	0	0	0	0	0	0	0
Total Automated Warnings		27	19	20	14	22	21	27	16	18	25
Sub-total		41	29	34	34	32	35	43	24	25	32
Private Crossings		5	1	5	3	1	5	3	2	0	4
Farm Crossings		0	2	0	0	0	1	0	2	0	1
Total		46	32	39	37	33	41	46	28	25	37
Serious Injuries											
Public Crossings											
Total Passive Warnings		31	21	16	13	6	12	18	15	15	9
Flashing Lights and Bells		24	30	16	21	16	20	13	23	21	22
Gates		10	5	5	6	7	6	6	8	11	14
Other Automated Warnings		0	0	0	0	0	0	0	0	0	1
Total Automated Warnings		34	35	21	27	23	26	19	31	32	37
Sub-total		65	56	37	40	29	38	37	46	47	46
Private Crossings		3	3	5	5	3	7	5	6	3	6
Farm Crossings		1	1	1	0	1	2	0	0	0	1
Total		69	60	43	45	33	47	42	52	50	53

* Figures in parenthesis denote the number of public grade crossings for federally regulated railways in Canada by warning type as of April 2006. (There are approximately 28 500 private and farm crossings in Canada.) (Source: Transport Canada)

Table 8
Crossing Accidents and Related Casualties by Province
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents*										
Newfoundland and Labrador	(7)	1	0	0	0	0	0	0	0	1
Nova Scotia	(119)	7	5	3	7	3	10	1	2	5
New Brunswick	(190)	6	5	2	5	2	8	2	9	3
Quebec	(1660)	61	51	48	51	44	43	44	36	56
Ontario	(4768)	91	75	65	94	88	80	77	80	92
Manitoba	(2360)	46	30	34	19	21	25	36	28	18
Saskatchewan	(5462)	49	33	38	30	32	29	24	24	19
Alberta	(2791)	71	70	54	52	45	54	55	38	56
British Columbia	(840)	33	38	29	24	28	28	22	32	18
Northwest Territories/Yukon	(19)	0	0	0	1	0	1	0	1	1
Canada	(18 216)	365	307	273	283	263	278	261	250	237
Crossing Accidents per MMTM**	4.51	3.43	3.25	3.17	2.90	3.05	2.84	2.89	2.68	2.78
Crossing Accidents with Derailment	6	5	5	8	9	12	9	4	9	12
Fatalities										
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	0	1	2	0	0	0	0
New Brunswick	1	2	0	0	0	0	0	0	0	1
Quebec	6	7	7	6	8	4	9	4	9	7
Ontario	19	10	14	20	12	17	15	15	12	16
Manitoba	1	2	7	2	2	3	5	2	1	2
Saskatchewan	5	1	5	1	5	8	3	4	1	2
Alberta	5	6	4	5	3	5	10	3	2	6
British Columbia	8	4	2	3	2	2	4	0	0	3
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	46	32	39	37	33	41	46	28	25	37
Serious Injuries										
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	1
Nova Scotia	1	2	0	0	0	0	0	0	0	2
New Brunswick	1	1	1	0	0	2	1	1	2	0
Quebec	13	10	7	4	6	4	6	5	14	11
Ontario	13	11	7	19	7	15	14	19	11	20
Manitoba	13	5	6	3	4	3	3	4	6	1
Saskatchewan	8	6	6	7	3	5	4	4	3	4
Alberta	16	19	13	11	8	13	12	11	9	11
British Columbia	4	6	3	1	5	4	2	8	5	3
Northwest Territories/Yukon	0	0	0	0	0	1	0	0	0	0
Canada	69	60	43	45	33	47	42	52	50	53

* Figures in parenthesis denote the estimated number of public crossings for federally regulated railways in each province as of April 2006. (Source: Transport Canada)

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

Table 9
Trespasser Accidents and Related Casualties by Province
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents										
Newfoundland and Labrador	1	0	0	0	0	0	0	0	1	0
Nova Scotia	3	0	0	0	0	1	0	0	2	2
New Brunswick	3	0	0	0	1	0	2	0	0	2
Quebec	31	15	12	26	14	10	13	6	16	14
Ontario	55	47	36	46	41	42	43	38	45	43
Manitoba	1	4	4	1	1	7	3	3	3	6
Saskatchewan	3	4	2	3	2	3	0	2	3	0
Alberta	8	7	10	10	6	9	3	7	16	6
British Columbia	21	21	14	9	14	8	9	9	13	10
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	126	98	78	95	79	80	73	65	99	83
Fatal Accidents	67	69	59	61	54	56	50	45	67	64
Fatalities										
Newfoundland and Labrador	1	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	0	0	1	0	0	1	1
New Brunswick	2	0	0	0	1	0	2	0	0	1
Quebec	14	10	11	19	10	9	9	4	10	12
Ontario	35	34	30	31	30	29	33	30	32	33
Manitoba	0	3	3	0	0	2	1	2	3	4
Saskatchewan	1	2	1	1	1	3	0	0	4	0
Alberta	2	3	8	7	4	7	1	5	11	5
British Columbia	11	17	8	4	8	5	4	4	7	8
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	67	69	61	62	54	56	50	45	68	64
Serious Injuries										
Newfoundland and Labrador	1	0	0	0	0	0	0	0	1	0
Nova Scotia	0	0	0	0	0	0	0	0	1	1
New Brunswick	1	0	0	0	0	0	0	0	0	1
Quebec	10	5	1	7	3	1	3	2	6	2
Ontario	15	13	8	16	9	12	9	7	13	9
Manitoba	1	1	0	1	1	5	2	1	0	1
Saskatchewan	2	3	1	2	1	0	0	2	0	0
Alberta	4	4	2	3	5	2	2	2	5	1
British Columbia	11	4	5	5	4	3	5	5	7	2
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	45	30	17	34	23	23	21	19	33	17

Table 10
Reportable Incidents by Type and Assigned Factor
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Incidents										
Dangerous Goods Leaker	330	285	272	167	188	194	167	151	131	124
Main-Track Switch in Abnormal Position	8	12	14	15	17	9	9	11	12	10
Movement Exceeds Limits of Authority	71	104	107	115	102	95	93	102	90	89
Runaway Rolling Stock	18	16	20	15	9	9	19	13	11	16
Signal Less Restrictive than Required	4	1	9	8	2	7	3	2	1	1
Unprotected Overlap of Authorities	32	24	16	11	11	4	6	10	5	3
Crew Member Incapacitated	0	1	0	2	1	4	6	6	2	1
Total	463	443	438	333	330	322	303	295	252	244
Assigned Factors*										
Equipment	3	0	5	4	1	4	3	7	1	1
Individual/Personal	86	107	108	109	57	35	29	40	20	16
Track	4	2	6	3	3	5	3	3	0	2
Actions	124	159	174	110	134	112	105	117	108	106
Failure to Protect	7	12	14	34	44	42	39	39	37	31
Failure to Secure	11	9	11	16	11	6	10	8	5	10
Failure to Use Equipment Properly	3	0	8	2	7	1	3	5	6	2
Inadequate/Inappropriate Communications	5	6	16	4	8	6	3	5	5	7
Overlap of Authorities	92	120	113	40	56	49	45	58	48	49
Vandalism	4	9	6	1	2	5	2	1	4	4
Other	2	3	6	13	6	3	3	1	3	3
Total	217	268	293	226	195	156	140	167	129	125

* 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
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Incidents										
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	0	0	0	1	0	0	0	1
New Brunswick	2	9	10	8	3	5	6	10	7	1
Quebec	60	50	25	14	12	8	8	9	7	8
Ontario	110	100	89	65	59	74	65	46	34	30
Manitoba	10	6	9	11	24	8	9	9	17	3
Saskatchewan	8	13	10	4	2	8	4	2	4	4
Alberta	37	55	74	37	54	43	43	45	31	29
British Columbia	103	52	55	28	34	47	32	30	31	48
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	330	285	272	167	188	194	167	151	131	124
Leak by Location/Component*										
Structural	4	2	1	3	2	0	4	3	0	1
Safety Appurtenances	85	82	66	19	37	25	34	27	28	19
Operating Appurtenances	184	177	148	107	105	110	86	65	74	82
Auxiliary Appurtenances	41	31	46	32	28	34	25	25	15	12
Other	13	14	19	11	14	19	7	14	8	5
Total	327	306	280	172	186	188	156	134	125	119

* 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 (for example, 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.