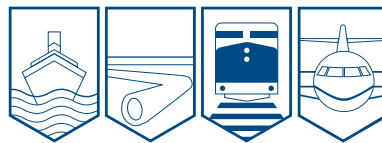
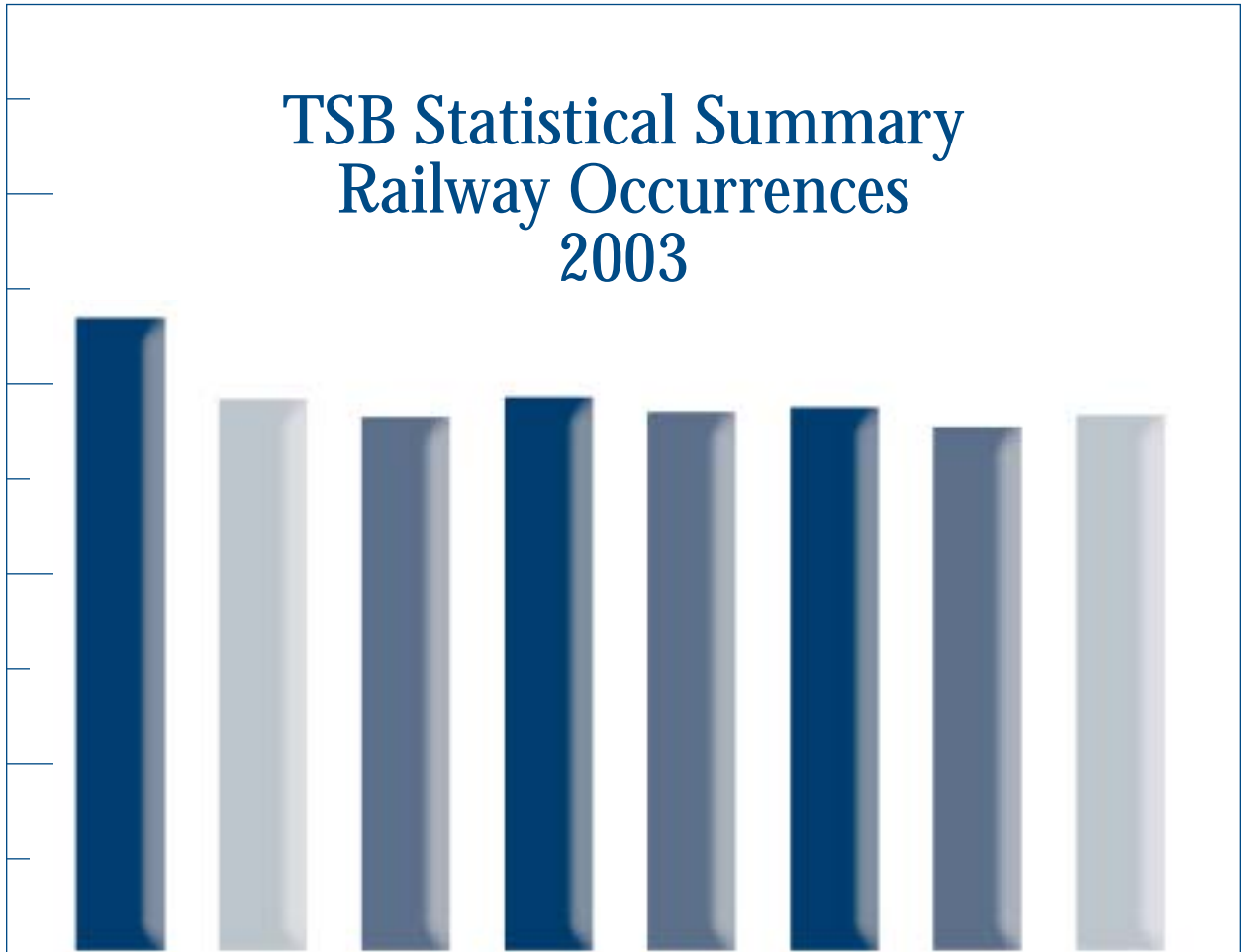




TSB Statistical Summary Railway Occurrences 2003



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 Internet 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 may 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 2003 statistics presented here reflect the TSB database updated as of 15 March 2004.

To enhance awareness and increase the safety value of the material presented in the TSB Statistical Summary, Railway Occurrences 2003, readers are encouraged to copy or reprint the data presented in whole, or in part, for further distribution (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.

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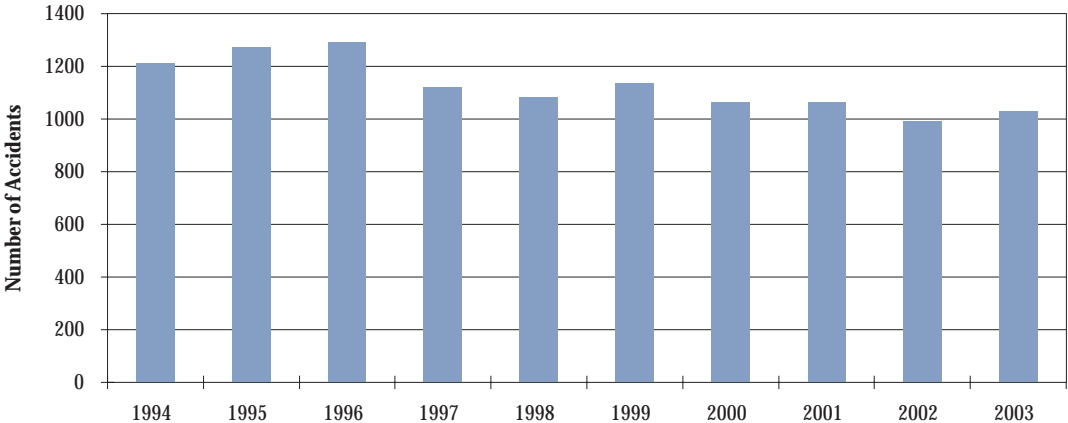
RAILWAY OCCURENCES IN 2003

ACCIDENTS

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

In 2003, 1030 rail accidents were reported to the TSB (Figure 1), a 5% increase from 2002 but a 3% decrease from the 1998-2002 average of 1062.

Figure 1 - Rail Accidents, 1994-2003

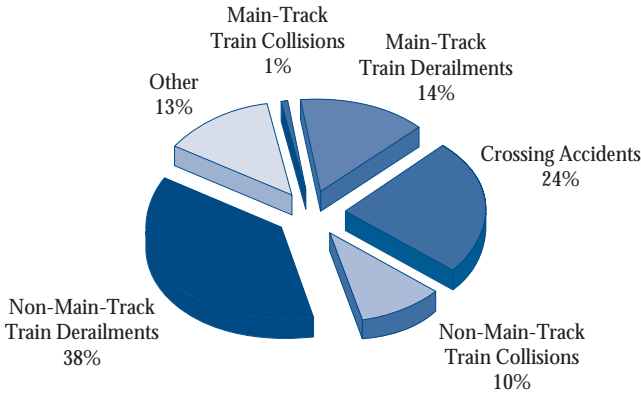


The largest proportion of reported rail accidents are non-main-track related. In 2003, these accounted for 48% of the total (Figure 2). Typically, most non-main-track accidents are minor, occurring during switching operations at speeds of less than 10 mph.

Main-track derailments and collisions accounted for 15% of all accidents in 2003, up from 13% in 2002.

In 2003, 24% of accidents involved vehicles or pedestrians at highway-rail crossings, a proportion which has remained relatively unchanged over the past five years.

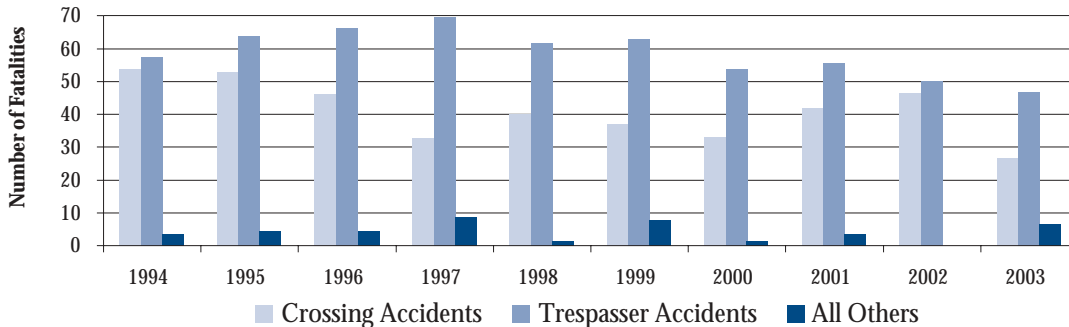
Figure 2 - Rail Accidents by Type, 2003



In 2003, 225 accidents involved rolling stock or vehicles carrying (or having recently carried) dangerous goods, comparable to the 2002 total of 221 and the five-year average of 228. Of these, 78% were non-main-track accidents. Eight accidents resulted in a dangerous goods release, compared to five in 2002 and the five-year average of six.

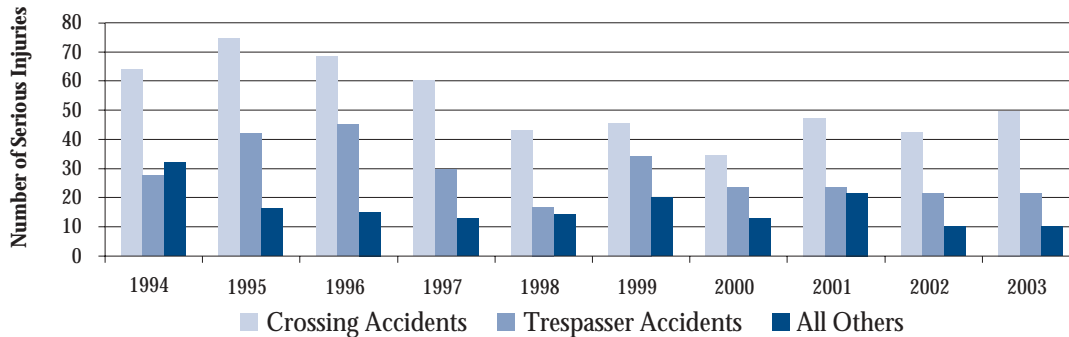
Rail fatalities reached a 21-year low of 79 in 2003, down from 96 in 2002 and the five-year average of 98. This decrease is mainly due to a reduction in crossing-related fatalities which totalled 27 in 2003 (Figure 3), a 41% and 31% decrease respectively from the 2002 total of 46 and the five-year average of 39. Trespassing fatalities totalled 46 in 2003, down from 50 in 2002 and the five-year average of 57. In 2003, six employees were fatally injured, up from the five-year average of two.

Figure 3 - Fatalities by Type of Occurrence, 1994-2003



A total of 81 serious injuries resulted from rail occurrences in 2003 (Figure 4), up from 73 in 2002 but equal to the five-year average. Crossing-related injuries totalled 50 in 2003, a 19% increase from the 2002 total and the five-year average of 42.

Figure 4 - Serious Injuries by Type of Occurrence, 1994-2003

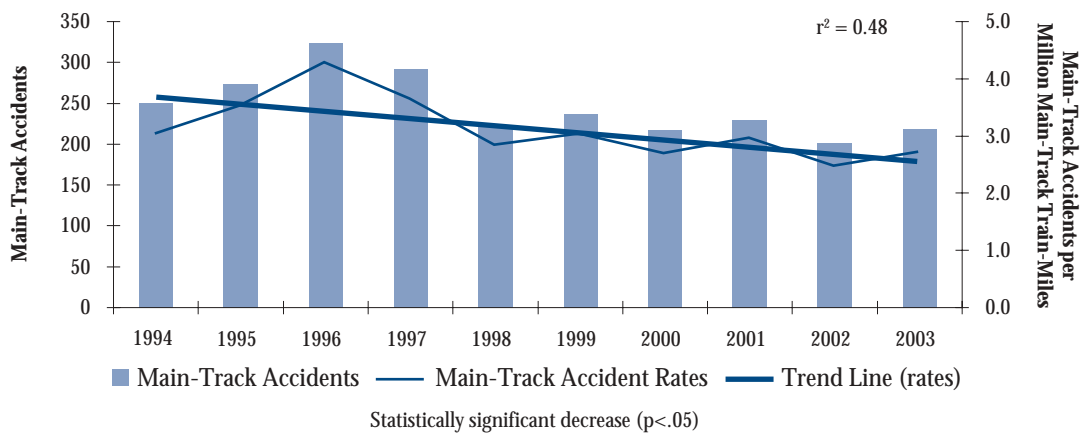


Freight trains accounted for 80% of trains involved in rail accidents in 2003, followed by single cars/cuts of cars and passenger trains with proportions of 8% and 5% respectively. Although crossing and trespasser accidents continued to account for the majority of passenger train accidents in 2003, the number of passenger trains involved in non-main-track accidents increased to 19, up from the five-year average of six. As most of these accidents occurred while switching equipment in maintenance centres, which meant the passenger cars were empty, none resulted in passenger injuries or fatalities.

Accidents by Type (Tables 4a to 9)

Main-track accidents: Main-track accidents (accidents other than crossing or trespasser accidents which occur on main track 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 track decreased by 2% over 2002, which resulted in a 13% increase in the accident rate from 2.4 main-track accidents per million main-track train-miles in 2002 to 2.7 in 2003. Notwithstanding, an analysis of the frequency of main-track accident rates using linear regression indicates a statistically significant downward trend¹ ($p < .05$) over the past 10 years.

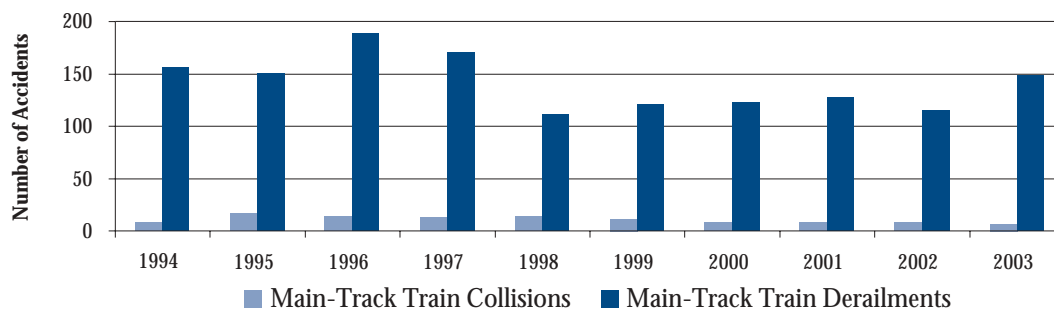
Figure 5 - Main-Track Accidents and Accident Rates, 1994-2003



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 six main-track collisions in 2003, fewer than the 2002 total of eight (Figure 6) and the five-year average of 10. No fatalities or serious injuries resulted from main-track collisions in 2003.

Figure 6 - Main-Track Collisions and Derailments, 1994-2003



¹ 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. $p < .05$).

A total of 148 main-track derailments were reported in 2003, a 28% increase from the 2002 total of 116 and a 25% increase from the five-year average of 118. This increase was most significant in Ontario where 57 main-track derailments occurred, up from 35 in 2002 and the five-year average of 33. Half of main-track derailments in 2003 involved the derailment of one or two cars, while 17% involved the derailment of more than 10 cars.

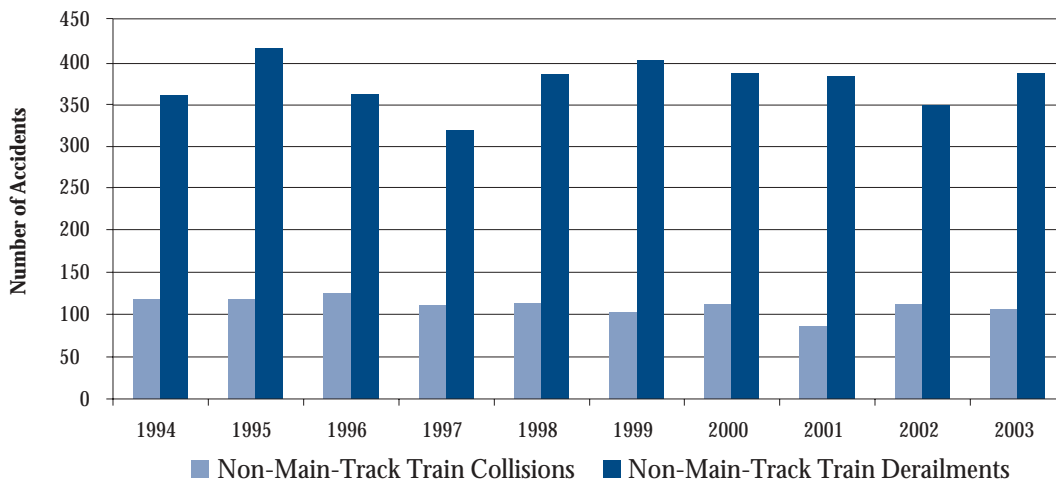
In May 2003, two crew members were fatally injured following a freight train derailment on a wooden trestle in McBride, B.C., and two were seriously injured following a freight train derailment in Melrose, Ontario, in February 2003.

In 2003, 38 main-track derailments involved dangerous goods, up from 24 in 2002 and the five-year average of 23. Four of these resulted in a release of dangerous goods, with three leading to an evacuation of the surrounding area.

In 2003, 38% of factors assigned² to main-track derailments were equipment-related, primarily axles and trucks, compared to 47% in 2002 but equal to the five-year average. Track-related factors, mainly track geometry and rail, accounted for 41% of assigned factors, up from 35% in 2002 and the five-year average of 37%. 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 104 in 2003, down from 112 in 2002 (Figure 7) but comparable to the five-year average of 105. Derailments occurred in 40% of non-main-track collisions, 77% of which involved the derailment of one or two cars.

Figure 7 - Non-Main-Track Collisions and Derailments, 1994-2003



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

No fatalities or serious injuries resulted from non-main-track collisions in 2003.

Dangerous goods were involved in 36% 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 (89%) (e.g., non-compliance with prescribed procedures). Failure to protect, such as improper positioning of movements and handling of switches, was assigned most often.

There were 388 non-main-track derailments in 2003, up 12% from 2002 (Figure 7) and 2% from the five-year average of 382. Sixty-nine percent of these accidents involved the derailment of one or two cars.

One railway employee was fatally injured in a non-main-track derailment in 2003.

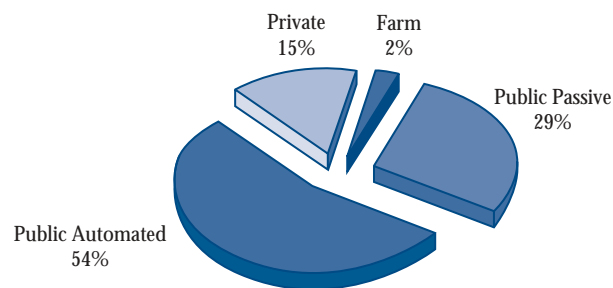
Dangerous goods cars were involved in 36% of non-main-track derailments, two of which resulted in a release of product.

In 2003, 46% of factors assigned to non-main-track derailments were rules-related, comparable to 2002 and the five-year average. Track-related factors also accounted for 39% of assigned factors, a proportion which has been relatively stable over the past 10 years.

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 21-year low of 247 in 2003, down from 261 in 2002 and the five-year average of 272. This decrease was due primarily to a reduction in accidents at public passive crossings, from 96 in 2002 to 71 in 2003. The proportion of accidents occurring at public passive crossings decreased from 37% in 2002 to 29% in 2003 (Figure 8). Although there are more than twice as many public passive crossings as public automated ones, more than half of the accidents occurred at automated crossings due in part to higher vehicle and train traffic volumes at these crossings. Accidents at public crossings equipped with flashing lights and bells, totalling 84 in 2003, decreased by 6% from the 2002 total of 89 and by 11% from the five-year average of 94. On the other hand, accidents at gated crossings totalled 49 in 2003, a 26% increase from the 2002 total and the five-year average of 39.

Figure 8 - Crossing Accidents by Type of Crossing, 2003

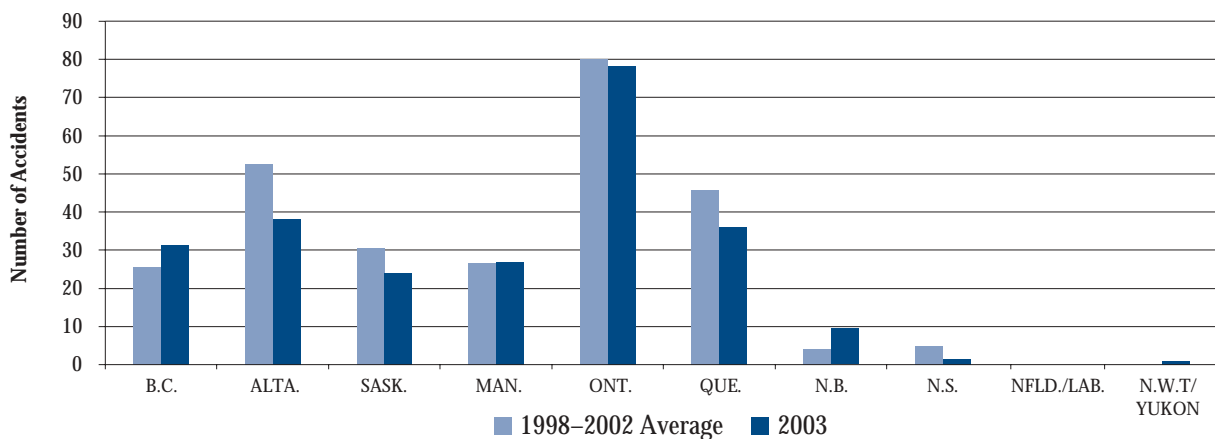


Fatal crossing accidents totalled 23 in 2003, down from 41 in 2002 and the five-year average of 35. Although crossing accidents involving pedestrians account for an average of 5% of all crossing accidents, they account for an average of 20% of fatal crossing accidents. Crossing-related fatalities totalled 27 in 2003, down 41% from the 2002 total of 46 and 31% from the five-year average of 39.

Failing to stop was the most common motor vehicle driver behaviour contributing to crossing accidents (73%), followed by vehicles stopped, stalled or stuck on the track (9%). Accidents involving abandoned vehicles accounted for 6% of crossing accidents.

Crossing accidents were equal to, or lower than, respective five-year averages in most provinces (Figure 9). The most notable decrease was in Alberta, where crossing accidents reached a 21-year low of 38, down from the five-year average of 52. Although the number of crossing accidents in British Columbia and New Brunswick was higher than the five-year average, none resulted in fatalities. However, serious injuries in British Columbia increased to eight in 2003, up from the five-year average of three.

Figure 9 - Crossing Accidents by Province

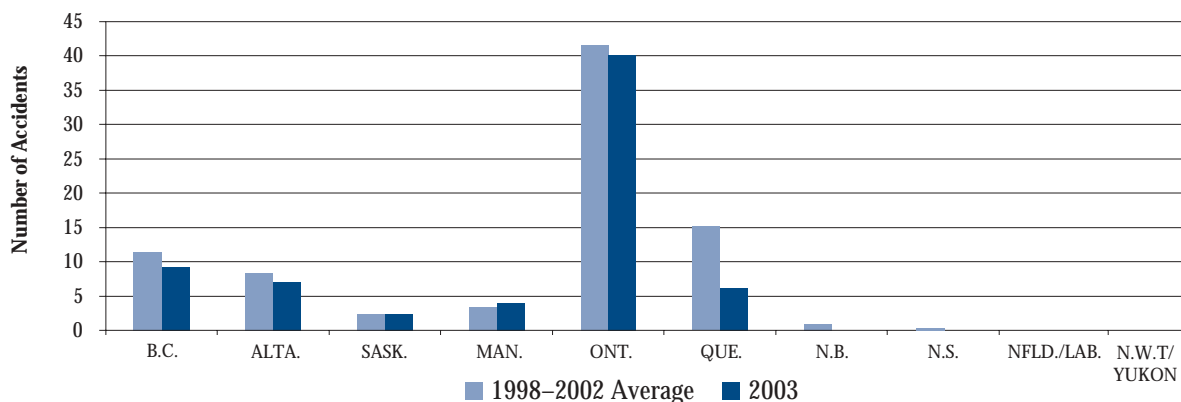


Trespasser accidents: Trespasser accidents involve persons, primarily pedestrians, not authorized to be on railway rights-of-way and who are struck by rolling stock other than at railway crossings. They totalled 68 in 2003, down 7% from the 2002 total of 73 and 16% from the five-year average of 81.

Nearly three-quarters of trespasser accidents occurred in Ontario and British Columbia, which accounted for 59% and 13% of accidents respectively (Figure 10). While the number of trespasser accidents in most provinces has been relatively stable over the past five years, Quebec has seen a decrease in such accidents, from an average of 15 to six in 2003.

In the past five years, virtually all trespasser accidents resulted in casualties (i.e., 68% in fatalities and 30% in serious injuries).

Figure 10 - Trespasser Accidents by Province



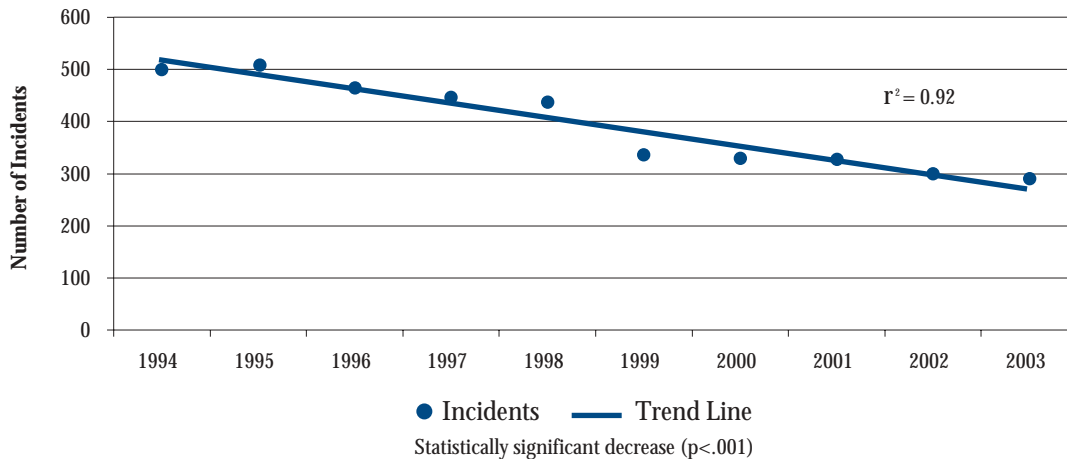
INCIDENTS

Overview of Incidents (Tables 10 and 11)

In 2003, reported rail incidents reached a 21-year low of 295, down from 303 in 2002 and the five-year average of 345.

Statistical analysis using linear regression indicates 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.

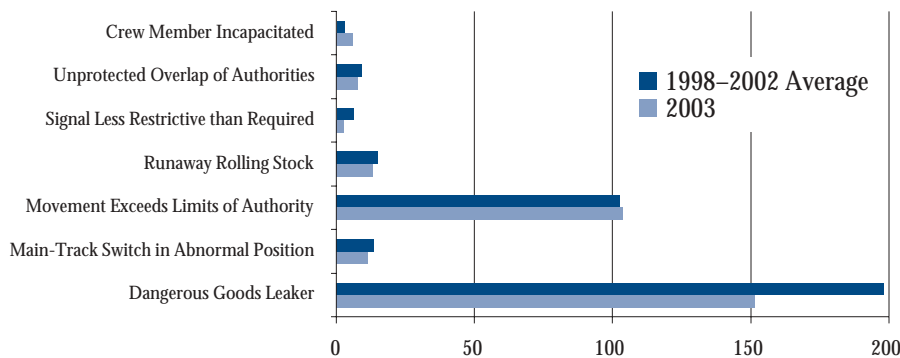
Figure 11 - Rail Incidents, 1994-2003



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 151 DG leaker incidents in 2003, accounting for 51% of reported incidents. This total represents a 10% and 24% decrease respectively from the 2002 total of 167 and the five-year average of 198 (Figure 12). In 2003, there were 103 incidents where the movement exceeded the limit of authority, up from 93 in 2002 but comparable to the five-year average of 102.

Factors assigned in non-dangerous goods incidents were primarily operational or rules-related (70%), with the most frequent involving an overlap of authorities or a failure to protect.

Figure 12 - Rail Incidents by Type



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, $p < .05$).



APPENDIX A - RAIL OCCURRENCE TABLES

Table 1

Railway Occurrences* and Casualties
1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Accidents										
Main-Track Train Collisions	11	15	13	12	14	10	9	7	8	6
Main-Track Train Derailments	157	151	188	172	108	119	121	127	116	148
Crossing Accidents	391	379	365	307	273	283	263	278	261	247
Non-Main-Track Train Collisions	118	116	122	113	114	100	113	86	112	104
Non-Main-Track Train Derailments	365	417	362	322	388	403	387	385	347	388
Collisions/Derailments Involving Track Units	13	14	22	19	13	27	16	18	11	23
Employee/Passenger Accidents	7	6	6	6	10	13	13	8	8	6
Trespasser Accidents	99	112	126	98	78	95	79	80	73	68
Fires/Explosions	27	39	61	44	51	53	32	36	24	23
Other	25	27	39	23	26	26	30	35	24	17
Total	1213	1276	1304	1116	1075	1129	1063	1060	984	1030
Reportable Incidents										
Dangerous Goods Leaker	332	352	330	285	272	167	188	194	167	151
Main-Track Switch in Abnormal Position	24	15	8	12	14	15	17	9	9	11
Movement Exceeds Limits of Authority	90	101	71	104	107	115	102	95	93	103
Runaway Rolling Stock	14	11	18	16	20	15	9	9	19	13
Other	40	23	36	26	25	21	14	15	15	17
Total	500	502	463	443	438	333	330	322	303	295
Million Main-Track Train-Miles (MMTTM)**										
	82.5	78.4	76.0	79.5	79.0	78.8	80.1	79.9	82.5	80.6
Main-Track Accidents***/MMTTM										
	3.1	3.5	4.2	3.7	2.9	3.0	2.8	3.0	2.4	2.7
Accidents Involving Dangerous Goods										
Main-Track Train Derailments	33	35	51	32	25	19	30	17	24	38
Crossing Accidents	9	7	9	4	8	8	12	7	6	3
Non-Main-Track Train Collisions	72	62	85	61	56	48	50	40	48	37
Non-Main-Track Train Derailments	202	190	190	172	136	133	149	128	130	139
All Others	17	14	33	18	15	16	8	13	13	8
Total	333	308	368	287	240	224	249	205	221	225
Accidents with a Dangerous Goods Release										
	7	5	15	8	5	9	7	5	5	8
Fatalities										
Crossing Accidents	54	53	46	32	39	37	33	41	46	27
Trespasser Accidents	57	64	67	69	61	62	54	56	50	46
All Others	2	4	4	8	1	7	1	2	0	6
Total	113	121	117	109	101	106	88	99	96	79
Serious Injuries										
Crossing Accidents	64	75	69	60	43	45	33	47	42	50
Trespasser Accidents	28	41	45	30	17	34	23	23	21	21
All Others	31	16	15	12	15	20	11	21	10	10
Total	123	132	129	102	75	99	67	91	73	81

* For federally regulated railways only.

** 2003 main-track train-miles are estimated. (Source: Railways annual reports submitted to Transport Canada)

*** 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 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Main-Track Train Collisions										
Fatalities	0	0	3	0	0	0	0	0	0	0
Serious Injuries	1	4	1	0	2	0	0	0	2	0
Main-Track Train Derailments										
Fatalities	0	2	0	3	0	4	0	0	0	2
Serious Injuries	2	0	0	5	0	6	1	9	0	2
Crossing Accidents										
Fatalities	54	53	46	32	39	37	33	41	46	27
Serious Injuries	64	75	69	60	43	45	33	47	42	50
Non-Main-Track Train Collisions										
Fatalities	0	0	0	1	0	0	0	1	0	0
Serious Injuries	1	2	3	1	0	2	0	0	0	0
Non-Main-Track Train Derailments										
Fatalities	0	1	0	1	0	0	0	1	0	1
Serious Injuries	2	0	0	0	0	0	0	0	0	0
Coll./Derail. Involving Track Units										
Fatalities	0	0	1	1	0	0	0	0	0	0
Serious Injuries	4	4	4	0	3	0	1	0	0	0
Employee/Passenger Accidents										
Fatalities	2	0	0	2	1	3	1	0	0	1
Serious Injuries	5	6	6	4	10	10	8	8	6	3
Trespasser Accidents										
Fatalities	57	64	67	69	61	62	54	56	50	46
Serious Injuries	28	41	45	30	17	34	23	23	21	21
Fires/Other										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	16	0	1	1	0	0	0	1	0	1
Dangerous Goods Leakers										
Fatalities	0	0	0	0	0	0	0	0	0	0
Serious Injuries	0	0	0	0	0	0	0	0	0	1
Other Incidents										
Fatalities	0	1	0	0	0	0	0	0	0	2
Serious Injuries	0	0	0	1	0	2	1	3	2	3
Fatalities by Person Type										
Employees	1	5	3	7	0	7	1	2	0	6
Passengers	0	0	0	2	0	0	0	0	0	0
Pedestrians	8	8	8	7	8	7	8	6	10	7
Vehicle Occupants	46	45	38	24	31	30	28	34	38	23
Trespassers	57	63	67	69	61	61	51	56	48	43
Other Persons	1	0	1	0	1	1	0	1	0	0
Total	113	121	117	109	101	106	88	99	96	79
Serious Injuries by Person Type										
Employees	16	16	15	7	12	17	10	16	10	11
Passengers	16	0	1	5	3	7	1	7	0	0
Pedestrians	3	7	3	2	4	5	7	5	6	6
Vehicle Occupants	58	70	65	58	39	38	27	42	36	44
Trespassers	29	39	45	29	16	32	21	20	21	20
Other Persons	1	0	0	1	1	0	1	1	0	0
Total	123	132	129	102	75	99	67	91	73	81



Table 3
Rail Accidents by Train Type*
1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Freight Train										
Main-track train collisions	10	24	19	11	19	15	13	9	19	10
Main-track train derailments	149	140	178	164	106	111	114	120	115	150
Non-main-track train collisions	131	111	144	150	141	132	125	105	133	108
Non-main-track train derailments	342	372	330	306	351	367	325	346	319	338
Crossing	340	333	309	267	239	241	225	243	234	218
Trespasser	76	82	92	73	52	70	49	56	44	49
Other	50	46	80	63	70	82	63	59	47	44
Total	1098	1108	1152	1034	978	1018	914	938	911	917
Passenger Train										
Main-track train collisions	2	0	0	4	3	2	1	1	0	1
Main-track train derailments	7	7	5	4	1	9	3	5	0	1
Non-main-track train collisions	0	0	2	1	4	0	0	0	0	8
Non-main-track train derailments	3	1	4	1	4	3	4	8	7	11
Crossing	37	27	40	30	29	32	18	26	23	18
Trespasser	20	24	29	24	25	23	28	23	29	18
Other	10	17	12	5	9	8	11	13	8	1
Total	79	76	92	69	75	77	65	76	67	58
Track Unit										
Main-track train collisions	0	0	0	0	1	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	0	1
Non-main-track train derailments	0	0	0	0	0	1	0	1	0	0
Crossing	7	3	5	5	2	7	4	5	1	5
Trespasser	0	1	0	0	0	1	0	1	0	0
Other	15	23	33	22	24	40	28	28	17	37
Total	22	27	38	27	27	49	32	35	18	43
Single Car/Cut of Cars										
Main-track train collisions	3	4	6	4	6	0	0	0	0	0
Main-track train derailments	1	2	1	1	0	3	1	1	2	1
Non-main-track train collisions	87	98	80	41	39	42	56	35	51	49
Non-main-track train derailments	11	38	23	15	21	20	17	23	22	32
Crossing	0	0	0	0	0	0	1	0	1	0
Trespasser	0	1	1	0	0	1	0	0	0	0
Other	7	13	19	15	9	8	6	10	5	10
Total	109	156	130	76	75	74	81	69	81	92
Other										
Main-track train collisions	4	1	0	0	2	0	1	0	0	0
Main-track train derailments	1	2	4	4	1	3	4	1	2	1
Non-main-track train collisions	8	13	5	4	12	3	21	4	7	7
Non-main-track train derailments	10	14	11	10	21	17	42	14	7	16
Crossing	9	17	11	5	3	6	11	4	3	6
Trespasser	3	4	4	0	1	0	1	0	0	1
Other	0	5	6	4	1	5	5	1	0	1
Total	35	56	41	27	41	34	85	24	19	32

* 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 1994-2003

By Province

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Newfoundland & Labrador	1	0	3	1	1	0	2	3	1	0
Nova Scotia	2	0	3	0	1	3	2	2	1	0
New Brunswick	5	5	3	3	0	0	2	3	0	1
Quebec	19	24	24	25	21	22	14	19	23	26
Ontario	58	47	55	49	37	30	28	33	35	57
Manitoba	15	17	14	22	12	11	17	14	11	6
Saskatchewan	15	17	24	20	7	10	14	12	10	13
Alberta	23	16	29	18	15	16	15	17	16	17
British Columbia	19	25	33	34	14	26	27	24	19	28
Northwest Territories/Yukon	0	0	0	0	0	1	0	0	0	0
Canada	157	151	188	172	108	119	121	127	116	148
Derailments per MMTM*	1.90	1.93	2.47	2.16	1.37	1.51	1.51	1.59	1.41	1.84
Derailments per BGTM**	0.46	0.46	0.58	0.49	0.32	0.34	0.32	0.33	0.31	

By Total Number of Derailed Cars per Accident

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Derailed Cars										
1	64	67	77	71	43	50	43	51	45	67
2	23	21	16	20	20	14	11	15	13	8
3	9	15	10	5	3	8	11	8	4	8
4	6	1	11	5	8	5	6	9	6	5
5-10	26	24	33	37	18	24	24	22	26	35
10+	29	23	41	34	16	18	26	22	22	25
Total	157	151	188	172	108	119	121	127	116	148

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

**BGTM - Billion gross ton-miles; 2003 data not yet available (Source: Railway Association of Canada)



Table 4b

Main-Track Train Derailments by Assigned Factors* 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Environmental	12	13	21	11	4	10	0	5	2	4
Equipment - Total	74	66	80	69	43	40	50	46	53	51
Axle	23	26	25	16	9	15	20	16	15	20
Brakes	6	2	9	10	6	2	7	5	9	5
Draft System	2	4	9	5	4	7	8	6	4	2
Superstructure	8	6	7	9	5	2	7	6	7	5
Truck	12	11	10	15	12	8	1	3	10	11
Wheel	23	17	20	14	7	6	7	10	8	8
Track - Total	91	86	70	67	49	54	46	40	39	56
Geometry	44	42	29	38	31	31	20	15	20	26
Object on Track	0	0	1	3	1	1	2	3	1	1
Other Track Material (OTM)	6	8	6	3	4	5	3	5	2	1
Rail	26	26	21	11	9	9	19	7	10	18
Roadbed	5	3	7	9	3	6	0	5	1	4
Switch	0	0	0	0	0	0	2	3	1	0
Turnouts	10	7	6	3	1	2	0	2	4	6
Actions - Total	53	37	41	50	45	23	20	27	18	25
Failure to Protect	9	6	2	10	4	6	6	4	3	5
Failure to Secure	1	1	0	1	0	0	0	1	0	1
Failure to Use Equipment Properly	10	6	8	7	10	7	5	9	11	10
Improper Loading/Lifting	2	1	1	3	1	1	1	1	1	0
Improper Placement/Position for Task	3	1	2	2	4	2	5	2	1	2
Inadequate/Inappropriate Maint. of Equipment	20	12	16	19	20	3	1	4	1	2
Operating at Improper Speed	3	9	6	7	5	1	1	5	1	4
Vandalism	4	1	4	0	0	2	0	1	0	0
Other	1	0	2	1	1	1	1	0	0	1
TOTAL	230	202	212	197	141	127	116	118	112	136

* 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

1994-2003

By Province

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	1	2	0	0	1	0	0	2
New Brunswick	6	1	2	7	0	1	1	2	1	2
Quebec	21	15	26	22	20	19	14	14	15	15
Ontario	29	36	37	30	36	31	42	28	48	44
Manitoba	16	10	17	7	10	13	11	11	11	7
Saskatchewan	11	8	7	8	7	6	4	4	5	7
Alberta	22	26	20	19	31	19	26	15	17	20
British Columbia	13	19	12	18	10	11	14	12	15	7
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	118	116	122	113	114	100	113	86	112	104

By Total Number of Derailed Cars per Accident

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Derailed Cars										
0*	66	71	60	50	54	49	55	43	60	62
1	19	19	29	26	35	23	25	22	21	20
2	17	7	14	20	11	13	19	10	16	12
3	5	7	7	4	5	7	7	5	8	1
4	7	7	5	4	2	1	2	3	3	4
5-10	4	5	6	8	7	6	4	3	2	4
10+	0	0	1	1	0	1	1	0	2	1
Total	118	116	122	113	114	100	113	86	112	104

* Number of collisions with no derailment.



Table 5b

Non-Main-Track Train Collisions by Assigned Factors* 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Environmental	2	1	2	0	1	2	1	1	3	1
Equipment - Total	5	5	1	1	0	4	1	2	2	3
Brakes	0	1	0	0	0	2	0	1	0	0
Draft System	4	4	0	1	0	2	1	1	1	1
Superstructure	1	0	1	0	0	0	0	0	1	2
Wheel	0	0	0	0	0	0	0	0	0	0
Track - Total	3	1	1	0	1	4	3	1	0	5
Appurtenances	2	1	1	0	1	2	1	1	0	3
Geometry	0	0	0	0	0	1	0	0	0	0
Others	1	0	0	0	0	1	2	0	0	2
Actions - Total	116	133	128	125	117	63	85	72	87	70
Failure to Protect	49	66	71	74	67	35	43	47	63	55
Failure to Secure	22	22	23	19	29	11	24	19	15	11
Failure to Use Equipment Properly	22	21	23	12	12	5	7	3	6	2
Improper Placement/Position for Task	4	7	0	1	4	2	1	0	0	0
Inadequate/Inappropriate Communications	6	5	2	3	2	4	2	1	0	0
Inadequate/Inappropriate Maint. of Equipment	2	2	0	0	3	1	0	0	0	0
Operating at Improper Speed	7	8	8	14	0	4	5	1	1	1
Vandalism	2	0	0	1	0	0	0	0	2	1
Other	2	2	1	1	0	1	3	1	0	0
TOTAL	126	140	132	126	119	73	90	76	92	79

* 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 1994-2003

By Province

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Newfoundland & Labrador	0	1	1	0	1	0	1	0	0	0
Nova Scotia	4	2	6	3	2	3	2	5	6	17
New Brunswick	28	16	20	16	11	15	7	15	19	18
Quebec	95	90	62	61	78	74	69	65	53	63
Ontario	115	139	116	102	118	117	108	138	126	126
Manitoba	43	57	61	31	42	37	38	27	17	25
Saskatchewan	25	28	24	21	34	32	26	30	19	31
Alberta	28	44	38	52	64	64	88	50	68	63
British Columbia	27	40	34	36	38	61	48	55	38	45
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	1	0
Canada	365	417	362	322	388	403	387	385	347	388

By Total Number of Derailed Cars per Accident

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Derailed Cars										
1	181	196	173	128	152	175	177	188	136	184
2	71	98	80	79	101	93	93	80	82	86
3	38	51	38	40	52	44	37	49	44	48
4	24	21	28	27	27	34	22	28	26	27
5-10	44	42	39	39	47	54	53	38	53	40
10+	7	9	4	9	9	3	5	2	6	3
Total	365	417	362	322	388	403	387	385	347	388



Table 6b

Non-Main-Track Train Derailments by Assigned Factors* 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Environmental	33	35	43	30	12	15	5	19	10	15
Equipment - Total	26	29	32	16	27	40	25	26	29	30
Axle	0	0	0	1	0	0	2	1	0	0
Brakes	5	1	4	3	5	5	7	6	7	3
Draft System	4	7	2	0	2	11	5	2	8	8
Superstructure	2	5	4	2	5	1	2	5	6	6
Truck	2	4	4	4	3	12	1	4	3	5
Wheel	13	12	18	6	12	11	8	8	5	8
Track - Total	160	169	145	138	192	161	154	145	118	120
Appurtenances	2	1	2	2	0	1	1	0	3	1
Geometry	49	58	54	67	73	60	62	48	29	42
Rail	15	17	12	11	22	21	17	14	14	16
Roadbed	14	17	13	8	4	5	4	5	2	2
Other Track Material	25	37	28	16	37	14	24	29	21	16
Turnouts	48	33	35	33	53	55	26	31	45	33
Object on Track	7	6	1	1	3	5	5	10	1	6
Switch	0	0	0	0	0	0	15	8	2	4
Other	0	0	0	0	0	0	0	0	1	0
Actions - Total	215	264	216	191	238	159	181	138	135	141
Failure to Protect	100	122	95	99	107	96	111	83	68	86
Failure to Secure	11	18	17	9	12	4	10	11	11	17
Failure to Use Equipment Properly	41	50	42	35	35	18	17	15	34	12
Improper Loading/Lifting	1	0	0	2	1	1	13	2	1	1
Improper Placement/Position for Task	11	6	1	6	8	2	9	5	0	3
Inadequate/Inappropriate Communication	1	10	4	1	1	1	2	1	1	1
Inadequate/Inappropriate Maint. of Equipment	35	33	36	28	56	17	6	10	10	3
Operating at Improper Speed	7	6	9	3	2	5	7	4	2	8
Vandalism	8	19	12	7	15	12	6	6	7	10
Other	0	0	0	1	1	3	0	1	1	0
TOTAL	434	497	436	375	469	375	365	328	292	306

* 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 1994-2003

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Accidents											
Public Crossings*											
Total Passive Warnings	(13,442)	154	136	140	109	95	98	84	77	96	71
Flashing Lights & Bells	(4,309)	141	136	136	113	96	91	95	101	89	84
Gates	(1,958)	31	44	32	32	34	35	42	43	39	49
Other Automated Warnings	(23)	1	0	0	1	2	0	2	1	0	1
Total Automated Warnings	(6,290)	173	180	168	146	132	126	139	145	128	134
Sub-total	(19,732)	327	316	308	255	227	224	223	222	224	205
Private Crossings		49	56	50	48	41	49	37	48	32	36
Farm Crossings		15	7	7	4	5	10	3	8	5	6
Total		391	379	365	307	273	283	263	278	261	247
Fatal Accidents											
		45	39	39	30	38	32	30	35	41	23
Fatalities											
Public Crossings											
Total Passive Warnings		21	17	14	10	14	20	10	14	16	8
Flashing Lights & Bells		20	26	18	11	11	5	12	11	14	9
Gates		7	7	9	8	9	9	10	10	13	6
Other Automated Warnings		0	0	0	0	0	0	0	0	0	0
Total Automated Warnings		27	33	27	19	20	14	22	21	27	15
Sub-total		48	50	41	29	34	34	32	35	43	23
Private Crossings		2	3	5	1	5	3	1	5	3	2
Farm Crossings		4	0	0	2	0	0	0	1	0	2
Total		54	53	46	32	39	37	33	41	46	27
Serious Injuries											
Public Crossings											
Total Passive Warnings		22	27	31	21	16	13	6	12	18	14
Flashing Lights & Bells		34	32	24	30	16	21	16	20	13	22
Gates		4	10	10	5	5	6	7	6	6	8
Other Automated Warnings		0	0	0	0	0	0	0	0	0	0
Total Automated Warnings		38	42	34	35	21	27	23	26	19	30
Sub-total		60	69	65	56	37	40	29	38	37	44
Private Crossings		2	4	3	3	5	5	3	7	5	6
Farm Crossings		2	2	1	1	1	0	1	2	0	0
Total		64	75	69	60	43	45	33	47	42	50

*Figures in parenthesis denote the number of public grade crossings for federally regulated railways in Canada by warning type as of March 2004. (There are approximately 28 500 private and farm crossings in Canada.) (Source: Transport Canada)



Table 8

Crossing Accidents and Related Casualties by Province 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Accidents*										
Newfoundland & Labrador	(7)	0	1	1	0	0	0	0	0	0
Nova Scotia	(119)	6	4	7	5	3	7	3	10	1
New Brunswick	(251)	12	12	6	5	2	5	2	8	2
Quebec	(1,696)	78	58	61	51	48	51	44	43	44
Ontario	(4,913)	108	121	91	75	65	94	88	80	77
Manitoba	(2,398)	29	33	46	30	34	19	21	25	36
Saskatchewan	(5,995)	42	44	49	33	38	30	32	29	24
Alberta	(3,484)	71	66	71	70	54	52	45	54	55
British Columbia	(850)	45	40	33	38	29	24	28	28	22
Northwest Territories/Yukon	(19)	0	0	0	0	0	1	0	1	0
Canada	(19,732)	391	379	365	307	273	283	263	278	261
Crossing Accidents per MMTM**	4.36	4.55	4.51	3.43	3.25	3.17	2.90	3.05	2.84	2.85
Crossing Accidents with Derailment	10	6	6	5	5	8	9	12	9	4
Fatalities										
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	0	0	0	1	2	0	0
New Brunswick	1	1	1	2	0	0	0	0	0	0
Quebec	7	11	6	7	7	6	8	4	9	4
Ontario	22	14	19	10	14	20	12	17	15	14
Manitoba	2	4	1	2	7	2	2	3	5	2
Saskatchewan	7	14	5	1	5	1	5	8	3	4
Alberta	8	8	5	6	4	5	3	5	10	3
British Columbia	7	1	8	4	2	3	2	2	4	0
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	54	53	46	32	39	37	33	41	46	27
Serious Injuries										
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	2	0	0	0	0	0	0
New Brunswick	1	1	1	1	1	0	0	2	1	1
Quebec	9	15	13	10	7	4	6	4	6	5
Ontario	25	26	13	11	7	19	7	15	14	18
Manitoba	4	3	13	5	6	3	4	3	3	3
Saskatchewan	4	13	8	6	6	7	3	5	4	4
Alberta	17	14	16	19	13	11	8	13	12	11
British Columbia	4	3	4	6	3	1	5	4	2	8
Northwest Territories/Yukon	0	0	0	0	0	0	0	1	0	0
Canada	64	75	69	60	43	45	33	47	42	50

* Figures in parentheses denote the estimated number of public crossings for federally regulated railways in each province as of March 2004. The Canada total is the actual figure. (Source: Transport Canada)

** 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 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Accidents										
Newfoundland & Labrador	0	0	1	0	0	0	0	0	0	0
Nova Scotia	1	0	3	0	0	0	0	1	0	0
New Brunswick	0	6	3	0	0	0	1	0	2	0
Quebec	27	27	31	15	12	26	14	10	13	6
Ontario	40	41	55	47	36	46	41	42	43	40
Manitoba	7	13	1	4	4	1	1	7	3	4
Saskatchewan	3	3	3	4	2	3	2	3	0	2
Alberta	12	13	8	7	10	10	6	9	3	7
British Columbia	9	9	21	21	14	9	14	8	9	9
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	99	112	126	98	78	95	79	80	73	68
Fatal Accidents										
	55	63	67	69	59	61	54	56	50	46
Fatalities										
Newfoundland & Labrador	0	0	1	0	0	0	0	0	0	0
Nova Scotia	1	0	1	0	0	0	0	1	0	0
New Brunswick	0	6	2	0	0	0	1	0	2	0
Quebec	12	16	14	10	11	19	10	9	9	4
Ontario	31	26	35	34	30	31	30	29	33	31
Manitoba	2	5	0	3	3	0	0	2	1	2
Saskatchewan	3	2	1	2	1	1	1	3	0	0
Alberta	4	7	2	3	8	7	4	7	1	5
British Columbia	4	2	11	17	8	4	8	5	4	4
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	57	64	67	69	61	62	54	56	50	46
Serious Injuries										
Newfoundland & Labrador	0	0	1	0	0	0	0	0	0	0
Nova Scotia	0	0	0	0	0	0	0	0	0	0
New Brunswick	0	0	1	0	0	0	0	0	0	0
Quebec	9	10	10	5	1	7	3	1	3	2
Ontario	7	13	15	13	8	16	9	12	9	8
Manitoba	4	5	1	1	0	1	1	5	2	2
Saskatchewan	0	1	2	3	1	2	1	0	0	2
Alberta	6	6	4	4	2	3	5	2	2	2
British Columbia	2	6	11	4	5	5	4	3	5	5
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	28	41	45	30	17	34	23	23	21	21



Table 10

Reportable Incidents by Type and Assigned Factor 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Incidents										
Dangerous Goods Leaker	332	352	330	285	272	167	188	194	167	151
Main-Track Switch in Abnormal Position	24	15	8	12	14	15	17	9	9	11
Movement Exceeds Limits of Authority	90	101	71	104	107	115	102	95	93	103
Runaway Rolling Stock	14	11	18	16	20	15	9	9	19	13
Signal Less Restrictive than Required	10	0	4	1	9	8	2	7	3	2
Unprotected Overlap of Authorities	30	22	32	24	16	11	11	4	6	9
Crew Member Incapacitated	0	1	0	1	0	2	1	4	6	6
Total	500	502	463	443	438	333	330	322	303	295
Assigned Factors*										
Equipment	4	0	3	0	5	4	1	4	3	7
Individual/Personal	111	114	86	107	108	108	57	35	29	40
Track	10	4	4	2	6	3	3	5	3	3
Actions	151	147	124	159	174	110	134	112	105	114
Failure to Protect	18	14	7	12	14	34	44	42	39	38
Failure to Secure	11	8	11	9	11	16	11	6	10	7
Failure to Use Equipment Properly	2	1	3	0	8	2	7	1	3	5
Inadequate/Inappropriate Communication	2	2	5	6	16	4	8	6	3	5
Overlap of Authorities	111	115	92	120	113	40	56	49	45	57
Vandalism	5	4	4	9	6	1	2	5	2	1
Other	2	3	2	3	6	13	6	3	3	1
Total	276	265	217	268	293	225	195	156	140	164

* 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 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Incidents										
Newfoundland & Labrador	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	0	0	0	1	0	0
New Brunswick	17	4	2	9	10	8	3	5	6	10
Quebec	32	40	60	50	25	14	12	8	8	9
Ontario	115	119	110	100	89	65	59	74	65	46
Manitoba	19	31	10	6	9	11	24	8	9	9
Saskatchewan	13	10	8	13	10	4	2	8	4	2
Alberta	55	69	37	55	74	37	54	43	43	45
British Columbia	81	78	103	52	55	28	34	47	32	30
Northwest Territories/Yukon	0	0	0	0	0	0	0	0	0	0
Canada	332	352	330	285	272	167	188	194	167	151
Leak by Location/Component*										
Structural	8	6	4	2	1	3	2	0	4	3
Safety Appurtenances	59	81	85	82	66	19	37	25	34	25
Operating Appurtenances	173	165	184	177	148	107	105	110	86	65
Auxiliary Appurtenances	35	48	41	31	46	32	28	34	25	25
Others	55	50	13	14	19	11	14	19	7	14
Total	330	350	327	306	280	172	186	188	156	132

* 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.

