



U.S. Department
of Transportation
**Federal Transit
Administration**

Commuter Rail Safety Study

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Office of Safety and Security



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1.0 Introduction

The commuter rail industry has a strong safety record. The National Transportation Safety Board (NTSB), in its *Safety Report for 2005*, shows that of the 45,650 transportation fatalities that occurred in the United States in 2005, only 81 (or 0.18 percent) are attributed to commuter rail. Of all U.S. surface-based transportation modes, only rail rapid transit has fewer fatalities and serious injuries per million passengers carried. Further, over the last decade, the number of passengers transported by commuter railroads has increased by almost 50 percent. Yet, over the same period of time, the rate of safety accidents/incidents per million total train miles and the rate of injuries per million passengers transported have each fallen by almost 50 percent.

While much progress has been made, significant accidents continue to occur, and the number of annual fatalities has not been reduced substantively over the last decade. Moreover, recent accidents have highlighted specific issues that need prompt government and industry attention. The exposure of pedestrians, trespassers, and motorists at highway-rail grade crossings and along the rail right-of-way continues to provide significant safety challenges with no immediate or cost-effective solutions.

There is a need to ensure that the safety performance of the commuter rail industry is appropriately assessed and analyzed, and that the results are documented and effectively communicated to the commuter railroads, government, industry associations, and other interested parties. To meet this need, the Federal Transit Administration (FTA), Office of Safety and Security, working cooperatively with the Federal Railroad Administration (FRA), Office of Safety, has performed this *Commuter Rail Safety Study*. The objectives of this study are to:

- Identify the most frequent, highest risk causes of commuter rail accidents;
- Direct FTA and FRA oversight and technical assistance resources to address these high-risk causes; and
- Accelerate industry awareness, to promote identification and implementation of activities and practices that have the potential to mitigate the largest risks.

Background

In the United States, commuter railroads are under the jurisdiction of FRA, yet receive substantial funding from FTA. FRA requires and ensures compliance with safety regulations established for the transportation of passengers on the general railroad system (see FRA regulations in sections 49 CFR Part 200 through Part 265). FTA, through terms and conditions placed on its grants for major capital projects (49 U.S.C. Section 5309) and urbanized area formula funding (49 U.S.C. Section 5307) works actively with commuter railroads to ensure safety in their design, engineering, construction and operation, and in the procurement of commuter rail vehicles. In Fiscal Year 2006, FTA invested over \$460 million in 18 major commuter rail projects in varying stages of design, engineering and construction. In FY 2006, FTA also provided hundreds of millions of dollars to the commuter rail industry in urbanized formula funding. Both FRA and FTA also provide technical assistance and training to commuter rail professionals on a variety of safety and security issues.

Between 1991 and 2001, commuter railroads receiving funding from FTA reported summary accident data to FTA through the National Transit Database (NTD) and detailed accident/incident reports to FRA through the Rail Accident/Incident Reporting System (RAIRS) as required in 49 CFR Part 225. However, when significant revisions were made to the NTD in

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2001, placing an additional burden on safety reporters, it was determined that commuter railroads no longer needed to report safety data to FTA, since they were already required by Federal law to file detailed accident and incident reports with FRA. In support of this change, FRA agreed to share its commuter rail safety data with FTA for analysis.

Now, five years after this change, FTA's Office of Safety and Security, working with FRA's Office of Safety, has performed an in-depth analysis of safety data reported to FRA by commuter railroads receiving FTA funds. By focusing on the safety issues experienced by operating commuter railroads, this analysis targets possible areas for improvement to be monitored by FRA and FTA in the coming years. Also, this analysis supports the identification of issues for consideration in the review of safety plans and programs established by commuter rail grantees for FTA-funded projects, extensions and vehicle procurements. Earlier recognition of likely design and operating issues can promote enhancements during project engineering and construction phases that could potentially save lives, reduce injuries and property damage, and reduce system interruptions and delays due to accidents and incidents.

Commuter Railroads

There are 19 commuter railroads operating in the United States that receive funding from FTA. Each year, these commuter railroads transport over 400 million passengers and provide almost 10 billion passenger miles of service. Every weekday in the United States, more than 1.5 million passengers use commuter rail service to reach their destinations. Commuter railroads receiving funding from FTA employ more than 25,000 people and, each year collect over \$1.5 billion in fares from passengers. The 19 operating railroads receiving FTA funds include the following:

- Altamont Commuter Express Authority (ACEX)
- Alaska Railroad Corporation (ARR)
- Connecticut Department of Transportation (CDOT)
- Long Island Rail Road (LI)
- MARC Train Service (MACZ)
- Massachusetts Bay Transit Authority (MBTA)
- Metro North Commuter Railroad (MNCW)
- *Music City Star East Corridor Commuter Rail (MSC)**
- Northern Indiana Commuter Transportation District (NICD)
- Northeast Illinois Regional Commuter Rail Corporation (NIRC)
- New Jersey Transit Rail Operations (NJTR)
- Peninsular Corridor Joint Powers Board (PCMZ)
- Southern California Regional Rail Authority (SCAX)
- Sounder Commuter Rail (SCR)
- San Diego Northern Railway (SDNX)
- Southeastern Pennsylvania Transportation Authority (SEPA)
- Tri-county Commuter Rail Authority (TCCX)
- Trinity Railway Express (TREX)
- Virginia Railway Express (VREX)

**Just initiated service in September 2006.*

Table 1 shows the annual passengers transported by each commuter railroad in 2005, as well as other general information about each commuter railroad, including the number of vehicles operated, annual passenger miles, directional route miles and track miles, the number of stations, the number of rail grade crossings, and each commuter rail agency's website. This information is based on submissions made by commuter railroads to FTA and FRA in 2005.

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Table 1: U.S. Commuter Railroads -- 2005 General Information

Commuter Railroad	Website	Commuter Rail Vehicles	Annual Passenger Miles	Stations	Directional Route Miles	Track Miles	Annual Passengers Transported	Rail Grade Crossings
Altamont Commuter Express, San Joaquin Regional Rail Commission (ACEX)	http://www.acerail.com/	20	29,172,897	10	172.0	180.0	619,873	127
Alaska Railroad Corporation (ARR)	http://www.akrr.com/arcc8.html	97	25,110,943	10	92.4	46.2	200,266	27
Connecticut Department of Transportation – Shoreline (CDOT)	http://www.shorelineeast.com/	31	8,515,802	8	101.2	103.0	423,470	3
Long Island Rail Road (LI)	http://www.mta.nyc.ny.us/lirr/	1,138	2,155,432,949	124	638.2	701.1	80,146,557	402
Mass Transit Administration, Maryland Dept. of Transportation – MARC Commuter Rail (MACZ)	http://www.mtamaryland.com/services/marc/	153	214,040,053	42	400.4	471.0	706,3775	40
Massachusetts Bay Transportation Authority (MBTA)	http://www.mbta.com/	460	409,812,824	126	702.1	583.7	37,885,348	233
Metro-North Commuter Railroad (MNCW)	http://www.mta.nyc.ny.us/mnr/index.html	1,013	2,139,477,109	109	545.7	799.6	73,111,076	161
Music City Star East Corridor Commuter Rail (MSC)	http://www.musiccitystar.org/	15	n.a.	6	32.0	32.5	n.a.	22
Northern Indiana Commuter Transportation District (NICD)	http://www.nictd.com/	66	122,470,066	20	179.8	130.4	399,7202	117
Northeast Illinois Regional Commuter Railroad Corporation – Metra (NIRC)	http://www.metrarail.com/	1,151	1,702,286,080	230	940.4	1,144.0	75,763,636	512
New Jersey Transit Corporation (NJTR)	http://www.njtransit.com/sf_tr.shtml	1,237	1,762,112,322	168	1,070.2	1,115.9	67,069,100	329
Peninsula Corridor Joint Powers Board (PCMZ)	http://www.caltrain.com/index.html	153	202,576,597	34	153.7	136.7	9,867,498	49
Southern California Regional Rail Authority – Metrolink (SCAX)	http://www.metrolinktrains.com/	159	319,517,007	53	778.0	631.0	9,445,414	443
Central Puget Sound Regional Transit Authority (SCR)	http://www.soundtransit.org/	69	8,933,596	9	78.6	140.0	1,275,600	35
North San Diego County Transit Development Board (SDNX)	http://www.sdcommute.com/	35	41,583,500	8	82.2	83.7	1,485,125	34
Southeastern Pennsylvania Transportation Authority (SEPA)	http://www.septa.org/	357	405,976,113	156	449.2	695.0	29,851,513	116
Tri-County Commuter Rail Authority (TCCX)	http://www.tri-rail.com/	30	78,969,072	18	142.2	104.0	2,636,922	72
Trinity Railway Express (TREX)	http://www.trinityrailwayexpress.org/	54	69,979,591	10	69.5	43.3	2,242,564	34
Virginia Railway Express (VREX)	http://www.vre.org/	93	118,819,837	18	161.5	190.0	3,649,344	23
Total		6,331	9,814,786,358	1,159	6,789.3	7,331.1	406,734,283	2,779

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As indicated in Table 1, there is a wide disparity in the level of service provided by different commuter rail agencies throughout the country. There are **four large commuter railroads** (Long Island Rail Road, Metro-North Commuter Railroad, Metra, and New Jersey Transit) that collectively provide almost 73 percent of all passenger service in this mode. Each of these four railroads transports between 67 and 80 million passengers per year. There are also **four medium-sized commuter railroads** (MBTA, SEPTA, Metrolink, and the Peninsula Corridor Joint Powers Board) that collectively provide 23 percent of passenger service in this mode. Each of these four medium-sized railroads transports between 9 and 38 million passengers every year. The **10 remaining smaller commuter railroads** provide approximately four percent of all commuter rail passenger trips. Each of these smaller railroads averages between 200,000 and 3.7 million annual passengers.

In considering the diversity among the FTA-funded commuter railroads, it is also important to recognize the unique operation of the Alaska Railroad Corporation (AAR). A Class II railroad that extends from Seward, in the south of Alaska, to Fairbanks, in the interior of that state, AAR carries both freight and passengers between those two cities and to many destinations between them, including Denali National Park. Unlike traditional commuter railroad operations, the passenger service provided by the AAR is aimed primarily at tourists and private businesses that rent trains. However, the railroad is included in this study because it receives FTA funding and because, at least during the summer months, some of its scheduled service resembles traditional commuter rail transportation.

Sources of Data

Data used in this *Commuter Rail Safety Study* was obtained from FRA's Office of Safety based on reports received from the 18 operating FTA-funded commuter railroads using the following forms, as required in 49 CFR Part 225:

- Form FRA F 6180.55 - Railroad Injury and Illness Summary
- Form FRA F 6180.55a - Railroad Injury and Illness Summary (Continuation Sheet)
- Form FRA F 6180.54 - Rail Equipment Accident/Incident Report
- Form FRA F 6180.57 - Highway-Rail Grade Crossing Accident/Incident Report

This information is also maintained on FRA's Office of Safety website, available at: <http://safetydata.fra.dot.gov/officeofsafety/>. Summary data was collected from FRA for the 18 commuter railroads receiving FTA funding during the 10-year period between **January 1, 1996 and December 31, 2005**. In-depth accident and incident reports were collected from FRA for these 18 commuter railroads for the 79-month study period between **January 1, 2000 and July 31, 2006**.

FRA Accident/Incident Definitions

49 CFR Part 225.5 and 225.19 contain definitions of various key terms used in FRA's accident/incident reporting regulations.

- **Accident/Incident.** The term used to describe the entire list of FRA-reportable events. These include: fatalities, injuries and illnesses; collisions, derailments, and similar accidents involving the operation of on-track equipment causing reportable damage above an established threshold; and impacts between railroad on-track equipment and highway users at crossings.

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Accidents/incidents are further categorized as:

- **Train Accident.** Any collision, derailment, fire, explosion, act of God, or other event involving the operation of on-track equipment (standing or moving) that results in total damages to all railroads involved in the event that is greater than the current reporting threshold to railroad on-track equipment, signals, track, track structures, and roadbed. The classification of a train accident by type (collision, derailment, other) is determined by the first reportable event in the accident sequence.
- **Train Incident.** An event involving the movement of on-track equipment that results in a reportable injury or fatality but does not cause reportable damage above the threshold established for train accidents.
- **Non-train Incident.** An event that results in a reportable injury or fatality, but does not involve the movement of on-track equipment nor cause reportable damage above the threshold established for train accidents.
- **Accountable injury or illness.** Any condition, not otherwise reportable, of a railroad employee that is discernibly caused by an event, exposure, or activity in the work environment which condition causes or requires the railroad employee to be examined or treated by a physician or other qualified health care professional.
- **Accountable rail equipment accident/incident** means any event not otherwise reportable, involving the operation of on-track equipment that causes physical damage to either the on-track equipment or the track upon which such equipment was operated and that requires the removal or repair of rail equipment from the track before any rail operations over the track can continue.

FRA not only collects information on the occurrence of accidents and incidents involving commuter rail vehicles, track, equipment and passengers, but also has full responsibility for ensuring compliance with Occupational Safety and Health Administration (OSHA) regulations regarding the reporting of employee injuries and fatalities. Therefore, FRA collects detailed reports on each employee incident and accident from a minor bruise or contusion to an occupationally-related illness to a fatality resulting from a collision.

Key definitions for the reporting of fatalities, injuries, and illnesses arising from the operation of a commuter railroad include the following:

- **Fatality.** An event resulting in death of one or more persons. If death occurs subsequent to the filing of the monthly report, then the injury or illness must be reclassified as fatal.
- **Injury.** Harm to a person resulting from a single event, activity, occurrence, or exposure of short duration.
- **Occupational illness.** Any abnormal condition or disorder, as diagnosed by a physician or other licensed health care professional, of any person who falls under the definition for the classification of Worker on Duty-Employee, other than one resulting from injury, discernibly caused by an environmental factor associated with the person's railroad employment, including, but not limited to, acute or chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact.

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In collecting this data, FRA uses the following classification system to identify affected persons:

- **Worker on Duty—Employee:** An individual who receives direct monetary compensation from the railroad and is receiving pay for being on railroad property.
- **Employee Not On Duty:** An individual who receives direct monetary compensation from the railroad and who is on railroad property for purposes connected with his or her employment or with other railroad permission but is not "on duty".
- **Worker on Duty—Contractor:** An employee of a contractor for a railroad who does not receive direct monetary compensation from the railroad and who, while on railroad property, is engaged in either (i) the operation of on-track equipment or (ii) any other safety-sensitive function for the railroad as defined in § 209.303.
- **Contractor—Other:** A contractor employee for a railroad who does not receive direct monetary compensation from the railroad and who is not engaged in either (i) the operation of on-track equipment or (ii) any other safety-sensitive function for the railroad.
- **Passengers on Trains:** Persons who are on, boarding, or alighting from railroad cars for the purpose of travel.
- **Non-trespassers--On Railroad Property:** Persons lawfully on that part of railroad property that is used in railroad operation (other than those herein defined as employees, passengers, trespassers, or contractor employees), and persons adjacent to railroad premises when they are injured as the result of the operation of a railroad.
- **Non-trespassers--Off Railroad Property:** Persons affected by an event, such as a derailment or collision, which begins on railroad property but ends on public or private non-railroad property. For example, if a derailment results in a release of hazardous materials onto public or private non-railroad property and the hazardous material injures a "non-trespasser" located on public or private non-railroad property, the injury is reported as an injury to "Non-trespassers—Off Railroad Property."
- **Trespassers:** Persons who are on that part of railroad property used in railroad operation and whose presence is prohibited, forbidden, or unlawful. A person on a highway-rail crossing is not classified as a trespasser unless the crossing is protected by gates, or other similar barriers that were closed when the person went on the crossing, or unless the person attempted to pass over, under, or between cars or locomotives of a consist occupying the crossing.

Note: FRA does not collect fatality or injury reports for suicides and suicides attempts. However, in many instances, because of the difficulty of determining suicidal tendencies, commuter rail agencies may still file reports with FRA for these incidents, classifying the killed or injured persons involved as "trespassers."

2.0 Commuter Railroad Accident and Incident Safety Trends

To provide an **at-a-glance picture** of the safety performance of the 18 commuter railroads receiving funding from FTA over the last decade, summary data was collected from FRA's Office of Safety. **Table 2** presents the analysis of this data, providing 10-year trends for key safety categories.

As indicated in this table, over the last decade:

- In spite of a 50 percent increase in the number of passengers transported annually and a 40 percent increase in the number of annual passenger miles of service, the **total number of annual accidents/incidents** reported by commuter railroads has trended downward, **dropping by 22.39 percent** from 1996 to 2005.
- Over the last decade, the **number of fatalities** has remained relatively stable, ranging from a low of 61 in 1999 to a high of 99 in 2001, with **an average of 78 per year**.
- Due to the significant increase in the number of passengers transported per year, **the fatality rate per million passengers transported has dropped by 32.14 percent** since 1996.
- The **number of annual injuries** reported to FRA by commuter railroads has **dropped by almost 20 percent**, from 2,299 in 1996 to 1,849 in 2005.
- The **corresponding injury rate per million passengers transported** has also **dropped by more than 50 percent**, from 8.69 in 1996 to 4.33 in 2005.
- **Employee fatalities** have remained stable over the decade-long period, with the industry **averaging two employee fatalities per year**.
- The **total number of employee injuries dropped by more than 40 percent**, falling from 1,620 in 1996 to 958 in 2005.
- **Fatalities relating to derailments and collisions** between railroad vehicles and obstructions **have held relatively steady**, averaging **less than one fatality per year and less than 50 injuries per year** between 1997 and 2004. However, the MARC and NJ Transit accidents in 1996 and the Metrolink derailment in January of 2005 led to much higher fatality and injury numbers in these years.
- The **total numbers of derailments and collisions** with other rail vehicles **have remained stable or fallen slightly** since 1996.
- The **number of train accidents involving obstructions on the mainline has increased by 66 percent**, and the **number of train accidents occurring on the mainline has increased by approximately 20 percent**.
- The **number of highway-rail grade crossing accidents per year has increased by 15 percent** and the **number of fatalities** caused by these accidents **has increased by almost 60 percent**.
- The percentage of all highway rail grade crossing accidents occurring at **public crossings** has **increased by almost 20 percent** since 1996.

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Table 2: 10-Year Commuter Railroad Safety Trends

Category	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	% Change from Last Year	% Change from 1996
TOTAL ACCIDENTS/INCIDENTS	2,314	2,210	1,959	2,032	2,023	2,128	1,912	1,918	1,818	1,796	-1.08	-22.39
Total accident/incident rate (per million total train miles)	61.57	55.23	47.14	47.43	45.84	42.36	37.57	37.31	34.64	32.96	-3.54	-46.47
Total accident/incident rate (per million passengers transported)	8.74	7.81	6.33	6.14	5.99	5.19	4.66	4.76	4.48	4.26	-4.90	-51.26
Total fatalities	75	93	62	61	74	99	92	66	74	81	9.46	8.00
Total injuries	2,299	2,045	1,816	1,891	1,900	1,978	1,797	1,804	1,650	1,849	12.06	-19.57
Fatality rate per million passengers transported	0.28	0.33	0.20	0.18	0.21	0.24	0.23	0.16	0.18	0.19	5.56	-32.14
Injury rate per million passengers transported	8.69	7.23	5.87	5.72	5.21	4.72	4.32	4.42	4.01	4.33	7.98	-50.17
Employee-on-duty deaths	5	3	2	2	0	2	3	2	3	1	-66.67	-80.00
Employee-on-duty injuries	1,620	1,402	1,259	1,260	1,280	1,308	1,163	1,097	968	958	-0.79	-40.86
Employee-on-duty injury rate per 200,000 hours worked	7.47	6.44	5.65	5.55	5.52	5.29	4.56	4.14	3.65	3.62	-0.56	-51.49
Trespasser deaths, not at highway-rail grade crossings	46	68	42	45	58	68	60	40	42	40	-4.44	-13.04
TRAIN ACCIDENTS	100	85	89	77	105	127	137	147	149	113	-46.75	13.00
Train accidents per million train miles	2.66	2.12	2.14	1.80	2.38	2.53	2.69	2.86	2.84	2.07	-42.57	-22.06
Train accidents per million passengers transported	.38	.30	.29	.23	.30	.31	.33	.36	.37	.27	-27.03	-28.95
Train accident fatalities	14	1	0	1	2	0	3	0	0	13	1,300.00	-7.14
Train accident injuries	122	11	6	4	21	47	110	83	36	232	4,900.00	90.16
Collisions	11	11	15	8	8	10	10	7	9	5	-50.00	-54.55
Derailments	39	31	17	14	28	32	42	41	48	25	-164.30	-35.90
Other types, e.g., obstructions	50	43	57	55	69	85	85	99	92	83	-16.36	66.00
Train accidents on main line	66	48	63	49	74	86	83	92	94	80	-28.57	21.21
Accident rate per million train miles	1.79	1.22	1.53	1.16	1.68	1.76	1.68	1.84	1.85	1.52	-28.59	-14.99
Accidents on yard track	30	31	18	25	27	40	51	51	54	30	-96.00	0.00
Accident rate per million yard switching train miles	40.85	51.35	35.75	49.09	129.15	28.54	33.44	33.96	30.48	15.38	-30.75	-62.35
HIGHWAY-RAIL INCIDENTS	82	66	58	75	69	89	94	90	100	95	-6.67	15.85
Rate per million train miles	2.18	1.65	1.40	1.75	1.56	1.77	1.85	1.75	1.91	1.74	-9.24	-20.09
Highway-rail incidents fatalities	14	17	16	12	12	26	24	21	26	22	-33.33	57.14
Highway-rail incidents injuries	58	18	15	25	18	31	35	55	58	42	-64.00	-27.59
Incidents at public crossings	78	62	54	71	68	85	86	86	96	93	-4.23	19.23
*** Percent of total***	95.12	93.94	93.10	94.67	98.55	95.51	91.49	95.56	96	97.89	2.00	2.91
***OTHER ACCIDENTS/INCIDENTS ***	2,132	2,059	1,812	1,880	1,849	1,912	1,681	1,681	1,569	1,588	1.01	-25.52
Other incidents – fatalities	47	75	46	48	59	73	66	45	49	45	-8.33	-4.26
Other incidents – injuries	2,119	2,016	1,795	1,862	1,811	1,859	1,631	1,642	1,533	1,554	1.13	-26.66

Other Information

To support more in-depth analysis of trends in train accidents and highway-rail grade crossing accidents, additional information was analyzed for each of the 18 commuter railroads receiving funding from FTA during the 79-month study period between January 1, 2000 and July 31, 2006.

Table 3 presents a summary of the FRA reportable “train accidents” to occur at each of the 18 commuter railroads. It is important to note that the term “train accident,” as used by the FRA, only includes derailments, collisions, and other events involving railroad equipment, including trains/consists, bridges, other railroad vehicles, and track.

Collisions are defined by FRA “an impact between on-track equipment consists while both are on rails and where one of the consists is operating under train movement rules or is subject to the protection afforded to trains.” A train hitting a pedestrian or trespasser is not defined as a collision by FRA, and, therefore, these incidents are not included in Table 3. FRA recognizes the following types of collisions:

- **Head-on collision.** A collision in which the trains or locomotives involved are traveling in opposite directions on the same track.
- **Rear-end collision.** A collision in which the trains or locomotives involved are traveling in the same direction on the same track.
- **Side collision.** A collision at a turnout where one consist strikes the side of another consist.
- **Raking collision.** A collision between parts or lading of a consist on an adjacent track, or with a structure such as a bridge.
- **Broken train collision.** A collision in which a moving train breaks into parts and an impact occurs between these parts, or when a portion of the broken train collides with another consist.

A **derailment** occurs when on-track equipment leaves the rail for a reason other than a collision, explosion, highway-rail crossing impact, etc. Other events classified as “train accidents” by FRA and included in Table 3 are:

- **Obstruction accident.** An accident/incident in which a consist strikes: (1) a bumping post or a foreign object on the track right-of-way; (2) a highway vehicle at a location other than a highway-rail crossing site; (3) derailed equipment; or (4) a track motorcar or similar work equipment not equipped with AAR couplers, and not operating under train rules.
- **Fire or violent rupture.** An accident/incident caused by combustion or violent release of material carried by or transported by rail. Examples of this type include: fuel and electrical equipment fires; crankcase explosions; and violent release of liquefied petroleum gas or anhydrous ammonia.
- **Other impacts.** An accident/incident, not classified as a collision that involves contact between on-track equipment. Generally, these involve single cars or cuts of cars that are damaged during switching, train makeup, setting out, etc., operations. If both consists contain a locomotive, the event should be classified as a collision between trains.
- **Other accidents/incidents.** Events involving rail equipment not classified as one of the preceding types.

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Table 3: Commuter Railroad Accidents, January 1, 2000 to July 31, 2006

Commuter Railroad	Total	Derailment	Head on Collision	Rear end Collision	Side Collision	Raking Collision	Broken Train Collision	Obstruction	Fire / Violent Rupture	Other Impacts	Other Event	Accident Rate per Million Passengers Transported
Altamont Commuter Express Authority (ACEX)	1	1										0.22
Alaska RR Corp (ARR)	18	14					1			1	2	7.89
Connecticut Department Of Transportation (CDOT)	2							2				0.84
Long Island Rail Road (LI)	95	49		3	3	2		23	8	7		0.18
MARC Train Service (MACZ)	12	2		1	2			2			5	0.29
Massachusetts Bay Transit Authority (MBTA)	7	2				1		3			1	0.03
Metro North Commuter RR Co (MNCW)	331	24	2	4	4	3		46	29	23	196	0.70
Northern Indiana Commuter Transportation District	3	3										0.12
Northeast IL Regional Commuter Rail Corp (NIRC)	34	17	2		4	5		3	1	1	1	0.07
New Jersey Transit Rail Operations (NJTR)	216	98		1	3	2	1	15	22	16	58	0.51
Peninsular Commuter (PCMZ)	10	6						4				0.16
Southern California Regional Rail Authority (SCAX)	19	10	1					6			2	0.32
Southern Commuter Rail (SCR)	1	1										0.21
San Diego Northern Rwy (SDNX)	6	4						1		1		0.67
Southeastern Pennsylvania Transportation Authority	88	10	1	1	1	7		12	17	7	32	0.46
Trinity Railway Express (TREX)	3							2			1	0.24
Virginia Railway Express (VREX)	7	7										0.34
Total	853	248	6	10	17	20	2	119	77	56	298	0.33

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As shown in Table 3, the industry average rate for “train accidents” over the 79-month study period is **.33 accidents per million passengers transported**. Eleven (11) commuter railroads are at, below or just slightly above this industry average. Six (6) railroads are above the industry average:

- Two (2) of these railroads experienced rates that were less than double the industry average (NJTR and SEPTA);
- Four (4) of these railroads experienced rates that were greater than two times the industry average (CDOT, MNCW, SDNX and ARR)

Note: In Table 3, information is not provided for Tri-county Commuter Rail Authority (TCCX).

Table 4 presents a similar summary for highway-rail grade crossing accidents. As with collisions, highway-rail grade crossings do not include trespasser-related incidents. As indicated in this table, over the 79-month study period:

- There were 353 total highway-rail grade crossing accidents involving automobiles;
- There were 102 total highway-rail grade crossing accidents involving commercial trucks, tractor trailers, and pick-up trucks;
- There were 93 total highway-rail grade crossing accidents involving pedestrians;
- There were 33 total highway-rail grade crossing accidents involving vans, buses, motorcycles, and other motor vehicles; and
- There were 16 other highway-rail grade crossing accidents.

The average industry rate is **.61 highway-rail grade crossing collisions per 10 million passenger miles of service**. With only 19 highway-rail grade crossing collisions, the Alaska Railroad Corporation (ARR) has the highest rate of these collisions, due largely to the low number of passengers transported. Other commuter railroads experiencing rates of these collisions significantly higher than the industry average include the Tri-county Commuter Rail Authority (TCCX), Metrolink (SCAX), and the Northern Indiana Commuter Transportation District (NICD).

Note: In Table 4, information is not provided for Sounder Commuter Rail (SCR).

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Table 4: Commuter Railroad Highway-Rail Grade Crossing Accidents

Commuter Railroads	Total	Auto- mobile	Truck	Truck- Trailer	Pick-up Truck	Van	Bus	Motor -cycle	Other Motor Vehicle	Pedestrian	Other	Total Passenger Miles (1/1/2000 to 7/31/2006)	Average Rate per 10 Million Passenger Miles	Number of Highway- Rail Grade Crossings
Altamont Commuter Express Authority (ACEX)	4	1		1	1	1						29,172,897	1.37	127
Alaska RR Corp (ARR)	19	12	1	1	5							25,110,943	7.57	27
Connecticut Department Of Transportation (CDOT)	1	1										8,515,802	1.17	3
Long Island Rail Road (LI)	52	26	3	3						19	1	2,155,432,949	0.24	402
MARC Train Service (MACZ)	6	4	1									214,040,053	0.28	40
Massachusetts Bay Transit Authority (MBTA)	40	24	4	3	1					6	2	409,812,824	0.98	233
Metro North Commuter RR Co (MNCW)	17	8	2	4	1 ¹				1		1	2,139,477,109	0.08	161
Northern Indiana Commuter Transportation District	24	20	3									122,470,066	1.96	117
Northeast IL Regional Commuter Rail Corp (NIRC)	163	111	8	8	4 1	4			1	24	3	1,702,286,080	0.96	512
New Jersey Transit Rail Operations (NJTR)	73	35	4		2	6	1	2	1	17	5	1,762,112,322	0.41	329
Peninsular Commuter (PCMZ)	30	15	1	2	1	1				10		202,576,597	1.48	49
Southern California Regional Rail Authority (SCAX)	92	51	5	11	8	2	2	1		10	2	319,517,007	2.88	443
San Diego Northern Railway (SDNX)	4	1								2	1	41,583,500	0.96	34
Southeastern Pennsylvania Transportation Authority	16	10	2		2				1	1		405,976,113	0.39	116
Tri-county Commuter Rail Authority (TCCX)	44	29		3	3	2			2	4	1	78,969,072	5.57	72
Trinity Railway Express (TREX)	10	3		3	1	3						69,979,591	1.43	34
Virginia Railway Express (VREX)	2	2										118,819,837	0.17	23
Total	597	353	34	39	29	21	3	3	6	93	16	9,805,852,762	0.61	2,722

3.0 In-depth: Commuter Railroad Fatalities

Number of Fatalities

As indicated in **Table 5**, during the 79-month study period, there were **526 fatalities** reported to FRA by the 18 operating commuter railroads receiving FTA funds.

Table 5: Commuter Railroad Fatalities by Year

Commuter Railroad	2000	2001	2002	2003	2004	2005	2006	Total
Altamont Commuter Express, San Joaquin Regional Rail Commission (ACEX)	0	1	0	0	1	0	1	3
Alaska Railroad Corporation (ARR)	1	0	0	0	0	1	0	2
Connecticut Department of Transportation – Shoreline (CDOT)	0	1	0	0	0	0	0	1
Long Island Rail Road (LI)	7	10	9	7	4	9	2	48
Mass Transit Administration, Maryland Dept. of Transportation – MARC Commuter Rail (MACZ)	2	0	0	0	2	1	1	6
Massachusetts Bay Transportation Authority (MBTA)	11	11	15	5	4	5	6	57
Metro-North Commuter Railroad (MNCW)	4	3	6	1	4	2	1	21
Northern Indiana Commuter Transportation District (NICD)	5	17	23	16	13	17	4	95
Northeast Illinois Regional Commuter Railroad Corporation – Metra (NIRC)	0	0	0	0	0	0	0	0
New Jersey Transit Corporation (NJTR)	21	32	16	8	17	9	6	109
Peninsula Corridor Joint Powers Board (PCMZ)	14	12	5	10	9	9	10	69
Southern California Regional Rail Authority – Metrolink (SCAX)	1	1	9	13	5	17	5	51
Central Puget Sound Regional Transit Authority (SCR)	0	0	0	0	0	0	0	0
North San Diego County Transit Development Board (SDNX)	1	4	5	2	2	0	1	15
Southeastern Pennsylvania Transportation Authority (SEPA)	3	3	4	0	7	5	0	22
Tri-County Commuter Rail Authority (TCCX)	3	3	0	2	5	6	2	21
Trinity Railway Express (TREX)	0	1	0	2	1	0	1	5
Virginia Railway Express (VREX)	1	0	0	0	0	0	0	1
Total	74	99	92	66	74	81	40	526

Figure 1 depicts the categories of individuals involved in fatality accidents during the 79-month study period, following the FRA classification system. This figure shows that:

- Trespasser fatalities accounted for 88 percent (463) of the total.
- Non-Trespassers on Railroad Property accounted for five percent (26) of the total.
- Passengers on trains accounted for four percent (20) of the total fatalities.
- Employee fatalities accounted for three percent (14) of the total.
- Fatalities for contractors, both on duty and legitimately on railroad property, accounted for the remaining 3 fatalities.

Figure 1: Fatalities by Type of Person

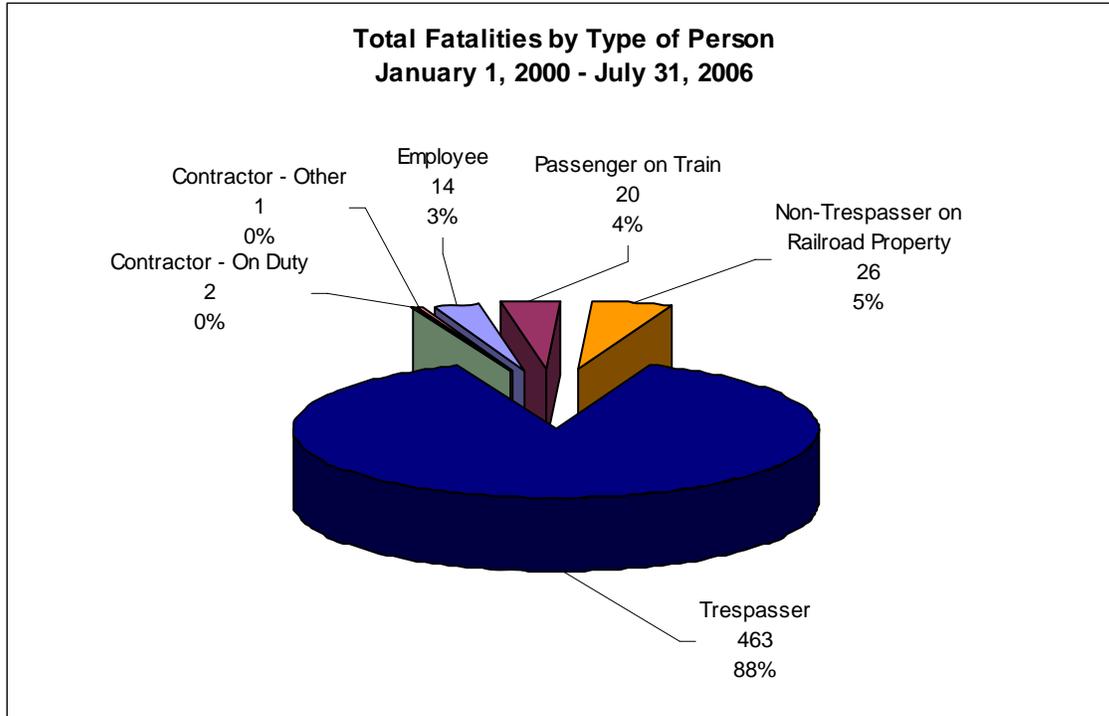


Table 6 presents rates of fatalities for each of the 18 commuter railroads receiving FTA funding during the 79-month study period. As shown in this table:

- The average industry rate for **fatalities per 10 million passenger miles of service is .09**
 - Two (2) commuter railroads (NICD and SCR) did not experience a single FRA-reportable fatality during the 79-month study period
 - An additional six (6) commuter railroads are at or below the industry average rate for the 79-month study period
 - Of the remaining 10 commuter railroads:
 - Five (5) experienced rates of fatalities just slightly above the industry average
 - Two (2) experienced rates of fatalities two or more times greater than the industry average (SCAX and MBTA)
 - Three (3) experienced fatality rates more than three times the industry average (SDNX, PCMZ and TCCX)
- The average industry rate for **fatalities per million passengers transported is .20**
 - As stated above, two (2) commuter railroads (NICD and SCR) did not experience a single FRA-reportable fatality during the 79-month study period
 - An additional eight (8) commuter railroads experienced rates that are at, below, or only slightly above the industry average
 - Of the remaining eight (8) commuter railroads:
 - Two (2) have rates that are approximately double the industry average over the 79-month study period (TRES and CDOT)
 - One (1) has a rate that approximately triples the industry average (ACEX)
 - The remaining five (5) have rates that more than quadruple the industry average (SDNX, PCMX, ARR, SCAX and TCCX)

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Table 6: FRA-Reported Fatality Rates, January 1, 2000 through July 31, 2006

Commuter Railroad	Total Deaths	Total Passenger Miles -- 1/1/00 to 7/31/06	Total Passengers Transported -- 1/1/00 to 7/31/06	Fatalities per 10 Million Passenger Miles	Fatalities per Million Passengers Transported
Altamount Commuter Express, San Joaquin Regional Rail Commission (ACEX)	3				
Alaska Railroad Corporation (ARR)	2		4,595,420	0.14	0.65
Connecticut Department of Transportation – Shoreline (CDOT)	1	211,948,186	2,282,368	0.12	0.88
Long Island Rail Road (LI)	48	170,285,543	2,386,778	0.11	0.42
Mass Transit Administration, Maryland Dept. of Transportation – MARC Commuter Rail (MACZ)	6	84,908,905,968	541,891,111	0.03	0.09
Massachusetts Bay Transportation Authority (MBTA)	57	1,264,525,122	41,663,129	0.05	0.14
Metro-North Commuter Railroad (MNCW)	21	2,933,273,179	252,088,993		
Northern Indiana Commuter Transportation District (NICD)	0	13,644,055,538	470,244,505	0.19	0.23
Northeast Illinois Regional Commuter Railroad Corporation – Metra (NIRC)	95	763,197,707	25,723,210	0.02	0.04
New Jersey Transit Corporation (NJTR)	109	10,164,599,377	460,524,158	0.09	0.21
Peninsula Corridor Joint Powers Board (PCMZ)	69	9,645,805,013	420,185,730		
Southern California Regional Rail Authority – Metrolink (SCAX)	51	1,266,123,839	62,070,481	0.11	0.26
Central Puget Sound Regional Transit Authority (SCR)	0	2,042,955,338	59,953,520	0.54	1.11
North San Diego County Transit Development Board (SDNX)	15		4,837,609	0.25	0.85
Southeastern Pennsylvania Transportation Authority (SEPA)	22	35,657,984	8,965,639		
Tri-County Commuter Rail Authority (TCCX)	21	250,041,135	189,255,068	0.60	1.67
Trinity Railway Express (TREX)	5	2,573,864,830	17,544,564	0.09	0.12
Virginia Railway Express (VREX)	1	508,528,240	12,736,271	0.41	1.20
Total	526	360,930,702	20,326,283	0.14	0.39
		664,296,216	2,597,274,837	0.02	0.05
		61,203,990,620		0.09	0.20

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Figures 2 and 3 provide a visual representation of these rates for the 18 commuter railroads receiving FTA funding during the 79-month study period.

Figure 2: Fatalities per 10 Million Passenger Miles

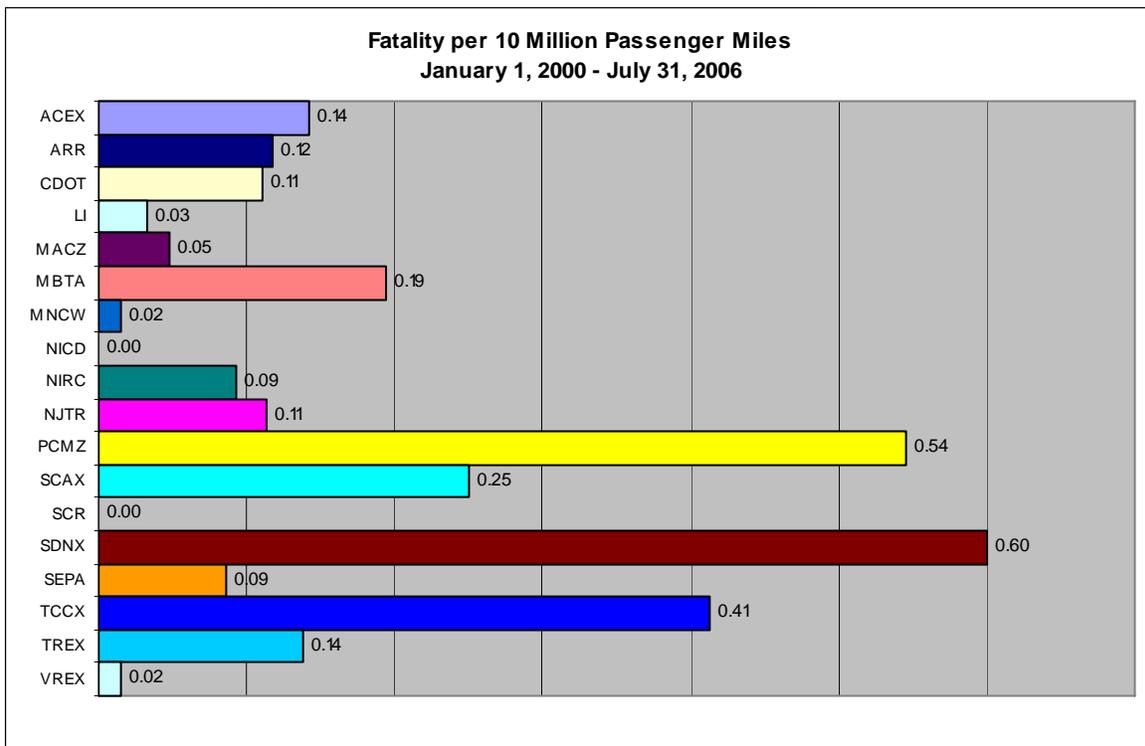
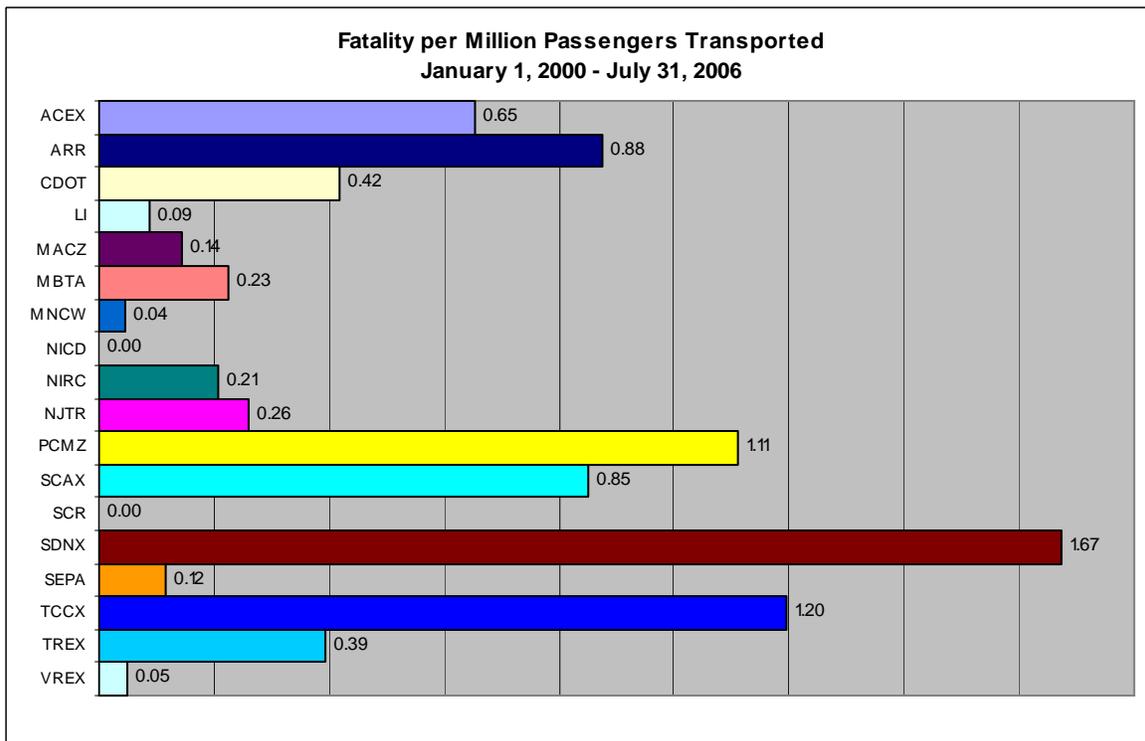


Figure 3: Fatalities per Million Passengers Transported



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Causes of Fatalities

Table 7 identifies the categories of probable causes attributed to the 526 fatalities reported by the 18 commuter railroads receiving FTA funding during the 79-month study period. **Table 8** identifies these causes by the type of person affected.

Table 7: Causes of Fatalities – January 1, 2000 to July 31, 2006

Fatality Cause	2000	2001	2002	2003	2004	2005	2006	Total	Percent
Environmental	1							1	0.19%
Equipment					2		1	3	0.57%
Human factor	13	16	25	14	13	21	3	105	19.96%
Impairment, substance use					1			1	0.19%
Object fouling track						1		1	0.19%
Outside caused (e.g., assaulted/attacked)					1			1	0.19%
Procedures for operating/using equipment not followed			1					1	0.19%
Trespassing	58	81	65	50	52	56	32	394	74.90%
Trespassing, unrelated to using Remotely Controlled Locomotives (RCL)							1	1	0.19%
Undetermined	2	2	1	2	5	3	3	18	3.42%
Total	74	99	92	66	74	81	40	526	100%

Table 8: Fatalities by Cause and Type of Person Killed – January 1, 2000 to July 31, 2006

Fatality Cause	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Contractor - other	Total
Environmental	1						1
Equipment	1		1		1		3
Human factor	7	2	71	9	15	1	105
Impairment, substance use			1				1
Object fouling track			1				1
Outside caused (e.g., assaulted/attacked)	1						1
Procedures for operating/using equipment not followed	1						1
Trespassing	1		382	11			394
Trespassing, unrelated to using Remotely Controlled Locomotives			1				1
Undetermined	2		6		10		18
Total	14	2	463	20	26	1	526

Table 9 presents a summary of the event descriptions reported to FRA for the 526 fatalities that occurred during the 79-month study period. **Table 10** provides causal categories for the fatalities occurring at each of the 18 commuter railroads receiving FTA funding.

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Table 9: Fatality Event Descriptions, January 1, 2000 through July 31, 2006

Event Description	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Contractor - other	Total
Assaulted by other					2	1	3
Burned			1				1
Caught in/crushed by materials	1						1
Caught in/crushed in excavation, land slide, cave-in, etc.	1						1
Caught, crushed, pinched, other			1				1
Collision - between on track equipment	1			3			4
Collision/impact - auto, truck, bus, van, etc.	1		1				2
Derailment	1			12			13
Electrical shock due to contact with 3rd rail, catenary, pantograph	1		6				7
Electrical shock, other (explain in narrative)	1						1
Highway-rail collision/impact			132	1	12		145
Horseplay, practical joke, etc.			1				1
Lost balance					2		2
Other (describe in narrative)		2	18				20
Other impacts - on track equipment			1				1
Ran into object/equipment			1				1
Slipped, fell, stumbled, other			2	1	2		5
Struck against object			4	1			5
Struck by object	1		7				8
Struck by on-track equipment	4		285	2	8		299
Sudden/unexpected movement of on-track equipment	2		3				5
Total	14	2	463	20	26	1	526

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Table 10: Causes of Fatalities by Commuter Railroad, January 1, 2000 to July 31, 2006

Commuter Railroad	Environmental	Equipment	Human Factor	Impairment, Substance Use	Object Fouling Track	Outside Caused (e.g, Assaulted/ Attacked)	Procedures for Operating/ Using Equipment not Followed	Trespassing	Trespassing, Unrelated to Using Remotely Controlled Locomotives	Undetermined	Total
Altamont Commuter Express, (ACEX)								3			3
Alaska Railroad Corporation (ARR)	1		1								2
Connecticut Department of Transportation (CDOT)								1			1
Long Island Rail Road (LI)		1	32					15			48
MARC Commuter Rail (MACZ)								6			6
Massachusetts Bay Transportation Authority (MBTA)			10		1			41	1	4	57
Metro-North Commuter Railroad (MNCW)			9			1		10			21
Northern Indiana Commuter Transportation District (NICD)											0
Northeast Illinois Regional Commuter Railroad Corporation – Metra (NIRC)			30					61		4	95
New Jersey Transit Corporation (NJTR)	1		2	1				104		2	109
Peninsula Corridor Joint Powers Board (PCMZ)			4					65			69
Southern California Regional Rail Authority – Metrolink (SCAX)			7					44			51
Central Puget Sound Regional Transit Authority (SCR)											0
North San Diego County Transit Development Board (SDNX)								15			15
Southeastern Pennsylvania Transportation Authority (SEPA)			10				1	7		3	22
Tri-County Commuter Rail Authority (TCCX)								16		5	21
Trinity Railway Express (TREX)								5			5
Virginia Railway Express (VREX)	1							1			1
Total	1	3	105	1	1	1	1	394	1	18	526

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As shown in these tables, as reported to FRA, **almost 75 percent of commuter railroad fatalities** are attributed to the **actions of trespassers**. An additional **20 percent of fatality accidents** were caused by **human factors issues**. The remaining **five percent of fatalities** were caused by a **range of events**, including environmental conditions, substance abuse, and undetermined causes.

Conclusion -- Fatalities

During the 79-month study period, the nation's four largest commuter railroads (Long Island Railroad, Metro-North Commuter Railroad, Metra, and New Jersey Transit) were responsible for **79 percent** of total commuter railroad passenger miles and **73 percent** of all passengers transported. Combined, these four railroads reported **273 fatalities, accounting for 52 percent of the total**. As evidenced in Table 4, due to the volume of passengers carried and the level of service, these four commuter railroads are near or below the industry average rates for fatalities per 10 million passenger miles of service and fatalities per million passengers transported. Two of these railroads, Long Island Railroad and Metro-North Commuter Railroad, with only 69 fatalities between them over the 79-month study period, posted among the lowest fatality rates of all commuter railroads.

During the 79-month study period, the four medium-sized commuter railroads, including MBTA, SEPTA, Metrolink, and the Peninsula Corridor Joint Powers Board, provided **16 percent** of total commuter rail passenger miles and **23 percent** of all passenger trips. Combined, these four railroads experienced **199 fatalities and accounted for 38 percent of the total**. Among this group, the Peninsula Corridor Joint Powers Board and Metrolink had the highest fatality rates per passenger miles and passengers transported. These rates are more than five times the rates of the other two commuter railroads in this category, and among the highest rates reported for all commuter railroads.

During the 79-month study period, the remaining 10 smaller commuter railroads provided **five percent** of commuter rail passenger miles and **four percent** of all passengers transported. Combined these railroads accounted for **54 fatalities or 10 percent of the total commuter railroad fatalities**. In this group, the Tri-County Commuter Rail Authority (TCCX) has by far the highest fatality rates, with the third highest overall rate by passenger miles and the highest overall rate by the number of passengers transported.

Also, in reviewing the fatality data, it is apparent that trespasser-related incidents comprise the vast majority (88 percent) of the 526 fatalities reported during the 79-month study period. However, because of the way in which the FRA reporting system is structured, it is impossible to determine which among these 466 trespasser fatalities may be suicides or occurred as the result of a passenger or pedestrian violating traffic signals and rules out of confusion, poor signage, or poor station or crosswalk design. FTA and FRA are committed to working together to ensure greater classification of these fatalities in the future to support more targeted analysis.

4.0 In-depth: Commuter Railroad Injuries

Number of Injuries

As indicated in **Table 11**, during the 79-month study period, there were **11,900 injuries** reported to FRA by the 18 operating commuter railroads receiving FTA funds.

Table 11: Commuter Railroad Injuries by Year

Commuter Railroad	2000	2001	2002	2003	2004	2005	2006	Total
Altamont Commuter Express, San Joaquin Regional Rail Commission (ACEX)	4	2	2	0	1	0	0	9
Alaska Railroad Corporation (ARR)	50	57	30	29	28	29	13	236
Connecticut Department of Transportation – Shoreline (CDOT)	2	7	3	4	0	2	1	19
Long Island Rail Road (LI)	414	382	323	321	327	308	144	2,219
Mass Transit Administration, Maryland Dept. of Transportation – MARC Commuter Rail (MACZ)	5	7	18	7	8	8	4	57
Massachusetts Bay Transportation Authority (MBTA)	103	113	127	120	90	94	83	730
Metro-North Commuter Railroad (MNCW)	476	466	375	431	366	281	138	2,533
Northern Indiana Commuter Transportation District (NICD)	21	8	21	26	31	17	10	134
Northeast Illinois Regional Commuter Railroad Corporation – Metra (NIRC)	283	388	360	262	264	407	141	2,105
New Jersey Transit Corporation (NJTR)	174	219	208	226	189	201	124	1,341
Peninsula Corridor Joint Powers Board (PCMZ)	25	23	31	29	34	20	17	179
Southern California Regional Rail Authority – Metrolink (SCAX)	31	24	53	59	24	103	11	305
Central Puget Sound Regional Transit Authority (SCR)	0	1	2	3	1	0	0	7
North San Diego County Transit Development Board (SDNX)	5	1	4	4	3	3	1	21
Southeastern Pennsylvania Transportation Authority (SEPA)	279	262	202	232	246	343	217	1,781
Tri-County Commuter Rail Authority (TCCX)	18	14	28	46	32	27	6	171
Trinity Railway Express (TREX)	2	3	3	2	2	2	3	17
Virginia Railway Express (VREX)	8	1	7	3	4	4	9	36
Total	1,900	1,978	1,797	1,804	1,650	1,849	922	11,900

Figure 4 depicts the categories of individuals experiencing these injuries during the 79-month study period, using the FRA’s classification system:

- Employee injuries accounted for 64 percent (7,537) of the total.
- Injuries to passengers on trains accounted for 19 percent (2,193) of the total.
- Non-Trespassers on Railroad Property sustained 1,308 injuries, accounting for 11 percent of the total.
- Injuries to contractors, both on duty and legitimately on railroad property, accounted for 2 percent (337) of the total.
- Non-Trespassers off Railroad Property accounted for less than one-half of one percent of total injuries (43).

Figure 4: Commuter Railroad Injuries by Type of Person, January 1, 2000 to July 31, 2006

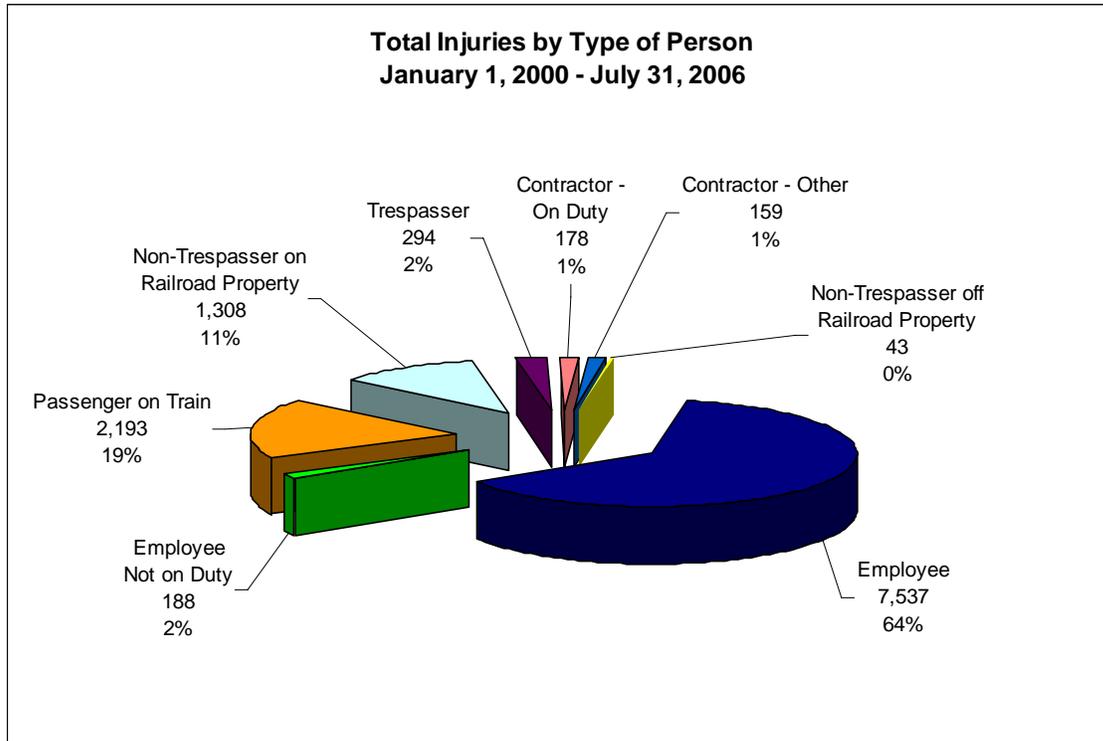


Table 12 provides additional detail on number of injuries occurring at each of the 18 commuter railroads in operation during the 79-month study period by category of individual affected. Table 13 provides detail regarding injury rates at the 18 commuter railroads during the 79-month study period. This analysis shows that these rates are relatively consistent for the 18 commuter railroads:

- Over the 79-month study period, the average rate for **employee/contractor injuries per ten million passenger miles of service is 1.32.**
 - While seven (7) of the 18 commuter railroads have rates higher than the industry average, only one (1) commuter railroad (ARR) experienced employee/contractor injuries at a rate that is more than twice the industry average.
- The average rate for **employee/contractor injuries per million passengers transported is 3.10.**
 - Only two (2) of the 18 commuter railroads experienced a rate of employee/contractor injuries per million passengers transported greater than two times the industry average (ARR and CDOT).
- The average rate for **passenger/non-trespasser-off-and-on-railroad-property/trespasser injuries per 10 million passenger miles of service is 0.63.**
 - Five (5) commuter railroads experienced rates above the industry average; four (4) of these agencies experienced rates that just barely doubled the industry average (SEPTA, NIRC, TCCX, and SCR).
- The average rate for **passenger/non-trespasser-off-and-on-railroad-property/trespasser injuries per million passengers transported is 1.48.**
 - Six (6) of the 18 commuter railroads experienced rates above the industry average; two (2) of these commuter railroads experienced rates that just barely doubled the industry average (ARR and SEPTA) and a third agency had a rate that just tripled the industry average (TCCX).

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Table 12: FRA-Reported Commuter Railroad Injuries – January 1, 2000 to July 31, 2006

Commuter Railroad	Total Injuries	Employee -- On Duty	Employee -- Not on Duty	Passenger on Train	Non-Trespasser on Railroad Property	Trespasser	Contractor -- On Duty	Contractor -- Other	Non-Trespasser off Railroad Property
Altamont Commuter Express Authority (ACEX)	9	1	0	5	2	0	0	1	0
Alaska Railroad Corporation (AAR)	236	213	4	3	0	4	11	1	0
Connecticut Department Of Transportation (CDOT)	19	16	0	3	0	0	0	0	0
Long Island Rail Road (LI)	2,219	1,664	24	181	296	35	3	16	0
MARC Train Service (MACZ)	57	26	0	22	7	2	0	0	0
Massachusetts Bay Transit Authority (MBTA)	730	575	18	82	40	15	0	0	0
Metro North Commuter Railroad (MNCW)	2,533	1,881	68	176	330	12	4	48	14
Northern Indiana Commuter Transportation District (NICD)	134	116	0	9	6	3	0	0	0
Northeast Illinois Regional Commuter Rail Corporation – Metra (NIRC)	2,105	704	30	969	245	110	14	13	20
New Jersey Transit Rail Operations (NJTR)	1,341	982	38	168	97	44	5	7	0
Peninsular Commuter Joint Powers Board (PCMZ)	179	120	2	9	16	20	10	2	0
Southern California Regional Rail Authority – Metrolink (SCAX)	305	64	0	110	0	26	99	6	0
Southern Commuter Rail (SCR)	7	0	0	3	3	0	1	0	0
San Diego Northern Railway (SDNX)	21	13	0	2	0	4	2	0	0
Southeastern Pennsylvania Transportation Authority (SEPA)	1,781	1,135	3	395	232	7	1	3	5
Tri-county Commuter Rail Authority (TCCX)	171	3	0	46	25	6	25	62	4
Trinity Railway Express (TREX)	17	6	0	3	3	4	1	0	0
Virginia Railway Express (VREX)	36	18	1	7	6	2	2	0	0
Total	11,900	7,537	188	2,193	1,308	294	178	159	43

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Table 13: FRA-Reported Injury Rates, January 1, 2000 through July 31, 2006

Commuter Railroad	Total Passenger Miles -- 1/1/00 to 7/31/06	Total Passengers Transported -- 1/1/00 to 7/31/06	Employee / Contractor Injury per 10 Million Passenger Miles	Employee / Contractor Injury per Million Passengers Transported	Passenger/Other Injury per 10 Million Passenger Miles	Passenger/Other Injury per Million Passengers Transported
Altamont Commuter Express Authority	211,948,186	4,595,420	0.09	0.44	0.33	1.52
Alaska RR Corp.	170,285,543	2,282,368	13.45	100.33	0.41	3.07
Connecticut Department Of Transportation	89,996,703	2,386,778	1.78	6.70	0.33	1.26
Long Island Rail Road	14,613,905,968	541,891,111	1.17	3.15	0.35	0.94
MARC Train Service	1,264,525,122	41,663,129	0.21	0.62	0.25	0.74
Massachusetts Bay Transit Authority	2,933,273,179	252,088,993	2.02	2.35	0.47	0.54
Metro North Commuter RR Co.	13,644,055,538	470,244,505	1.47	4.26	0.39	1.13
Northern Indiana Commuter Transportation District	763,197,707	25,723,210	1.52	4.51	0.24	0.70
Northeast IL Regional Commuter Rail Corp.	10,164,599,377	460,524,158	0.75	1.65	1.32	2.92
New Jersey Transit Rail Operations	9,645,805,013	420,185,730	1.07	2.46	0.32	0.74
Peninsular Commuter	1,266,123,839	62,070,481	1.06	2.16	0.36	0.72
Southern California Regional Rail Authority	2,042,955,338	59,953,520	0.83	2.82	0.67	2.27
Southern Commuter Rail	35,657,984	4,837,609	0.28	0.21	1.68	1.24
San Diego Northern Railway	250,041,135	8,965,639	0.60	1.67	0.24	0.67
Southeastern Pennsylvania Transportation Authority	2,573,864,830	189,255,068	4.44	6.03	2.48	3.38
Tri-county Commuter Rail Authority	508,528,240	17,544,564	1.77	5.13	1.59	4.62
Trinity Railway Express	360,930,702	12,736,271	0.19	0.55	0.28	0.79
Virginia Railway Express	664,296,216	20,326,283	0.32	1.03	0.23	0.74
Total	61,203,990,620	2,597,274,837	1.32	3.10	0.63	1.48

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Figure 5 provides a visual representation of the rates of injury for railroad employees and contractors per 10 million passenger miles of service. **Figure 6** presents the rates of injury for railroad employees and contractors per million passengers transported.

Figure 5: Rates of Employee/Contractor Injury per 10 Million Passenger Miles

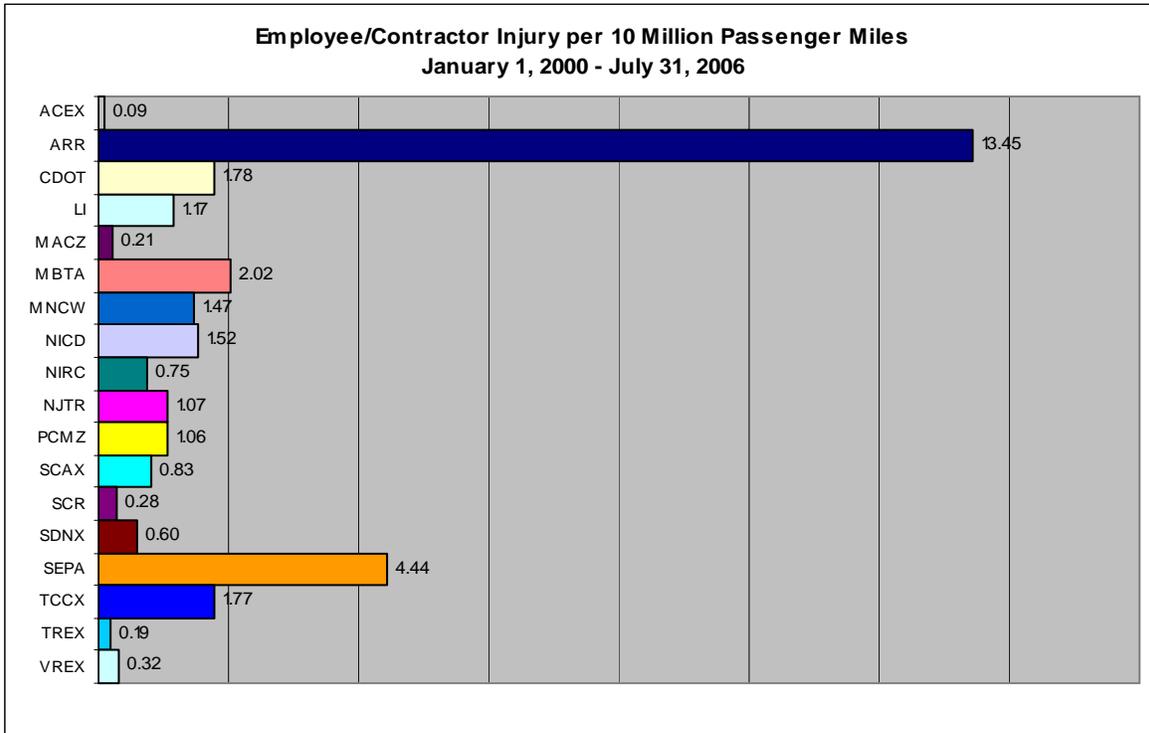


Figure 6: Rates of Employee/Contractor Injury per Million Passengers Transported

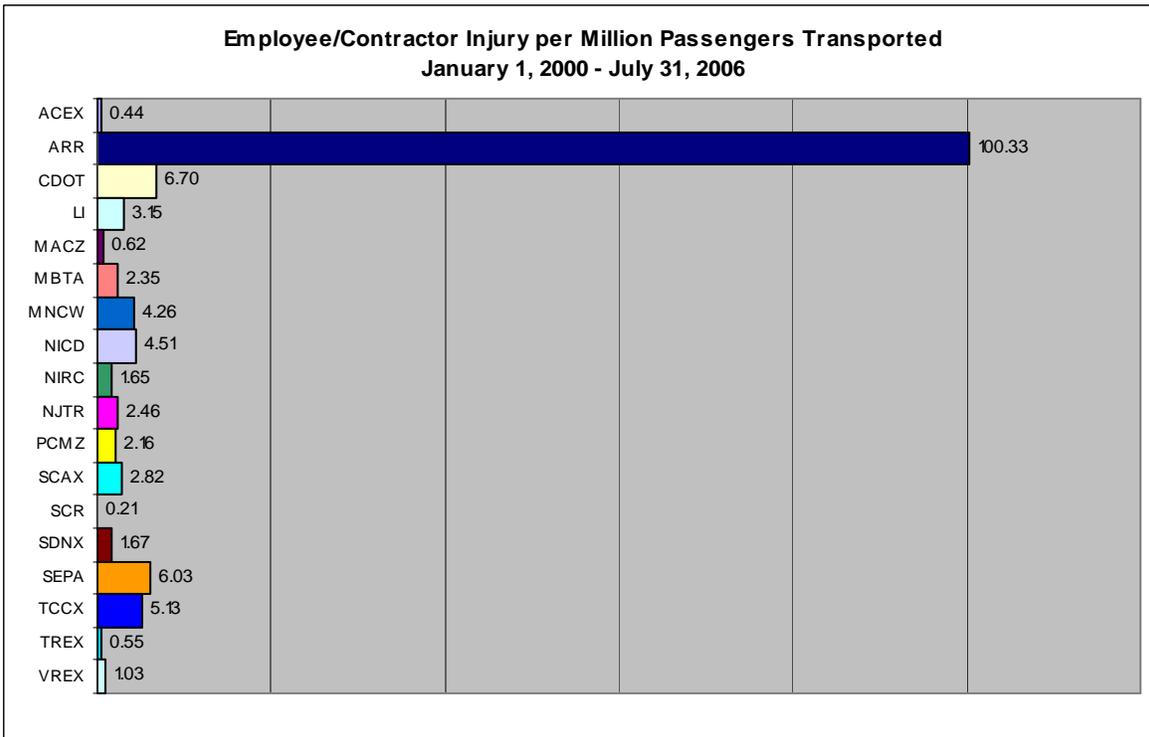


Figure 7 provides a visual representation of the rates of injury for passengers/non-trespassers/trespassers per 10 million passenger miles. **Figure 8** presents the rates of injury for passengers/non-trespassers/trespassers per million passengers transported.

Figure 7: Rates of Passenger/Other Injury per 10 Million Passenger Miles

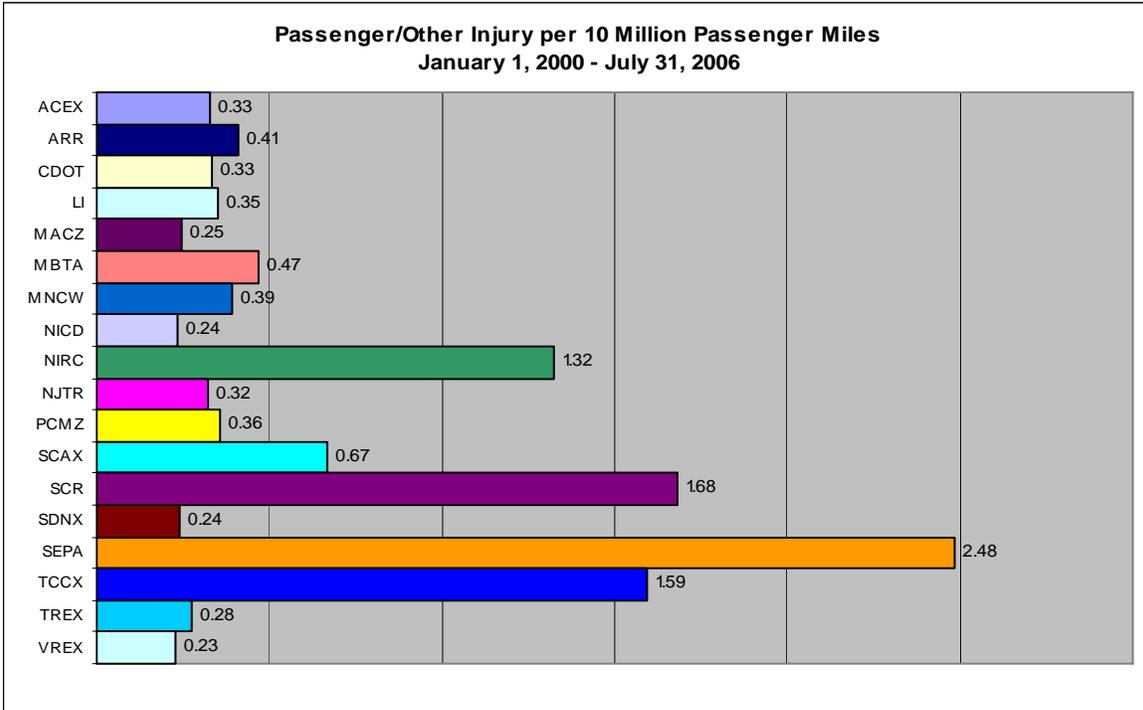
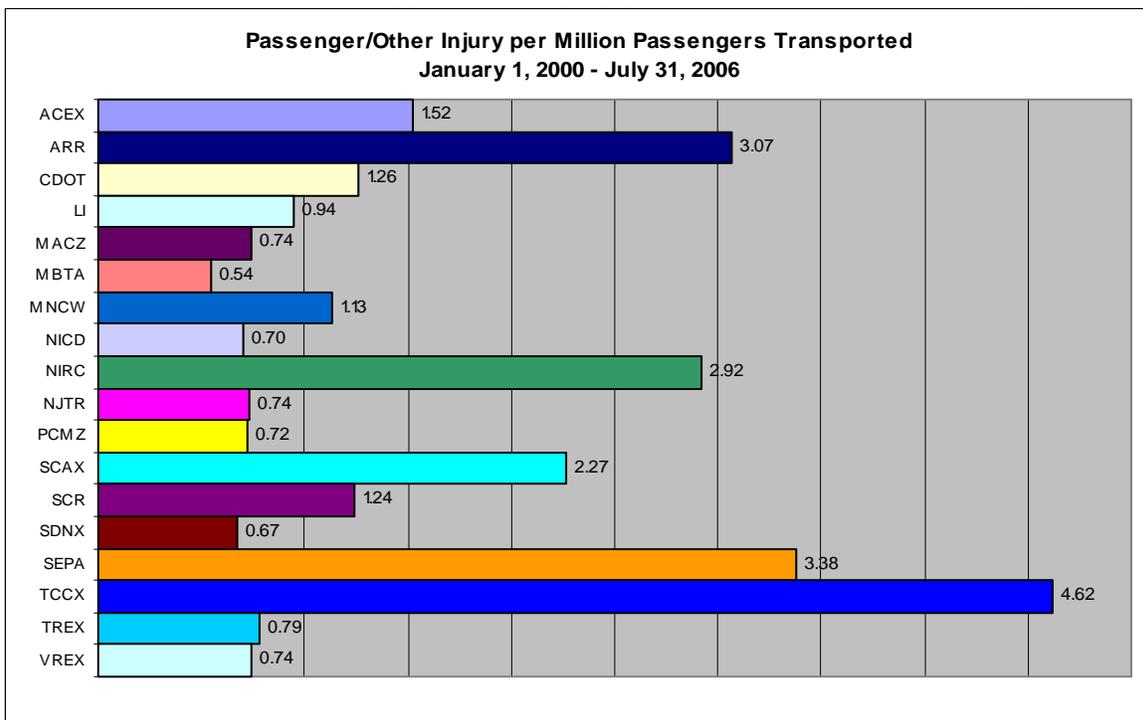


Figure 8: Rates of Passenger/Other Injury per Million Passengers Transported



Causes of Injuries

Table 14 identifies the causes of the 11,900 injuries reported to FRA during the 79-month study period. **Table 15** provides categories of event descriptions reported to FRA for these injuries during the 79-month study period. **Table 16** summarizes this information by type of person affected.

Table 14: Cause of Injuries, January 1, 2000 to July 31, 2006

Injury Cause	2000	2001	2002	2003	2004	2005	2006	Total	Percent
Act of God				2	1		1	4	0.03%
Close or no clearance				3	4	2	1	10	0.08%
Environmental	413	407	172	177	147	180	101	1597	12.85%
Equipment	144	136	129	147	182	142	74	954	7.68%
Equipment, related to using Remotely Controlled Locomotives (RCL)						1		1	0.01%
Failure to provide adequate space between equipment during switching operation				1				1	0.01%
Human factor	732	790	1097	1100	897	1037	507	6160	49.57%
Human factor, unrelated to using RCL						1	2	3	0.02%
Impairment, physical condition, e.g., fatigue	3	7	6	6	10	5	2	39	0.31%
Impairment, physical condition, e.g., fatigue, related to using RCL						1		1	0.01%
Impairment, substance use	7	11	5	3	3	8	4	41	0.33%
Insufficient training				1				1	0.01%
Lack of communication				2	2	2	1	7	0.06%
Object fouling track				3	18	2	8	31	0.25%
Outside caused (e.g., assaulted/attacked)				24	92	37	16	169	1.36%
Procedures for operating/using equipment not followed	302	250	93	80	79	69	56	929	7.48%
Procedures for operating/using equipment not followed, unrelated to using RCL						1		1	0.01%
Safety equipment not worn or in place	18	27	19	28	17	9	4	122	0.98%
Signal	1	1	1	1	1			5	0.04%
Slack adjustment during switching operation				2				2	0.02%
Track	11	31	13	11	8	4	2	80	0.64%
Trespassing	42	36	48	57	36	99	17	335	2.70%
Trespassing, related to using RCL						1		1	0.01%
Trespassing, unrelated to using RCL						1		1	0.01%
Undetermined	227	282	214	156	153	247	126	1405	11.31%
Total	1,900	1,978	1,797	1,804	1,650	1,849	922	11,900	100.00%

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Table 15: Commuter Railroad Injury Event Descriptions, January 1, 2000 to July 31, 2006

Injury Event	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Non-trespasser off Railroad Property	Employee Not on Duty	Contractor - Other	Total
Aggravated pre-existing condition	51	1		3					55
Apprehending/removing from property	12			1	1			1	15
Assaulted by coworker	13						1		14
Assaulted by other	136			15	17		4	2	174
Bitten by animal	5								5
Bitten/stung by bee, spider, other insect	78			3	1			1	83
Blowing/falling debris	56	3							59
Bodily function/sudden movement, e.g., sneezing, twisting	174	1		5	3	1	6	1	191
Bumped	9							1	10
Burned	24	1		1				3	29
Caught Between Equipment	4								4
Caught Between Machinery	3			2					5
Caught Between Material	6							2	8
Caught in/compressed by hand tools	29	3						1	33
Caught in/compressed by other machinery	29	2		4			1		36
Caught in/compressed by powered hand tools	18	1							19
Caught in/crushed by materials	66	9		4	1			5	85
Caught in/crushed in excavation, land slide, cave-in, etc.	2	1							3
Caught, crushed, pinched, other	428	8		86	13			10	545
Cave in, slide, etc.	10				2			1	13
Climatic condition, exposure to environmental cold	2			1					3
Climatic condition, exposure to environmental heat	8	1		1					10
Climatic conditions, other (e.g., high winds)	19			1					20
Collision - between on track equipment	73			158				2	233
Collision/impact - auto, truck, bus, van, etc.	200	5	1	2	2	14	9		233
Committing vandalism/theft				1					1
Defective/malfunctioning equipment	65			5	4				74
Derailment	26			302					328
Electrical shock due to contact with 3rd rail, catenary, pantograph	35	1	9					3	48
Electrical shock from hand tool	6								6
Electrical shock while operating welding equipment	4								4
Electrical shock, other (explain in narrative)	54	2			2			3	61

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Table 15: Commuter Railroad Injury Event Descriptions, January 1, 2000 to July 31, 2006

Injury Event	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Non-trespasser off Railroad Property	Employee Not on Duty	Contractor - Other	Total
Exposure to chemicals – external	58			2	2		2		64
Exposure to fumes - inhalation	104			2	2				108
Exposure to noise - single incident	20	1							21
Exposure to noise over time	6								6
Exposure to poisonous plants	19				1			1	21
Exposure to welding light	15								15
Highway-rail collision/impact	18		127	74	33	3	4		259
Horseplay, practical joke, etc.	6		1	1	4				12
Lost balance	207	14	4	157	111	1	10	10	514
Missed handhold, grabiron, step, etc.	28			12	13			2	55
Needle puncture/prick/stick	39	2		2				1	44
On track equipment, other incidents	8			5	2				15
Other (describe in narrative)	321	25	11	70	20	1	3	8	459
Other impacts - on track equipment	16			3			1		20
Overexertion	1,299	18		18	1		12	8	1,356
Pushed/shoved from	4			4	4				13
Pushed/shoved into/against	38	1		5	8				52
Pushed/shoved onto	1		1	3	5				10
Ran into object/equipment	11		1	2	1		1	1	17
Ran into on-track equipment	3			1			1		4
Repetitive motion - other (describe in narrative)	24	2							26
Repetitive motion - tools	28	1						1	30
Repetitive motion - typing, keyboard, etc.	6								6
Repetitive motion - work processes	39	4							43
Rubbed, abraded, etc.	32	1			3			1	37
Shot	1	1			1				3
Slack action, draft, compressive buff/coupling		7		1					8
Slipped, fell, stumbled, etc. due to climatic condition	403		1	215	314	6	36	2	977
Slipped, fell, stumbled, other	470	14	21	547	407	4	27	15	1,505
Slipped, fell, stumbled, etc. due to irregular surface	261	1	1	103	134	4	13	16	533
Slipped, fell, stumbled, etc. due to object, ballast, spike, etc.	442	2	6	40	64	2	31	7	594
Slipped, fell, stumbled, etc. on oil, grease, etc.	182	3		30	32	1	8	3	259
Stabbing, knifing, etc.	3						1		4

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Table 15: Commuter Railroad Injury Event Descriptions, January 1, 2000 to July 31, 2006

Injury Event	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Non-trespasser off Railroad Property	Employee Not on Duty	Contractor - Other	Total
Stepped on object	64	3		2	6		1	1	77
Struck against object	408	8	2	61	28	2	7	12	528
Struck by falling object	182	6		20	9			4	221
Struck by object	547	17	2	102	23	3	6	14	714
Struck by on-track equipment	22	1	101	7	16				147
Struck by thrown or propelled object	72		1		2	1		4	80
Sudden release of air	10								10
Sudden, unexpected movement, other	195	6		17	12		2	4	236
Sudden/unexpected movement of on-track equipment	83	1	2	86	1		1	1	175
Sudden/unexpected movement of material	105		1	1	2		1	5	115
Sudden/Unexpected Movement of tools	29							1	30
Sudden/unexpected movement of vehicle	63			5	1				69
Thrill seeking			1						1
Total	7,537	178	294	2,193	1,308	43	188	159	11,900

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Table 16: Causes of Commuter Railroad Injuries by Type of Person -- January 1, 2000 to July 31, 2006

Injury Cause	Worker on Duty - Employee	Worker on Duty - Contractor	Trespassers	Passenger on Train	Non-trespasser on Railroad Property	Non-trespasser off Railroad Property	Employee Not on Duty	Contractor - Other	Total
Act of God	3							1	4
Close or no clearance	9	1							10
Environmental	981	9		248	308	6	34	11	1,597
Equipment	731	13		149	48	1	6	6	954
Equipment, related to using RCL	1								1
Failure to provide adequate space between equipment during switching operation	1								1
Human factor	3,950	91	65	1,122	714	29	118	71	6,160
Human factor, unrelated to using Remotely Controlled Locomotives	1	2							3
Impairment, physical condition, e.g., fatigue	19		1	12	6		1		39
Impairment, physical condition, e.g., fatigue, related to using Remotely Controlled Locomotives	1								1
Impairment, substance use	15		7	7	11	1			41
Insufficient training		1							1
Lack of communication	4	2						1	7
Object fouling track	8		2	15	2		4		31
Outside caused (e.g., assaulted/attacked)	113			42	9		1	4	169
Procedures for operating/using equipment not followed	835	16	1	24	13		7	33	929
Procedures for operating/using equipment not followed, unrelated to using Remotely Controlled Locomotives					1				1
Safety equipment not worn or in place	98	6		5	3	1	2	7	122
Signal	5								5
Slack adjustment during switching operation	1			1					2
Track	54			23	2		1		80
Trespassing	14		216	100	5				335
Trespassing, related to using Remotely Controlled Locomotives	1								1
Trespassing, unrelated to using Remotely Controlled Locomotives					1				1
Undetermined	692	37	2	445	185	5	14	25	1,405
Total	7,537	178	294	2,193	1,308	43	188	159	11,900

Conclusion -- Injuries

In looking at the injuries reported during the 79-month study period, it is clear that the employee and contractor injuries account for the majority (66 percent). This is to be expected, since FRA uses its accident/incident reporting system to meet its obligation to fulfill OSHA reporting requirements. However, analysis of these injuries also shows that passengers boarding, riding and alighting trains received 2,193 injuries and that non-trespassers on railroad property, including passengers and motorists injured in stations and performing legal movements around tracks and through intersections and grade crossings, accounted for 1,308 injuries during the 79-month study period.

In reviewing these injuries, it is interesting to note that human factors issues are responsible for more than half of the injuries to employees/contractors, passengers, and non-trespassers on railroad property. This appears to be an area which may benefit from additional analysis and research. Environmental conditions, mainly poor weather, are responsible for 13 percent of employee injuries, 11 percent of passenger injuries, and 24 percent of injuries to non-trespassers on railroad property. Equipment failures are responsible, across the boards for approximately 10 percent of injuries to employees/contractors, passengers and non-trespassers on railroad property. Finally, failure to follow operating procedures is accountable for more than 10 percent of employee injuries and approximately one percent of injuries to passengers and non-trespassers on railroad property.

5.0 Conclusion

The results of this *Commuter Rail Safety Study* have identified the tremendous progress made by commuter railroads receiving FTA funding in reducing the occurrences of accidents, injuries and fatalities over the last decade. For additional points of comparison, **Table 17** depicts key safety performance measures over the last decade between the 18 operating commuter railroads receiving FTA funds and the National Passenger Railroad Corporation (Amtrak). **Table 18** provides additional detail on Amtrak's 10-year safety trends.

Table 17: Key Points – 10-Year Comparison – Commuter Railroads and Amtrak

Category – 1996 to 2005	FTA-funded Commuter Railroads	Amtrak
Passengers Transported	2,597,274,837	235,653,446
Total Train Miles	465,654,448.00	373,409,809
Total Accidents/Incidents	12,426	14,419
Total Accident/Incident Rate per Million Train Miles	26.69	38.61
Total Fatalities	526	1,206
Total Injuries/Illnesses	11,900	13,194
Employee-on-Duty Accident/Incident Rate per 200,000 Hours Worked	5.19	4.12
Employee-on-Duty deaths	23	9
Total Train Accidents	853	1,090
Rate of Train Accidents per Million Train Miles	1.83	2.91
Highway-Rail Grade Crossing Accidents	597	1,608
Rate of Highway-Rail Grade Crossing Accidents per Million Train Miles	1.29	4.3
Highway-Rail Grade Crossing Fatalities	190	506
Highway-Rail Grade Crossing Injuries	355	997
Total Trespasser Fatalities	466	700
Rate of Trespasser Fatalities per Million Train Miles	1.01	1.87

Table 17 demonstrates that the 18 FTA-funded commuter railroads have lower rates of train accidents per million train miles, lower rates of highway-rail grade crossing accidents per million train miles, and lower rates of trespasser fatalities per million train miles. However, Amtrak has lower rates of employee fatalities per 200,000 hours worked. While the commuter railroads have a slightly better safety performance overall than Amtrak, the types of safety challenges experienced by Amtrak and the commuter railroads are similar. Based on the analysis presented in this *Commuter Railroad Safety Study* several areas have been identified in need of improvement:

- Reduction in trespasser-related accidents and fatalities;
- Reduction in mainline accidents caused by obstructions;
- Reduction in injuries to employees, passengers on trains, and non-trespassers on railroad property related to human factors issues and environmental conditions;
- Reduction in highway-rail grade crossing accidents at public crossings; and
- Improvement in compliance with operating procedures.

Over the next year, FTA and FRA are committed to working together to establish target safety goals addressing each of these areas and to support and monitor the performance of commuter railroads in meeting them.

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Table 18: Amtrak 10-Year Safety Trends

Category	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	% Change From Last Year	% Change from 1996
TOTAL ACCIDENTS/INCIDENTS	1,386.00	1,413.00	1,341.00	1,265.00	1,603.00	1,629.00	1,458.00	1,505.00	1,523.00	1,296.00	-17.94	-6.49
Total accident/incident rate per million train miles	40.96	38.12	37.87	34.98	44.43	42.23	36.77	38.08	38.81	34.24	-13.07	-16.41
Total fatalities	101.00	117.00	120.00	105.00	131.00	139.00	126.00	118.00	128.00	121.00	-6.67	19.80
Total injuries and illnesses	1,209.00	1,328.00	1,180.00	1,161.00	1,412.00	1,527.00	1,484.00	1,344.00	1,364.00	1,185.00	-15.42	-1.99
Employee on duty deaths	1.00	3.00	2.00	.	.	1.00	.	1.00	.	1.00	.	0.00
Total employee on duty reports	987.00	901.00	842.00	914.00	920.00	881.00	824.00	791.00	825.00	648.00	-19.37	-34.35
Employee on duty rate per 200,000 hours	4.64	4.33	3.87	4.03	4.01	4.10	4.18	4.19	4.34	3.52	-20.34	-24.14
Trespasser deaths, not at highway-rail grade crossings	56.00	57.00	67.00	51.00	70.00	67.00	78.00	64.00	77.00	71.00	-11.76	26.79
TRAIN ACCIDENTS	88.00	84.00	89.00	85.00	148.00	150.00	112.00	111.00	111.00	112.00	1.18	27.27
Train accidents per million train miles	2.60	2.27	2.51	2.35	4.10	3.89	2.82	2.81	2.83	2.96	5.54	13.77
Train accident deaths	.	1.00	.	.	.	1.00	4.00	1.00	2.00	1.00	.	.
Train accident injuries	39.00	74.00	28.00	41.00	106.00	151.00	226.00	18.00	76.00	96.00	48.78	146.15
Collisions	4.00	3.00	4.00	3.00	8.00	8.00	4.00	3.00	7.00	3.00	-133.30	-25.00
Derailments	57.00	51.00	55.00	46.00	80.00	77.00	57.00	45.00	43.00	35.00	-17.39	-38.60
Other types, e.g., obstructions	27.00	30.00	30.00	36.00	60.00	65.00	51.00	63.00	61.00	74.00	36.11	174.07
Train accidents on main line	37.00	46.00	46.00	40.00	72.00	72.00	60.00	62.00	71.00	80.00	22.50	116.22
Rate per million train miles	1.15	1.31	1.38	1.17	2.12	1.97	1.59	1.66	1.91	2.24	27.76	93.83
Accidents on yard track	50.00	36.00	41.00	37.00	72.00	72.00	51.00	45.00	40.00	31.00	-24.32	-38.00
Rate per million yard switching train miles	28.25	18.39	19.70	17.78	34.60	34.87	25.14	21.84	19.22	14.90	-24.32	-47.27
HIGHWAY-RAIL INCIDENTS	150.00	176.00	170.00	181.00	202.00	162.00	142.00	149.00	146.00	130.00	-8.84	-13.33
Rate per million train miles	4.43	4.75	4.80	5.01	5.60	4.20	3.58	3.77	3.72	3.43	-5.71	-22.53
Highway-rail incidents deaths	41.00	53.00	50.00	52.00	56.00	69.00	42.00	52.00	46.00	45.00	-1.92	9.76
Highway-rail incidents injuries	66.00	123.00	125.00	146.00	90.00	84.00	93.00	125.00	64.00	81.00	11.64	22.73
Incidents at public crossings	132.00	150.00	145.00	158.00	168.00	140.00	118.00	129.00	130.00	108.00	-13.92	-18.18
Percent of total	88.00	85.23	85.29	87.29	83.17	86.42	83.10	86.58	89.04	83.08	-6.83	-5.59
OTHER ACCIDENTS/INCIDENTS	1,148.00	1,153.00	1,082.00	999.00	1,253.00	1,317.00	1,204.00	1,245.00	1,266.00	1,054.00	-21.22	-8.19
Other incidents deaths	60.00	63.00	70.00	53.00	75.00	69.00	80.00	65.00	80.00	75.00	-9.43	25.00
Other incidents injuries	1,104.00	1,131.00	1,027.00	974.00	1,216.00	1,292.00	1,165.00	1,201.00	1,224.00	1,008.00	-22.18	-8.70
EMPLOYEE HOURS WORKED	42,558,749.00	41,663,112.00	43,480,510.00	45,399,073.00	45,840,150.00	42,956,762.00	39,450,311.00	37,801,336.00	38,039,779.00	36,831,282.00	-2.66	-13.46
TOTAL TRAIN MILES	33,840,497.00	37,063,760.00	35,414,704.00	36,160,704.00	36,080,704.00	38,575,104.00	39,652,480.00	39,519,448.00	39,246,704.00	37,855,704.00	-3.85	11.87
YARD SWITCHING MILES	1,769,655.00	1,957,814.00	2,080,704.00	2,080,704.00	2,080,704.00	2,065,104.00	2,028,480.00	2,060,448.00	2,080,704.00	2,080,704.00	0.00	17.58
PASSENGERS TRANSPORTED	27,590,012.00	20,555,107.00	21,246,203.00	21,544,160.00	22,985,354.00	23,525,230.00	23,320,755.00	24,594,785.00	25,215,344.00	25,076,496.00	-0.64	-9.11