NATIONAL TRANSPORTATION SAFETY BOARD

An independent federal agency

Testimony of the Honorable T. Bella Dinh-Zarr, PhD, MPH
Vice Chairman
National Transportation Safety Board
Before the
Committee on Commerce, Science, and Transportation
United States Senate
on
Passenger Rail Safety:
Accident Prevention and On-Going Efforts to Implement Train Control Technology
Washington, DC
June 10, 2015

Good morning Chairman Thune, Ranking Member Nelson, and the Members of the Committee. Thank you for inviting the National Transportation Safety Board (NTSB) to testify before you today.

The NTSB is an independent Federal agency charged by Congress with investigating every civil aviation accident and significant incidents in the United States and significant accidents and incidents in other modes of transportation – railroad, highway, marine and pipeline. The NTSB determines the probable cause of accidents and other transportation events and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the Federal Government and other organizations to provide assistance to victims and their family members impacted by major transportation disasters.

Since its inception, the NTSB has investigated more than 140,500 aviation accidents and thousands of surface transportation accidents. In addition, the NTSB has completed 553 major investigative reports in the areas of railroad, pipeline, and hazardous materials safety, including 150 accidents involving Amtrak. On call 24 hours a day, 365 days a year, NTSB investigators travel throughout the country and internationally to investigate significant accidents and develop factual records and safety recommendations with one aim—to ensure that such accidents never happen again.

To date, we have issued over 14,000 safety recommendations to nearly 2,300 recipients. Because we have no authority to regulate the transportation industry, our effectiveness depends on our reputation for conducting thorough, accurate, and independent investigations and for producing timely, well-considered recommendations to enhance transportation safety.

The NTSB's annual Most Wanted List highlights safety-critical actions that the US Department of Transportation (DOT), United States Coast Guard, other Federal entities, states, and organizations need to take to help prevent accidents and save lives. In January, the NTSB released its Most Wanted List of Transportation Safety Improvements for 2015. Each year, we develop our Most Wanted List based on safety issues we identify as a result of our accident investigations. This year's Most Wanted List includes "Implement Positive Train Control in 2015." As we pointed out:

> Without Positive Train Control (PTC), real-world results have been tragic. PTC is a system of functional requirements for monitoring and controlling train movements to provide increased safety. While the NTSB has called for a system like this for over 45 years, it still has not been fully implemented in our commuter, intercity, and freight trains. Without it, everybody on a train is one human error away from an accident.
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> Congress enacted the Rail Safety Improvement Act of 2008 [RSIA]. The Act requires each Class 1 rail carrier and each provider of regularly-scheduled intercity or commuter rail passenger service to implement a PTC system by December 31, 2015. Progress is being made toward this lifesaving goal. Metrolink became the first commuter rail system to implement PTC, when it began a revenue service demonstration on the BNSF Railway. This demonstration project is a step in the right

direction, and Metrolink reports it will implement PTC fully throughout its entire system before the Congressionally mandated deadline.

It has been more than 45 years since the NTSB first recommended the forerunner to PTC. In the meantime, more PTC-preventable collisions and derailments occur, more lives are lost, and more people sustain injuries that change their lives forever.

Yet there is still doubt when PTC systems will be implemented nationwide as required by law.

Each death, each injury, and each accident that PTC could have prevented, testifies to the vital importance of implementing PTC now.

For over 45 years, the NTSB has investigated numerous train collisions and over speed derailments caused by operational errors involving human performance failures. The NTSB attributed these human performance failures to a variety of factors, including fatigue, sleep disorders, medications, loss of situational awareness, reduced visibility, and distractions in the operating cab. Many of these PTC-preventable accidents occurred after train crews failed to comply with train control signals, follow operating procedures in non-signaled or "dark" territories, observe work zone protections, or adhere to other specific operating rules such as returning track switches to normal position after completing their work at railroad sidings.

The first NTSB-investigated accident that train control technology would have prevented occurred in 1969, when four people died and 43 were injured in the collision of two Penn Central commuter trains in Darien, Connecticut.[1] The NTSB recommended, based upon its investigation of that accident, that the FRA study the feasibility of requiring railroads to install an automatic train control system, the precursor to today's PTC systems.[2] The appendix to this prepared statement provides a chart showing that since the NTSB issued the first safety recommendation concerning train control technology in 1970, there have been more than 140 accidents across the country resulting in nearly 300 fatalities, more than 6500 injuries, and costing millions of dollars, that could have been prevented or mitigated by PTC.

Older cab signaling and speed control systems, such as automatic train control (ATC), have been in use for nearly a century. In 1919, a system that could automatically stop a train in violation of a signal was tested on the Buffalo, Rochester, and Pittsburgh Railway. That same system was commercially applied to the Chicago and North Western Railway in 1923. ATC is designed to enforce restrictive and stop signals by applying a penalty brake application to slow or stop the train to prevent or mitigate the results of train-to-train collisions, but ATC will not prevent all train collisions and was not designed to prevent over speed derailments.[3] Although ATC is still in use today, the nearly century-old technology is obsolete and insufficient to provide an acceptable level

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[1] NTSB, *Penn Central Company, Collision of Trains N-48 and N-49 on August 20, 1969*, Rpt. No. RAR-70-03 (October 14, 1970).

[2] R-70-020, Dec. 18, 1970.

[3] Penalty braking is a brake application that is initiated after the train engineer fails to comply with a signal or to acknowledge an alerter alarm.

of rail safety today. PTC systems are designed to prevent derailments caused by over speeding and train-to-train collisions by slowing or stopping trains that are not complying with the signal systems, track authorities and speed limits. They are also designed to protect track workers from being struck by trains by preventing train incursions into designated work zones and prevent train movement through misaligned switches.

Congress enacted RSIA in the aftermath of the 2008 accident in Chatsworth, California in which a Metrolink commuter train and a Union Pacific freight train collided head-on, killing 25 people and injuring 102 others.[4] The NTSB's investigation concluded that the Metrolink engineer's use of a cell phone to send text messages distracted him from his duties and that PTC could have prevented or mitigated this accident. This Committee's report accompanying the Senate bill under consideration prior to the enactment of the RSIA also pointed to the NTSB's investigation of a 2005 train derailment in Graniteville, South Carolina, in which an employee failed to properly line a track switch, resulting in the death of nine individuals due to the release of chlorine gas. [5] [6]

RSIA requires the implementation of a PTC system by December 31, 2015, on each line over which intercity passenger or commuter service is operated or over which poison- or toxic-by-inhalation hazardous materials are transported .[7] Several rail carriers have stated that they will not meet the 2015 deadline, and we know that Congress is considering extending the PTC implementation deadline. We urge Congress not to extend the RSIA deadline and require full PTC implementation without delay. NTSB accidents are filled with files containing PTC preventable accidents, and every day that PTC is delayed, the risk of a PTC-preventable accident remains.

The most recent PTC-preventable accident occurred last month on May 12, 2015, when Amtrak Northeast Regional Train 188 derailed. The accident train, operating northbound from Washington to New York, departed Philadelphia's 30th Street Station on time bound for New York's Penn Station. The train derailed while traveling through a four-degree left curve at Frankford Junction. Maximum speed through the curve is 50 miles-per-hour (mph), but NTSB's preliminary data analysis determined that moments before the derailment, the train was traveling at 106 mph when the engineer applied the emergency brake system. Eight people were killed and more than 200 were injured.[8]

Another PTC-preventable accident occurred on December 1, 2013, when a Metro-North commuter train derailed in the Bronx after entering a curve with a 30 mph speed limit at 82 mph.[9] Four people lost their lives and 61 others were injured. We determined the probable cause of the derailment was the engineer's noncompliance with the 30 mph speed restriction because he had fallen asleep due to undiagnosed severe obstructive sleep apnea. A contributing factor was the

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[4] NTSB, *Collision of Metrolink Train 111 With Union Pacific Train LOF65-12 Chatsworth, California September 12, 2008*, Rpt. No. NTSB/RAR-10/01 (Jan. 21, 2010).
[5] S. Rpt. No. 110-270, accompanying *S. 1889, the Railroad Safety Enhancement Act of 2007*, at 6 (March 3, 2008).
[6] NTSB, *Collision of Norfolk Southern Freight Train 192 With Standing Local Norfolk Southern Train P22 With Subsequent Hazardous Materials Release at Graniteville, South Carolina, January 6, 2005,* Rpt. No. NTSB/RAR-05/04 (Nov. 29, 2005).
[7] Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, § 104 (2008).
[8] NTSB, Preliminary Report: Railroad DCA15MR010 (2015).
[9] NTSB, *Metro North Railroad Derailment*, Accident Brief No. RAB-14/12 (October 24, 2014).

absence of a positive train control system that would have automatically applied the brakes to enforce the speed restriction.

Other accidents that could have been prevented by PTC include:

- In September 2010, near Two Harbors, Minnesota, human error and fatigue contributed to the collision of two freight trains, injuring five crewmembers.
- In April 2011, near Red Oak, Iowa, fatigue contributed to the rear-end collision of a coal train with a standing maintenance-of-way equipment train, killing two crewmembers.
- In May 2011, in Mineral Springs, North Carolina, human error contributed to the rear-end collision of two freight trains, killing two crewmembers and injuring two more.
- In May 2011, in Hoboken, New Jersey, human error contributed to the collision of a train with the bumping post at the end of the track.
- In January 2012, near Westville, Indiana, inattentiveness contributed to the collision of three trains, injuring two crewmembers.
- In June 2012, near Goodwell, Oklahoma, human inattentiveness contributed to the collision of two freight trains, killing three crewmembers.
- In July 2012, near Barton County, Missouri, human error contributed to the collision of two freight trains, injuring two crewmembers.
- In May 2013, near Chaffee, Missouri, inattentiveness and fatigue contributed to the collision of two freight trains, injuring two crewmembers and causing the collapse of a highway bridge.
- In December 2013, near Keithville, Louisiana, human error contributed to the collision of two freight trains, injuring four crewmembers.

Since 2004, in the 30 PTC-preventable freight and passenger rail accidents that the NTSB investigated, 69 people died, more than 1,200 were injured, and damages totaled millions of dollars.

Thus far, some PTC systems have been successfully deployed. For example, one of the deployed PTC systems is the Amtrak Advanced Civil Speed Enforcement System (ACSES). Amtrak has deployed ACSES along portions of the Northeast Corridor that are owned by Amtrak.[10] ACSES, a transponder-based system approved by FRA, enforces maximum track speed limits, permanent and temporary speed limits, and positive stop at interlocking and controlled point signals displaying stop. In addition, Amtrak has deployed the Incremental Train Control System (ITCS) on more than 60 route miles along Amtrak owned Michigan Line between Chicago and Detroit.[11] ITCS has been in revenue service since September 2000.

Extending RSIA's deadline may result in a patchwork of PTC systems in operation across US rail systems. Without a fully implemented and PTC system, railroads that complied with the 2015 deadline would not be able to fully utilize their PTC functionality if they operate on track used by a carrier that has not met the law.

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[10] The area of track where the May 12, 2015 derailment occurred near Philadelphia is not yet equipped with ACSES. Amtrak has indicated it expects to have ACSES operational in this area by the end of 2015, if possible.

[11] *See* http://www.fra.dot.gov/Page/P0287.

In February 2013, the NTSB held a forum called "Positive Train Control: Is it on Track?" in order to bring together a wide range of experts to examine the technological, regulatory, and operational status of PTC.[12] Challenges hindering the full implementation of PTC were discussed, including cost, standardization of technologies, and availability of radio spectrum. Despite these challenges, the NTSB believes it is crucial that the Congressionally-mandated goal of PTC by the end of 2015 remain in place.

Conclusion

Early forerunners of PTC have been in existence since the 1920s. Yet, more than a decade into the 21st century, we are still hearing that PTC cannot be implemented this year--it is too costly and too difficult. This type of response would not have been tolerated concerning automobile seatbelt or airbag technology, and it should not be acceptable here. The NTSB strongly supports full PTC implementation without delay. Many railroads that have made the difficult decisions and invested millions of dollars to implement PTC in 2015 should not be penalized for their leadership. For each and every day that PTC implementation is delayed, the risk of a PTC-preventable accident remains.

Thank you for the opportunity to testify before you today. I look forward to responding to your questions.

[12] Information concerning the NTSB's PTC Forum on is available at http://www.ntsb.gov/news/events/Pages/2013_Train-Control_FRM.aspx

	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE OF ACCIDENT	LOCATION	RAILROAD(S)	INJURED	FATAL	Property Damage	ACCIDENT TYPE	PTC in PC	PTC RELATED REC(S)	RECIPIENT(S)	PTC Preventable under current FRA regulations	PTC Preventable under current NTSB recommendations
2	8/20/1969	Darien, CT	Penn Central	43	4		head-on		R-70-20	FRA	yes	yes
3	12/2/1971	***	Special Study - Signals & Operating Rules as Causal Factors in Train Accidents	***	***	***	***		R-71-45	FRA	***	***
4	3/12/1972	Herndon, PA	Penn Central	0	4		head-on	no	R-73-8 (alerters)	FRA	yes	yes
5	5/24/1972	Maquon, IL	Burlington Northern	0	4		head-on	no	none		yes	yes
6	5/24/1972	***	Special Study - Train Accidents Attributed to the "Negligence of Employees"	***	***	***	***	***	reiterate R-70-20 reiterate R-71-45		***	***
7	10/30/1972	Chicago, IL	Illinois Central Gulf	332	45		rear-end	no	R-73-30	FRA	yes	yes
8	11/10/1972	Moylan, PA	Penn Central	7	0		rear-end					yes
9	1/19/1973	Port Jefferson, NY	Long Island RR	3	0		rear-end					yes
10	2/21/1973	Taft, LA	Texas and Pacific	2	3		head-on	no	none		yes	yes
11	3/9/1973	Newburg Jct, NY	Erie Lackawanna	4	0		rear-end					yes
12	3/14/1973	Cheverly, MD	Penn Central	11	0		rear-end					yes
13	5/25/1973	New York, NY	Long Island RR	0	0		side					yes
14	6/8/1973	Mount Vernon, NY	Penn Central	144	1		rear-end					yes
15	6/25/1973	Indio, CA	Southern Pacific	0	2		rear-end	no	reiterate R-73-8		yes	yes
16	11/2/1973	Evanston, IL	Chicago Transit Authority	33	0		rear-end					yes
17	12/1/1973	Cotulla, TX	Missouri Pacific	0	3		misaligned switch	no	none		yes	yes
18	5/8/1974	Cleveland, OH	Penn Central	0	2		misaligned drawbridge	no	none		yes	yes
19	9/1/1974	Mustang, OK	St. Louis-San Francisco	3	1		head-on	no	none		yes	yes
20	9/13/1974	Chicago, IL	Chicago Transit Authority	35	0		rear-end					yes
21	11/18/1974	Chicago, IL	Chicago Transit Authority	13	0		rear-end					yes
22	1/2/1975	Botanical Gardens, NY	Penn Central	265	0		rear-end	yes	R-75-06 R-75-36	MTA FRA	yes	yes
23	5/30/1975	Meeker, LA	Texas and Pacific	0	3		rear-end	no	R-76-03 reiterate R-71-45	FRA	yes	yes
24	6/6/1975	Leetonia, OH	Penn Central	7	1	**$1,250,000**	rear-end	no	none		no	yes
25	10/17/1975	Wilmington, DE	Penn Central	25	0		rear-end	no	R-76-24	FRA	no	yes
26	7/5/1975	Hurricane, AK	Alaska RR	62	1	**$558,000**	rear-end	no	none		yes	yes
27	8/1/1975	Boston, MA	Massachusetts Bay Transportation Authority	154	0	**$425,000**	rear-end	no	none		no	yes
28	10/17/1975	Wilmington, DE	Penn Central	25	0	**$817,866**	rear-end	no	none		no	yes
29	1/9/1976	Chicago, IL	Chicago Transit Authority	380	1	**$267,000**	rear-end	no	none		no	yes
30	2/4/1976	Pettisville, OH	Penn Central	2	4	**$1,165,000**	head-on	no	reiterate R-76-03		yes	yes
31	7/13/1976	New Canaan, CT	Conrail	30	2		rear-end	no	none		yes	yes
32	8/18/1976	Cleveland, OH	Greater Cleveland Regional Transit Authority	20	0	**$61,000**	rear-end	no	none		yes	yes
33	2/4/1977	Chicago, IL	Chicago Transit Authority	266	11	**$1,200,000**	rear-end	no	none		no	yes
34	6/12/1977	Baltimore, MD	Conrail	4	0	**$300,000**	rear-end	no	none		yes	yes
35	7/8/1977	Cleveland, OH	Greater Cleveland Regional Transit Authority	60	0	**$100,000**	head-on	no	none		yes	yes
36	6/9/1978	Seabrook, MD	Conrail & Amtrak	176	0	**$248,050**	rear-end	no	R-78-39	Amtrak	yes	yes
37	1/31/1979	Muncy, PA	Conrail	3	2	**$1,304,200**	rear-end	no	reiterate R-76-03		no	yes
38	3/29/1979	Ramsey, WY	Union Pacific	3	2	**$1,121,000**	rear-end	no	reiterate R-76-03		no	yes

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1	DATE OF ACCIDENT	LOCATION	RAILROAD(S)	INJURED	FATAL	Property Damage	ACCIDENT TYPE	PTC in PC	PTC RELATED REC(S)	RECIPIENT(S)	PTC Preventable under current FRA regulations	PTC Preventable under current NTSB recommendations
39	4/20/1979	Edison, NJ	Amtrak	73	0	$353,600	head-on	no	none		yes	yes
40	7/24/1979	Thousand Palms, CA	Southern Pacific	4	1	$1,479,700	rear-end	no	none		yes	yes
41	10/1/1979	Royersford, PA	Conrail	0	2	$562,000	rear-end	no	reiterate R-76-03		no	yes
42	10/12/1979	Harvey, IL	Amtrak & Illinois Central Gulf	44	2		misaligned switch	no	none		yes	yes
43	10/16/1979	Philadelphia, PA	Conrail	524	1	$1,940,312	rear-end	no	none		no	yes
44	2/12/1980	Orleans Road, WV	Baltimore & Ohio	5	1	$1,688,200	head-on	yes	reiterate R-73-08		yes	yes
45	4/2/1980	Lakeview, NC	Amtrak & Seaboard Coast Line	123	0	$1,145,492	head-on	no	none		yes	yes
46	7/17/1980	North Wales, PA	Southeastern Pennsylvania Transportation Authority & Conrail	67	0	$1,475,000	rear-end	no	none		no	yes
47	9/6/1980	Welch, WV	Norfolk & Western	0	3	$1,446,553	side	no	reiterate R-76-03		yes	yes
48	10/16/1980	Hermosa, WY	Union Pacific	2	2	$993,000	rear-end	no	reiterate R-76-03		no	yes
49	11/7/1980	Dobbs Ferry, NY	Amtrak & Conrail	84	0	$915,000	head-on	no	none		yes	yes
50	2/9/1981	Germantown, MD	Baltimore & Ohio	4	0	$701,000	head-on	no	none		yes	yes
51	7/3/1981	Brooklyn, NY	New York Transit Authority	140	1	$543,200	rear-end	no	none		no	yes
52	8/11/1981	Beverly, MA	Boston & Maine and Massachusetts Bay	32	4	$1,683,200	head-on	no	none		yes	yes
53	12/28/1981	New Johnsonville, TN	Louisville & Nashville	1	2	$998,313	rear-end	no	R-82-98	Louisville & Nashville	no	yes
54	3/29/1982	Bristol, PA	Amtrak	32	0	$832,000	head-on	no	none		yes	yes
55	10/3/1982	Possum Grape, AR	Missouri Pacific	1	2	$1,047,000	side	no	none		yes	yes
56	9/14/1983	Sullivan, IN	Seaboard System	3	2		rear-end	no	none		no	yes
57	2/26/1984	Saltsburg, PA	Conrail	3	0	$784,719	rear-end	no	none		no	yes
58	4/13/1984	Wiggins, CO	Burlington Northern	2	5	$3,891,428	head-on	no	reiterate R-76-03	FRA	yes	yes
59	4/22/1984	Newcastle, WY	Burlington Northern & Atchison, Topeka and Santa Fe	2	2	$1,358,993	rear-end	no	reiterate R-76-03	FRA	no	yes
60	6/14/1984	Motley, MN	Burlington Northern	4	3	$3,931,146	head-on	no	none		yes	yes
61	7/23/1984	Queens, New York, NY	Amtrak	140	1	$3,199,000	head-on	no	none		yes	yes
62	1/21/1985	Gary, IN	Chicago, South Shore & South Bend	87	0	$2,433,000	head-on	no	none		yes	yes
63	2/25/1985	Robbins, SC	Seaboard System	3	0	$66,455	rear-end	no	none		yes	yes
64	7/10/1985	Cleveland, OH	Greater Cleveland Regional Transit Authority	50	0		rear-end	no	none		no	yes
65	8/2/1985	Westminster, CO	Burlington Northern	0	5	$4,000,000	head-on	no	none		yes	yes
66	5/7/1986	Brighton, MA	Boston & Maine and Conrail	153	0	$102,210	rear-end	no	R-87-16	FRA	no	yes
67	7/10/1986	North Platte, NE	Union Pacific	3	1		rear-end	no	R-87-19	UP	no	yes
68	10/9/1986	Fall River, WI	Amtrak	30	1		overspeed	no	none		yes	yes
69	1/4/1987	Chase, MD	Amtrak & Conrail	174	16		rear-end	no	R-87-01 R-87-02	Amtrak Amtrak	yes	yes
70	2/6/1987	East Concord, NY	CSX	7	2	$2,009,950	head-on	no	none		yes	yes
71	6/15/1987	Yuma, AZ	Southern Pacific	0	1		head-on	no	none		no	yes
72	10/12/1987	Russell, Iowa	Amtrak	122	0		misaligned switch	no	none		yes	yes
73	1/14/1988	Thompsontown, PA	Conrail	2	4	$6,015,000	head-on	no	none		yes	yes
74	1/29/1988	Chester, PA	Amtrak	24	0	$3,397,000	collision	yes	none		yes	yes
75	7/30/1988	Altoona, Iowa	Iowa Interstate	2	2	$1,000,000	head-on	no	none		yes	yes

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76	8/9/1990	Sugar Valley, GA	Norfolk Southern	3	3	**$1,269,000**	collision	no	R-91-25 R-91-31 R-91-32 reiterate R-87-16	FRA AAR Railway Progress Institute	yes	yes
77	11/7/1990	Corona, CA	Atchison, Topeka and Santa Fe Railway Company	2	4	**$4,400,000**	head-on	no	none		yes	yes
78	12/12/1990	Boston, MA	Amtrak and MBTA	453	0	**$12,500,000**	overspeed / collision	yes	none		yes	yes
79	7/2/1991	Cleveland, OH	Greater Cleveland Regional Transit Authority	15	0	**$5,500**	rear-end	yes	R-93-1 R-93-2 R-93-3 reiterate R-91-37	Greater Cleveland Regional Transit Authority State of Ohio	no	yes
80	8/30/1991	Ledger, MT	Burlington Northern	4	3	**$19,000,000**	head-on	yes	R-93-12 R-93-13 R-93-14 R-93-15	FRA AAR AAR Railway Progress Institute	yes	yes
81	9/17/1991	Knox, IN	Norfolk Southern	5	1	**$3,500,000**	head-on	no	R-92-09	Norfolk Southern	yes	yes
82	1/18/1993	Gary, IN	Northern Indiana Commuter Transportation District	95	7	**$854,000**	collision	no	none		yes	yes
83	11/11/1993	Kelso, WA	Burlington Northern & Union Pacific	0	5	**$4,605,000**	head-on	yes	R-94-13 R-94-14 R-94-15 R-94-16 R-94-17 R-94-18 reiterate R-87-16 reiterate R-93-12	FRA FRA FRA AAR BNSF UP	yes	yes
84	6/8/1994	Thedford, NE	Burlington Northern	2	2	**$2,500,000**	rear-end	yes	reiterate R-87-16 reiterate R-32-12		no	yes
85	2/9/1995	Brooklyn, NY	New York City Transit	15	0	**$1,500,000**	rear-end	no	R-96-11	NYCT	yes	yes
86	6/5/1995	Brooklyn, NY	New York City Transit	71	1	**$2,300,000**	rear-end	no	none		yes	yes
87	2/9/1996	Secaucus, NJ	New Jersey Transit	69	3	**$3,329,000**	head-on	no	none		yes	yes
88	2/16/1996	Silver Spring, MD	MARC & Amtrak	26	11	**$7,500,000**	head-on	yes	R-97-13 R-97-24 R-97-25 R-97-26 R-97-32 R-97-39 R-97-40 R-97-41 reiterate R-87-16	FRA FTA FTA CSX Maryland MTA AAR AAR AAR	yes	yes
89	3/11/1996	Philadelphia, PA	Southeastern Pennsylvania Transportation Authority	1	0	**$80,800**	rear-end	no	none		yes	yes
90	5/12/1996	Pleasant Hill, IL	Gateway Western	2	0	**$1,261,850**	side	no	none		yes	yes
91	8/20/1996	Smithfield, WV	CSX	2	2	**$3,848,914**	head-on	no	none		yes	yes
92	8/30/1996	Beaumont, CA	Southern Pacific Transportation	0	0	**$176,000**	rear-end	no	none		no	yes
93	2/21/1997	Odem, TX	Union Pacific	2	0	**$31,000**	rear-end	no	none		no	yes

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94	5/14/1997	Branson, MO	Missouri and Northern Arkansas & Branson Scenic	2	0	**$410,625**	misaligned switch	no	none		no	yes
95	6/22/1997	Devine, TX	Union Pacific	2	4	**$6,015,000**	head-on	yes	reiterate R-87-16		yes	yes
96	7/2/1997	Delia, KS	Union Pacific	1	1	**$5,141,000**	side	yes	none		yes	yes
97	9/29/1997	Hummelstown, PA	Conrail	0	1	**$571,700**	rear-end	no	none		yes	yes
98	3/25/1998	Butler, IN	Norfolk Southern & Conrail	2	1	**$616,200**	side	no	none		yes	yes
99	7/16/1998	Geneseo, KS	Central Kansas Railway	0	0	**$842,028**	rear-end	no	none		yes	yes
100	1/17/1999	Bryan, OH	Conrail	0	2	**$5,300,000**	rear-end	yes	R-01-06	FRA	yes	yes
101	3/23/1999	Momence, IL	Conrail & Union Pacific	4	0	**$1,791,000**	head-on	yes	none		yes	yes
102	2/13/2000	BWI Airport	Maryland Transit Admin	18	0	**$924,000**	overspeed	no	none		yes	yes
103	8/15/2000	BWI Airport	Maryland Transit Admin	17	0	**$935,000**	overspeed	no	none		yes	yes
104	2/5/2001	Syracuse, NY	Amtrak & CSXT	62	0	**$280,600**	rear-end	yes	none		no	yes
105	6/17/2001	Chicago, IL	Chicago Transit Authority	21	0	**$30,000**	rear-end	no	none		no	yes
106	8/3/2001	Chicago, IL	Chicago Transit Authority	118	0	**$136,138**	rear-end	no	none		no	yes
107	11/15/2001	Clarkston, MI	Canadian National	2	2	**$1,400,000**	head-on	no	none		yes	yes
108	12/13/2001	Pacific, MO	Union Pacific	4	0	**$10,000,000**	rear-end	no	none		no	yes
109	4/23/2002	Placentia, CA	BNSF & Metrolink	162	2	**$4,600,000**	head-on	yes	R-03-23 reiterate R-01-06	AAR	yes	yes
110	5/28/2002	Clarendon, TX	BNSF	3	1	**$8,000,000**	head-on	yes	none		yes	yes
111	6/12/2002	Aurora, IL	Metra	47	0	**$292,000**	head-on	no	none		no	yes
112	6/17/2002	Baltimore, MD	Amtrak & MARC	6	0	**$740,000**	side	yes	none		yes	yes
113	10/21/2002	Des Plaines, IL	Union Pacific	2	0	**$1,020,000**	side	no	none		yes	yes
114	2/13/2003	Scotts Bluff, NE	BNSF	2	1	**$2,400,000**	side	no	none		yes	yes
115	10/12/2003	Chicago, IL	Metra	47	0	**$5,000,000**	overspeed	yes	R-05-13 reiterate R-01-06	Metra	yes	yes
116	11/15/2003	Kelso, WA	BNSF & Union Pacific	2	0	**$2,700,000**	side	yes	none		yes	yes
117	2/21/2004	Carrizozo, NM	Union Pacific	0	2	**$1,964,543**	head-on	no	none		no	yes
118	5/19/2004	Gunter, TX	BNSF	1	4	**$2,000,000**	head-on	no	none		yes	yes
119	6/28/2004	Macdona, TX	Union Pacific	41	3	**$5,700,000 $150,000 enviro**	head-on	yes	none		yes	yes
120	1/6/2005	Graniteville, SC	Norfolk Southern	556	9	**$6,900,000**	misaligned switch	no	none		yes	yes
121	7/10/2005	Anding, MS	Canadian National	0	4	**$9,500,000 $616,800 enviro**	head-on	yes	R-07-01 (alerter) R-07-07	FRA CN	no	yes
122	9/15/2005	Shepherd, TX	Union Pacific	2	1	**$1,514,000**	misaligned switch	no	none		yes	yes
123	9/17/2005	Chicago, IL	Metra	117	2	**$6,350,000**	overspeed	yes	none		yes	yes
124	10/15/2005	Texarkana, AR	Union Pacific	0	1	**$2,400,000**	rear-end	no	none		yes	yes
125	1/18/2006	Lincoln, AL	Norfolk Southern	3	0	**$5,200,000**	rear-end	yes	none		yes	yes
126	7/1/2006	Abington, PA	Southeastern Pennsylvania Transportation Authority	38	0	**$179,700**	head-on	no	none		no	yes
127	1/9/2007	Woburn, MA	Massachusetts Bay Transportation Authority	12	2	**$560,841**	work zone authority	no	none		yes	yes
128	11/10/2007	Bertram, CA	Union Pacific	0	2	**$2,000,000**	rear-end	yes	none		yes	yes
129	11/30/2007	Chicago, IL	Norfolk Southern & Amtrak	71	0	**$1,299,000**	rear-end	yes	none		no	yes
130	5/28/2008	Newton, MA	Massachusetts Bay Transporations Authority	8	1	**$8,600,000**	rear-end	yes	R-09-08 R-09-14	FTA MBTA	no	yes
131	9/12/2008	Chatsworth, CA	Metrolink/Union Pacific	102	25	**$12,000,000**	head-on	yes	none		yes	yes
132	11/20/2008	Rialto, CA	Metrolink/BNSF	4	0	**$25,000**	side	yes	none		yes	yes

	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE OF ACCIDENT	LOCATION	RAILROAD(S)	INJURED	FATAL	Property Damage	ACCIDENT TYPE	PTC in PC	PTC RELATED REC(S)	RECIPIENT(S)	PTC Preventable under current FRA regulations	PTC Preventable under current NTSB recommendations
133	5/8/2009	Boston, MA	Massachusetts Bay Transportation Authority	68	0	$9,600,000	rear-end	yes	none		no	yes
134	7/18/2009	San Francisco, CA	MUNI	48	0	$4,500,000	rear-end	no	none		yes	yes
135	7/14/2009	Bettendorf, IA	DM&E	0	2	$1,500,000	misaligned switch	no	R-12-27	FRA	yes	yes
136	9/30/2010	Two Harbors, MN	Canadian National	5	0	$8,100,000	head-on	no	none		yes	yes
137	4/17/2011	Red Oak, IA	BNSF	0	2	$8,700,000	rear-end	yes	R-12-20 R-12-24	FRA AAR	no	yes
138	5/8/2011	Hoboken, NJ	PATH	32	0	$352,617	overspeed	yes	none		yes	yes
139	5/24/2011	Mineral Springs, NC	CSX	2	2	$1,600,000	rear-end	yes	none		yes	yes
140	1/6/2012	Westville, IN	CSX	2	0	$5,000,000	rear-end & raking	yes	none		yes	yes
141	6/24/2012	Goodwell, OK	UPRR	1	3	$14,800,000	head-on	yes	R-13-23 R-13-27	FRA All RR (2008 RSIA)	yes	yes
142	7/21/2012	Barton County, MO	Kansas City Souther & BNSF	2	0	$7,750,000	side	yes	none		yes	yes
143	5/25/2013	Chaffee, MO	UPRR & BNSF	2	0	$11,000,000	side	no	none		yes	yes
144	12/1/2013	Bronx, NY	Metro-North	61	4	$9,000,000	overspeed	yes	none		yes	yes
145	12/30/2013	Keithville, LA	BNSF	4	0	$7,800,000	head-on	no	none		yes	yes
146	3/24/2014	Chicago, IL	CTA	34	0	$11,196,796	overspeed	no	R-15-21 R-15-24	FTA CTA	no	yes
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