



***Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch***

***Accident Investigation Report
HQ-2013-15***

***Long Island Rail Road (LI)
New York City, NY
June 17, 2013***

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

TRAIN SUMMARY

1. Name of Railroad Operating Train #1 Long Island Rail Road	1a. Alphabetic Code LI	1b. Railroad Accident/Incident No. EQ20130602
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GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance Amtrak (National Railroad Passenger Corporation)	1a. Alphabetic Code ATK	1b. Railroad Accident/Incident No. 128778
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2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident 6/17/2013	4. Time of Accident/Incident 5:58 PM
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5. Type of Accident/Incident Derailment
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6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision System
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11. Nearest City/Town New York City	12. Milepost (to nearest tenth) .1	13. State Abbr. NY	14. County NEW YORK
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15. Temperature (F) 64 °F	16. Visibility Dark	17. Weather Clear	18. Type of Track Main
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19. Track Name/Number JO Interlocking	20. FRA Track Class Freight Trains-25, Passenger Trains-30	21. Annual Track Density (gross tons in millions)	22. Time Table Direction East
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OPERATING TRAIN #1

1. Type of Equipment Consist: EMU				2. Was Equipment Attended? Yes		3. Train Number/Symbol 768								
4. Speed (recorded speed, if available) R - Recorded E - Estimated 15 MPH		Code R	5. Trailing Tons (gross excluding power units)		6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter			Code 0						
6. Type of Territory Signalization: <u>Signaled</u> Method of Operation/Authority for Movement: <u>Signal Indication</u> Supplemental/Adjunct Codes: <u>G, A, N/A</u>														
7. Principal Car/Unit		a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.		Alcohol	Drugs						
(1) First Involved (derailed, struck, etc.)		LI7830	5	yes			0	0						
(2) Causing (if mechanical, cause reported)		0	0		9. Was this consist transporting passengers?		Yes							
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)		a. Head End	Mid Train		Rear End		11. Cars (Include EMU, DMU, and Cab Car Locomotives.)		Loaded		Empty			
			b. Manual	c. Remote	d. Manual	e. Remote			a. Freight	b. Pass.	c. Freight	d. Pass.	e. Caboose	
(1) Total in Train		0	0	0	0	0	(1) Total in Equipment Consist		0	10	0	0	0	
(2) Total Derailed		0	0	0	0	0	(2) Total Derailed		0	2	0	0	0	
12. Equipment Damage This Consist 578021			13. Track, Signal, Way & Structure Damage 600000											
14. Primary Cause Code T399 - Other frog, switch and track appliance defects (Provide detail)														
15. Contributing Cause Code														
Number of Crew Members							Length of Time on Duty							
16. Engineers/Operators		17. Firemen		18. Conductors		19. Brakemen		20. Engineer/Operator			21. Conductor			
1		0		1		1		Hrs: 2 Mins: 30			Hrs: 2 Mins: 30			
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device?			26. Was EOT Device Properly Armed?			
Fatal		0		0		0		N/A			N/A			
Nonfatal		0		0		0		27. Caboose Occupied by Crew?			N/A			
28. Latitude				29. Longitude										

CROSSING INFORMATION

Highway User Involved

Rail Equipment Involved

1. Type		5. Equipment	
2. Vehicle Speed (<i>est. mph at impact</i>)	3. Direction (<i>geographical</i>)	6. Position of Car Unit in Train	
4. Position of Involved Highway User		7. Circumstance	
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? N/A		8b. Was there a hazardous materials release by N/A	
8c. State here the name and quantity of the hazardous material released, if any.			
9. Type of Crossing Warning 1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other (<i>spec. in narr.</i>) 3. Standard FLS 6. Audible 9. Watchman 12. None N/A		10. Signaled Crossing Warning	11. Roadway Conditions N/A
12. Location of Warning N/A		13. Crossing Warning Interconnected with Highway Signals N/A	14. Crossing Illuminated by Street Lights or Special Lights N/A
15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User
19. Driver Passed Standing Highway Vehicle		20. View of Track Obscured by (<i>primary obstruction</i>)	
Casualties to:	Killed	Injured	21. Driver was
23. Highway-Rail Crossing Users		24. Highway Vehicle Property Damage (<i>est. dollar damage</i>)	22. Was Driver in the Vehicle?
26. Locomotive Auxiliary Lights? N/A		25. Total Number of Vehicle Occupants (<i>including driver</i>)	
28. Locomotive Headlight Illuminated? N/A		27. Locomotive Auxiliary Lights Operational? N/A	
29. Locomotive Audible Warning Sounded? N/A			

SYNOPSIS

At 5:58pm (EST) on June 17, 2013 at "JO" interlocking in Penn Station, New York City, NY, Long Island Railroad (LI) Train No. 768 derailed two cars mid-train while operating east on Track No. 14 through the interlocking limits lined for "Line 1" tunnel. This location is underground with good lighting. The outside temperature was 64° F. The 5th and 6th cars of the 10 car MU train derailed resulting in damage estimates of \$578,021 for equipment and \$600,000 for track. There were no reported injuries. There were approximately 1,000 passengers on board that were relocated to other transportation. 500 passengers were able to exit the west end of the train and walk to the Track No.14 platform. The remaining 500 passengers could not pass through the derailed cars so they exited from the east end with a train to train rescue.

The probable cause of the accident was MU No. LI7830 wheel hit a switch point protector and derailed. The switch point protector is located at No. 557 switch. The protector came loose due to two bolts missing with only the center bolt attached. As Train No. 768 passed over the switch, the switch point protector spun out of place and the 5th car of the consist stuck the loose switch point protector plate and derailed. The impact caused the switch point protector plate to spin 90° thereby derailing the 6th car. After impact with the 6th car, the switch point protector aligned itself and allowed the remaining portion of the train to pass without derailment.

The three bolts used to hold the switch point protector in place normally have lock washers to help prevent the vibrations of passing trains from spinning the bolts and causing them to become dislodged. The lock washers were removed after it was discovered there was a possible clearance issue with some of Amtrak's equipment. Without the lock washers installed the bolts worked themselves loose and after falling out of the switch point protector allowed for the movement of the switch point protector plate.

NARRATIVE

Circumstances Prior to the Accident:

For an unknown period of time the bolts securing the switch point protector on the No. 557 switch had been working themselves loose due to the removal of the lock washers. The lock washers are recommended for this application by the manufacturer. Eastward LI Train No. 768 was located on Station Track No. 14 waiting to depart at 5:45pm with 10 cars and 1,000 passengers. The intended route for Train No. 768 was lined from Track No. 14 to Line 1 Tunnel. This route included operating over Switch No. 557. At the time of Train No. 768's departure the switch point protector was loose with the bolts missing on the east and west end of the switch point protector, but was not obstructing the trains movement.

The Accident:

In review of Amtrak's daily track inspection reports for six months previous to July 2013, it was noted that the track inspectors found chipped switch points at Switch Location No. 557. They recommended replacement of the switch point stock rail, but there was no mention of loose or missing switch point protector bolts used to fasten the removable adjustable top plate of the switch point protector. The switch point protector is a Cleveland style which can be adjusted for a desired measurement of 3 15/16 inches. When the measurement exceeds 4 1/16 inches, the top bolts of the protector plate is loosened and the desired 3 15/16 inches is re-established. The manufacturer recommends a "Nord Lock Washer" be installed with the fastening bolts. These lock washers were not found at the accident site. During the investigation it was discovered there was a problem with clearance issues with Amtrak equipment so a decision was made to remove the lock washers to increase the clearances and stop the equipment snow plow hits at this location.

LI Train No. 768 was a 10 car MU train (M-7's) with the consist; 7590- 7589- 7736- 7735- 7830- 7829- 7082- 7081- 7192- 7191. The 5th car (LI 7830) and the 6th car (LI 7029) were the only cars to derail. The train contained 1,000 passengers and departed Track No. 14 in Penn Station, NY at 5:45pm heading east towards Long Island, NY. The engineer had a proper "clear" signal to proceed. The engineer didn't notice anything out of the ordinary as he passed over the loose switch point protector at the No. 557 switch. The train was being operated at a recorded speed of 15MPH. The maximum authorized speed for this area is 15MPH. The intended route of the train was Track No. 14 to Line 1 tunnel.

The four head cars (7590-7589-7736-7735) passed over the switch point protector without incident. However, when the 5th car passed over the loose switch point protector, the west wheel of car LI 7830 climbed over the protector plate causing the car to derail. The 6th car derailed when the east wheel of car LI 7829 also climbed over the protector plate. The action of car LI 7829 derailing spun the protector plate clear of the rail which allowed the remaining four cars to pass without derailing. The train came to a stop with the west car LI 7191 approximately 40 feet from the end of Track No.14 platform.

Analysis and Conclusions:

Analysis: FRA obtained fatigue related information, including a 10 day work history for the engineer assigned to train No. 768.

Conclusion: FRA concluded fatigue was not a factor for this accident.

Analysis: Penn Station, NY is owned by Amtrak with the Long Island Rail Road (LI) and NJ Transit (NJTR) as tenant railroads. Amtrak is responsible for the track maintenance and inspections. According to Amtrak's inspection records, the location of the derailment was inspected on a regular basis with no defects found on the switch point protector at Switch No. 557. Switch No. 557 and the switch point protector are located below Penn Station. The track is illuminated, but the track area is dirty with the accumulation of brake dust and grime. The three bolts (east end center west end) used to fasten the switch point protector are installed from the top of the adjustable plate with a lock washer. They are affixed with a nut on the bottom that fits into a cavity to prevent the nut from loosening. When viewed from the track area, if the nuts were loose or if they fell to the ground, it would be hard to determine unless there was a close inspection of the underside of the switch point protector or the bolts were attempted to be re-tightened. After the derailment, the area around the switch point protector was inspected and two bolts and nuts were found on the ground with no lock washers. Inspection of the remaining center bolt in the protector determined that it did not have a lock washer.

Conclusion: Closer inspection of the switch point protector may have discovered the nuts had fallen off the bolts and prevented this derailment.

Analysis: The manufacturer of the "Cleveland" type switch point protector designed the protector to have a "Nord-Lock Washer" installed between the bolt head and the protector plate. The purpose of a lock washer is to prevent the bolt head from spinning and causing the bolt to become loose. Due to a close clearance issue with Amtrak equipment passing over these switch point protectors, Amtrak decided to remove the lock washers to allow for greater clearance. Vibration caused by passing trains loosened the three bolts and caused the nuts to fall to the ground. In addition, the two end bolts at the east and west end of the protector were lifted out of the protector by the upward rocking action of the plate that was now loose.

Conclusion: Amtrak should not have removed the lock washers on the switch point protector against the recommendations of the manufacturer.

Analysis: The engineer, conductor and brakeman on Train No. 768 were subject to post accident drug and alcohol tested under Federal Railroad Administration (FRA) authority and in compliance with 49 CFR 219. The derailment resulted in a damage estimate of \$1,178,021. The test were all negative for all crew members.

Conclusion: drugs and alcohol were not a factor in this derailment.

Analysis: The transfer of 1,000 passengers was conducted in compliance with the approved joint passenger emergency preparedness plan. This was a joint document prepared and submitted by Amtrak, Long Island Rail Road and NJ Transit and approved by FRA. The passengers in the two derailed cars were relocated to the east or west cars that were not derailed. An onboard water supply was distributed to the passengers. Windows were removed to ventilate the cars and third rail power was removed so the cars had no air conditioning. Transfer of the passengers on the west four cars was conducted using the west end door of the last car (7181). The passengers were escorted by the emergency responders along the track bed and up to the Track 14 platform. The transfer of all passengers was completed at 6:40pm. Approximately 500 passenger were transferred by this means.

NJ Transit Train NJTR 3873 was utilized to remove the remaining passengers from the east end of LI #768 with an end to end/train to train evacuation. The NJTR train then proceeded to Track No.17 platform arriving at 9:14pm to detain the passengers.

Conclusion: The transfer of passengers was orderly and uneventful with no injuries. A debriefing was conducted on July 31, 2013 and the evacuation was discussed between the railroads and the emergency responders. Recommendations were made to improve response.

Overall Conclusion:

Amtrak did not follow the recommendations of the manufacturer to have lock washers in place to prevent the loosening and eventual displacement of the attachment bolts. Amtrak made the decision to remove the lock washers on the switch point protector bolts at Switch No. 557 at the "JO" interlocking. The removal of the lock washer was to allow more clearance for the Amtrak equipment passing by this location. Without the lock washers installed, the bolts spun and the nuts fell off the bolts. This eventually resulted in the two end bolts becoming dislodged. Combined with the center bolt remaining loose, the switch point protector plate was allowed to pivot and swing over the rail. With the plate located on top of the rail, the plate caused the wheels of cars LI 7830 and LI 7829 to derail.

Amtrak has now installed new bolts in all Cleveland type switch point protectors with lock washers. The new bolts have a shorter hex head which allows for the clearance of Amtrak equipment.

Probable Cause & Contributing Factors:

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