Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-57

CSX Transportation
St. Jacobs, IL
June 27, 2006

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report 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.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2006-57

1.Name of Railroad Operating Train #1: CSX Transportation Intermodal [CSXT]	1a. Alphabetic Code: CSXT	1b. Railroad Accident/Incident No.: 000023664
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: CSX Transportation Intermodal [CSXT]	3a. Alphabetic Code: CSXT	3b. Railroad Accident/Incident No.: N/A
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 06 / Day 27 / Year 2006	6. Time of Accident/Incident: 03:07: ☐ AM ☑ PM

7. Type of Accident/Indicent (single entry in code box): 1. Derailment; 2. Head on collision; 3. Rear end collision; 4. Side collision; 5. Raking collision; 6. Broken Train collision; 7. Hwy-rail crossing; 8. RR grade crossing; 9. Obstruction; 10. Explosion-detonation; 11. Fire/violent rupture; 12. Other impacts; 13. Other (describe in narrative): 01

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
19	7	4	35	Great Lakes

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Saint Jacobs	QS217.1	N/A	IL	MADISON

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark	Code	19. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow	Code	20. Type of Track 1. Main 2. Yard 3. Siding 4. Industry	Code
85 F		2		1		1

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Main		4	60.7		3

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry): 1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car; A. Spec. MoW Equip. Code: 1

26. Was Equipment Attended? 1. Yes 2. No: 1

27. Train Number/Symbol: S63828

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 54 MPH; Code: R

29. Trailing Tons (gross tonnage, excluding power units): 11390

30. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other (Specify in narrative) Code(s): e, N/A, N/A, N/A, N/A

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter; 2 = South, 4 = West: 0

	31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1)	First involved (derailed, struck, etc)	N/A	79	no
(2)	Causing (if mechanical cause reported)	CSXT139356	79	no

32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
0	0

33. Was this consist transporting passengers? (Y/N): N

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	81	0	50	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	17	0	4	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
614319	50000	E33C	N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 4 Mi 07	Hrs 4 Mi 07

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No: 1

50. Was EOT Device Properly Armed? 1. Yes 2. No: 1

51. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry): 1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car; A. Spec. MoW Equip. Code: N/A

53. Was Equipment Attended? 1. Yes 2. No: N/A

54. Train Number/Symbol: N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated: 0 MPH; Code: N/A

57. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. Trailing Tons (gross tonnage, excluding power units): N/A

c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; o. Positive train control; p. Other (Specify in narrative)

Code(s): N/A | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	0	N/A	N/A
(2) Causing (if mechanical cause reported)	0	N/A	N/A

59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
N/A	N/A

60. Was this consist transporting passengers? (Y/N): N/A

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Equipment Damage This Consist: 0

64. Track, Signal, Way, & Structure Damage: 0

65. Primary Cause Code: N/A

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

71. Engineer/Operator: Hrs 0 Mi 0

72. Conductor: Hrs 0 Mi 0

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? 1. Yes 2. No: N/A

77. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

78. Caboose Occupied by Crew? 1. Yes 2. No: N/A

Highway User Involved

79. Type: A. Auto; B. Truck; C. Truck-Trailer.; D. Pick-Up Truck; E. Van; F. Bus; G. School Bus; H. Motorcycle; J. Other Motor Vehicle; K. Pedestrian; M. Other (spec. in narrative) — Code: N/A

80. Vehicle Speed (est. MPH at impact): N/A

81. Direction geographical) 1.North 2.South 3.East 4.West — Code: N/A

82. Position: 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped — Code: N/A

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: N/A

Rail Equipment Involved

83. Equipment: 1.Train(units pulling); 2.Train(units pushing); 3.Train (standing); 4.Car(s) (moving); 5.Car(s) (standing); 6.Light Loco(s) (moving); 7.Light(s) (standing); 8.Other (specify in narrative) — Code: N/A

84. Position of Car Unit in Train: N/A

85. Circumstance: 1. Rail Equipment Struck Highway User; 2. Rail Equipment Struck by Highway User — Code: N/A

86b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning: 1.Gates; 2.Cantilever FLS; 3.Standard FLS; 4.Wig Wags; 5.Hwy. traffic signals; 6.Audible; 7.Crossbucks; 8.Stop signs; 9.Watchman; 10.Flagged by crew; 11.Other (spec. in narr.); 12.None

Code(s)							
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

88. Signaled Crossing Warning (See instructions for codes) — Code: N/A

89. Whistle Ban 1. Yes 2. No 3. Unknown — Code: N/A

90. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach — Code: N/A

91. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: N/A

92. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown — Code: N/A

93. Driver's Age: N/A

94. Driver's Gender 1. Male 2. Female — Code: N/A

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown — Code: N/A

96. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative) — Code: N/A

97. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: N/A

98. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed — Code: N/A

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	N/A	N/A

99. Driver Was 1. Killed 2.Injured 3. Uninjured — Code: N/A

100. Was Driver in the Vehicle? 1. Yes 2. No — Code: N/A

102. Highway Vehicle Property Damage (est. dollar damage): N/A

103. Total Number of Highway-Rail Crossing Users (include driver): N/A

104. Locomotive Auxiliary Lights? 1. Yes 2. No — Code: N/A

105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No — Code: N/A

106. Locomotive Headlight Illuminated? 1. Yes 2. No — Code: N/A

107. Locomotive Audible Warning Sounded? 1. Yes 2. No — Code: N/A

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED.

HQ-2006-57 Sketch.jpg

Double click on the below file to open the photograph. This view is looking west, towards the rear of the train. The head end, or east end of the train is separated from the wreckage and not seen from this photograph. North is to the right as you look at this photograph.

Photo Taken By: Illinois State Trooper - William Skrobul
Taken at: 5 p.m., on June 27, 2006 – Troy Illinois

109. SYNOPSIS OF THE ACCIDENT

At 3:07 p.m., c.d.t., on June 27, 2006, eastbound CSXT Train Symbol S638-28 derailed 21 cars at milepost QS217.1, near Sant Jacobs, Illinois. This line segment runs from St Louis, Missouri, to Danville, Illinois, on the CSXT Great Lakes Division, St. Louis Line Subdivision. Saint Jacobs is located about 20 miles northeast of St. Louis.

Train Symbol S638-28 consisted of 2 locomotives, 81 loads, 50 empties, 11,390 tons and was 7,969 feet long. The train was being operated at a recorded speed of 54 mph when the derailment occurred. Car numbers 79 through 99 derailed, which consisted of 17 loads and 4 empties. Seven derailed cars involved hazardous materials including three loads of ammonium nitrate, two loads of hydrogen peroxide and two residue cars which last contained dimethylamine and methylamine. Three loads of ammonium nitrate were ruptured and one load of hydrogen peroxide spilled product on the ground. The spill initiated a precautionary evacuation of 35 local residents and closed local roads within a ½ mile. The evacuation was lifted at 4:15 p.m., on June 28, 2006.

Monetary damages were $614,319 for mechanical and $50,000 for track, for a total of $664,319.

The probable cause of the derailment was a failure of the cross key retainer, which allowed the coupler to fall out of the A-end of Car No. CSXT 139356, the 79th head car. When the coupler fell to the track structure, it derailed one axle of Car No. CSXT 139356. The derailed wheels remained on the ties next to the rail for approximately 1,000 feet until it struck a road crossing. The road crossing caused the derailed car to steer to the north and cause derailment/pile up of the following cars.

110. NARRATIVE

Circumstances Prior to the Accident

The crew of Train Symbol S638-28 consisted of a locomotive engineer and a conductor. They first went on duty at 11:00 a.m., c.d.t., June 27, 2006, at the CSXT Roselake Yard in East St. Louis, Illinois. This was the away-from-home terminal for both crew members and both had received more than the statutory off-duty period prior to reporting for duty.

Train Symbol S638-28 consisted of 2 locomotives, 81 loads, 50 empties, 11,390 tons and was 7,969 feet long when it departed Roselake Yard. The train was scheduled to travel to Indianapolis, Indiana and had originated on the Terminal Railroad Association of St. Louis (TRRA) at Madison, Illinois, with 101 cars. Fifty-five cars were set out of the train at Roselake Yard. When the crew arrived at Roselake, they doubled the remaining 46 cars to 85 cars, which had been pre-tested by the mechanical department, using a yard air plant. The crew then performed a Class III air brake test prior to departure. The original train received a Class I air brake test by the TRRA at Madison.

Prior to departing Roselake Yard, the crew experienced a loss of communication between their head-end and rear-end devices. The mechanical department replaced the head-end device, which resolved the problem prior to departure.

As the eastbound train approached the accident site, the engineer was seated at the controls on the south side of the leading locomotive. The conductor was seated across from the engineer on the north side of the locomotive.

Approaching the derailment area from the west, there is a 0.34 percent ascending grade for approximately 5 miles. The grade then decreases to level at MP 221 to MP 218.5. The grade then increases to 0.57 percent ascending to MP 217 where the grade changes to 0.37 percent descending for approximately1/4 mile. At MP 217.25, the grade begins to ascend at 0.41 percent for approximately 3.5 miles. Approximately 1/2 mile west of the derailment site, there is a 1-degree right-hand curve. There is a road crossing protected by cross bucks at MP 217.

The railroad timetable direction of the train was east. The actual geographical direction was east.

The Accident

Train Symbol S63828 was being operated east at 54 mph approaching the accident area. The throttle position was in notch No. 8 for numerous miles approaching this area as the train was on a 0.34 percent ascending grade. The train was traveling 54 mph at the time of the derailment as recorded by the event recorder of the lead locomotive. The maximum authorized speed for mixed freight trains is 50 mph, as designated in the current CSXT, Great Lakes Division Timetable No. 4.

Approximately 1,000 feet west of the road crossing at MP 217, the coupler fell from the A-end of Car No. CSXT 139356, 79th head car. The A-end was the leading end of the car. As the coupler fell to the roadbed, it derailed one axle on Car No. CSXT 139356. The derailed wheels remained next to the rail until striking the road crossing at MP 217. Markings on the road crossing indicated the wheels became airborne and veered to the north. The sudden impact of the road crossing caused cars 79 through 99 (21 cars, 17 loads and 4 empties) to derail and pile up in a field north of the main line and east of the road crossing.

The derailment initiated an undesired emergency air brake application. The crew said no severe run in or run out occurred and they expected an air hose had separated. The conductor started to walk the train with an air hose and wrench. As the conductor approached the 40th head car, he noticed a separation in the train and the pile of wreckage further behind. The conductor reported his findings to the engineer and walked to the 78th head car, which was now the last car connected

to the train. About this time, the engineer said he saw numerous emergency vehicles going down the highway toward the rear of his train. The engineer told the conductor to return to the locomotive. After being questioned and assisting the emergency responders, the crew was taken to a hospital in Granite City, Illinois, for FRA post-accident drug and alcohol testing.

Seven derailed cars involved hazardous materials; three loads of ammonium nitrate, two loads of hydrogen peroxide, and two residue cars which last contained dimethylamine and methylamine. Three loads of ammonium nitrate were ruptured and one load of hydrogen peroxide spilled product on the ground. The spill initiated a precautionary evacuation of 35 local residents and closed local roads within 1/2 mile. The evacuation was lifted at 4:15 p.m., on June 28, 2006. The evacuation was initiated by the fire chief of the Troy, Illinois Fire Department and was later controlled by the Madison County EMA. No casualties were caused by the release or clean up of the hazardous materials.

Covered hopper Car Nos. UNPX 120089, UNPX 120337, and GCCX 70279, the 85th, 92nd, and 93rd head cars, respectively, all spilled approximately 33 tons of ammonium nitrate from the top hatch covers and bottom doors. These cars contained Ammonium Nitrate, 5.1 (8), UN 1942, PG III. Tank Car No. FMLX 200024 spilled approximately 100 gallons of Hydrogen Peroxide Aqueous Solution Stabilized, 5.1, UN 2015, PG I, out of the manway cover.

Analysis and Conclusions

Analysis

An inspection of the derailment site was conducted by this inspector on the morning of June 28, 2006. All cars were clear of the main line at this time and emergency responders were still at the scene. The derailed cars were stabilized in a field north of the main line and east of the road crossing at MP 217. A walking inspection of the main line track was made for approximately 1/2 mile west of the derailment site. The track and track structure was found to be in good condition with no exceptions taken. The point of derailment (POD) was marked approximately 1,000 feet west of the road crossing. A couple hundred feet west of the POD, numerous marks, gouges and splintered ties were found. Just east of the POD, a coupler was found in the ditch on the south side of the track roadbed. East of the POD, a single mark was observed on the ties next to the rail until the road crossing at MP 217. Marks on the road crossing indicated the derailed wheels went airborne and to the north on impact.

Car No. CSXT 139356 was inspected in the field north of the main line as it was laying on its left side. The A-end of the car had a missing coupler. The car was equipped with a keystone end of car cushion unit at each end. This style cushion unit is equipped with a yoke to fit a headless cross key. The cross key is cut with an offset at each end. The yoke is designed with a key slot the width of the cross key on one side and half the width on the other. When properly applied, the cross key is inserted through the wide slot of the yoke. The offset of the cross key holds the cross key in place on the half slot side. A retainer bolt holds the retainer in place on the wide slot side. The cross key is retained in place by the retainer.

Inspections of the A-end revealed the coupler and cross key were missing. The cross key retainer bolt and retainer were still in place. The opposite slot was elongated, and a 3-by-3inch retaining plate had been welded to the yoke to retain the cross key. The welded plate was found inside the yoke. The welded plate had evidence of the cross key beating on it until the weld failed. When the plate failed, the cross key was allowed to work out of the coupler/yoke and cause the coupler to fall to the roadbed. The cross key was not found.

The crew was taken to a hospital in Granite City for FRA post-accident drug and alcohol testing. This was performed after the crew was interviewed and had assisted the emergency responders. Due to this, the testing was delayed longer than usual. All testing was negative.

Conclusion

The railroad was in compliance with their own rules and all applicable federal regulations. The train crew was operating the train 4 mph over the designated speed limit but was also approaching a 0.41 percent grade which would have drug the train down. The speed of the train did not have anything to do with the failed car component. The failed car was inspected and tested by the CSXT mechanical department at Roselake prior to departure. It cannot be determined when the failed part actually failed. Even if the failed retainer was broken during inspection, the failed part would not be visible if the cushion unit was in the buff position.

Probable Cause and Contributing Factors

E33C - Coupler retainer pin/cross key missing

The FRA determined that the probable cause of the derailment is a failed coupler cross key retainer. The markings before and after the POD, the coupler in the ditch, and the coupler missing from Car No. CSXT 139356 clearly support the cause. Although the mechanical retainer was still in place in the yoke, the opposite side of the yoke had been altered and failed, which allowed the cross key to fall out. An inspection of the repair history was performed on Car No. CSTX 139356. The results of that inspection proved nonconclusive as to where the car was repaired in that fashion.