Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-73

CSX Transportation
Prosperity, SC
November 11, 2007

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-73

1.Name of Railroad Operating Train #1: CSX Transportation [CSX]	1a. Alphabetic Code: CSX	1b. Railroad Accident/Incident No.: 000039129
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident No.: N/A
3.Name of Railroad Operating Train #3: N/A	3a. Alphabetic Code: N/A	3b. Railroad Accident/Incident No.: N/A
4.Name of Railroad Responsible for Track Maintenance: CSX Transportation [CSX]	4a. Alphabetic Code: CSX	4b. Railroad Accident/Incident No.: 000039129
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 11 | Day 11 | Year 2007	7. Time of Accident/Incident: 03:51: ☑ AM ☐ PM

8. 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)* — Code: 01

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
0	N/A	N/A	0	Florence

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Prosperity	C37.0	N/A	SC	NEWBERRY

18. Temperature (F) *(specify if minus)*	19. Visibility *(single entry)* 1. Dawn 2. Day 3.Dusk 4.Dark — Code	20. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow — Code	21. Type of Track 1. Main 2. Yard 3. Siding 4. Industry — Code
29 F	4	1	1

22. Track Name/Number	23. FRA Track Class (1-9, X) — Code	24. Annual Track Density *(gross tons in millions)*	25. Time Table Direction 1. North 2. South 3. East 4. West — Code
single main	4	24.9	2

OPERATING TRAIN #1

26. 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	27. Was Equipment Attended? 1. Yes 2. No — Code	28. Train Number/Symbol
	1	1	U33005

29. Speed *(recorded speed, if available)* — Code: R
R - Recorded
E - Estimated 40 MPH

30. Trailing Tons *(gross tonnage, excluding power units)*: 12157

31. 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

31a. 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
0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	BBFX64899	9	yes
(2) Causing *(if mechanical cause reported)*	0	0	N/A

33. 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

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

35. 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	2	0	0	0	0
(2) Total Derailed	0	0	0	0	0

36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	96	0	0	0	0
(2) Total Derailed	38	0	0	0	0

37. Equipment Damage — This Consist: $2,398,120.00

38. Track, Signal, Way, & Structure Damage: $45,000.00

39. Primary Cause Code: T207

40. Contributing Cause Code: N/A

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
1	0	1	0

Length of Time on Duty

45. Engineer/Operator: Hrs 5 Mi 31

46. Conductor: Hrs 5 Mi 31

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

50. EOT Device? 1. Yes 2. No — 1

51. Was EOT Device Properly Armed? 1. Yes 2. No — 1

52. Caboose Occupied by Crew? 1. Yes 2. No — 2

OPERATING TRAIN #2

53. 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	54. Was Equipment Attended? 1. Yes 2. No — Code	55. Train Number/Symbol
	N/A	N/A	N/A

56. Speed *(recorded speed, if available)* — Code: N/A
R - Recorded
E - Estimated N/A MPH

58. 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

58a. Remotely Controlled Locomotive?
0 = Not a remotely controlled
1 = Remote control portable

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57. 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

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

60. 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

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

62. 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	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

64. Equipment Damage This Consist N/A

65. Track, Signal, Way, & Structure Damage N/A

66. Primary Cause Code N/A

67. Contributing Cause Code N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

72. Engineer/Operator Hrs N/A Mi N/A

73. Conductor Hrs N/A Mi N/A

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

77. EOT Device? 1. Yes 2. No N/A

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

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

OPERATING TRAIN #3

80. 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

81. Was Equipment Attended? 1. Yes 2. No Code N/A

82. Train Number/Symbol N/A

83. Speed *(recorded speed, if available)* Code
R - Recorded
E - Estimated N/A MPH N/A

84. Trailing Tons *(gross tonnage, excluding power units)* N/A

85. 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) N/A N/A N/A N/A N/A

85a. 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 N/A

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

87. 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

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

89. 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	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

91. Equipment Damage This Consist N/A

92. Track, Signal, Way, & Structure Damage N/A

93. Primary Cause Code N/A

94. Contributing Cause Code N/A

Number of Crew Members

95. Engineer/ Operators	96. Firemen	97. Conductors	98. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

99. Engineer/Operator Hrs N/A Mi N/A

100. Conductor Hrs N/A Mi N/A

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

104. EOT 1. Yes 2. No N/A

105. Was EOT Device Properly 1. Yes 2. No N/A

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

Highway User Involved

107. Code N/A
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)*

108. Vehicle Speed *(est. MPH at impact)* N/A

109. *geographical)* Code N/A
1.North 2.South 3.East 4.West

Rail Equipment Involved

111. Equipment Code N/A
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)*

112. Position of Car Unit in 0

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110. Position	Code	113. Circumstance	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A	1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	N/A
114a. 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	N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114c. State here the name and quantity of the hazardous materials released, if any.
N/A

115. Type 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					

116. Signaled Crossing *(See instructions for codes)*	Code	117. Whistle 1. Yes 2. No 3. Unknown	Code
	N/A		N/A

118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	Code	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code
	N/A		N/A		N/A

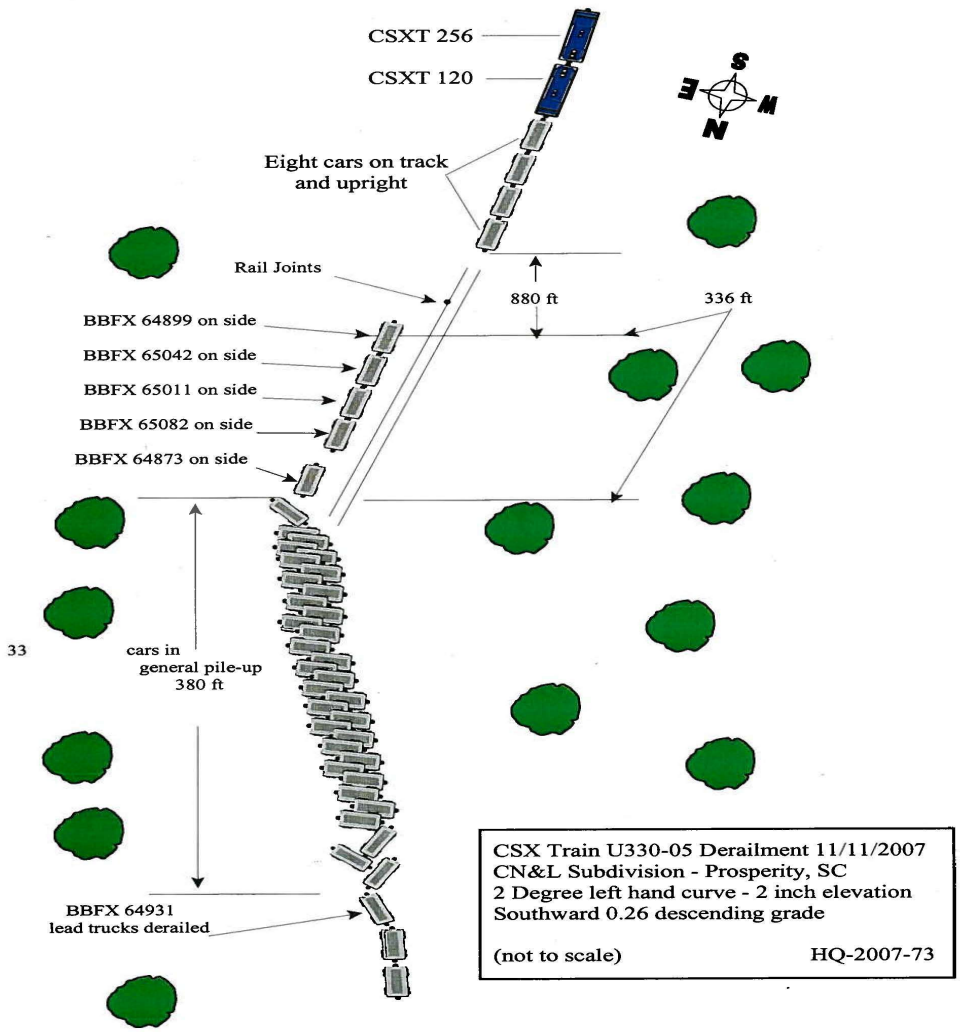
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify in narrative)*	Code
0		N/A		N/A		N/A

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code	126. 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		N/A

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code	128. Was Driver in the Vehicle? 1. Yes 2. No	Code
				N/A		N/A
129. Highway-Rail Crossing Users	0	0	130. Highway Vehicle Property Damage *(est. dollar damage)*	0	131. Total Number of Highway-Rail Crossing Users *(include driver)*	0

132. Locomotive Auxiliary Lights? 1. Yes 2. No	Code	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code
	N/A		N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code
	N/A		N/A

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



137. SYNOPSIS OF THE ACCIDENT

On November 11, 2007, at 3:51 a.m. EST, southbound CSX Transportation (CSX) loaded unit coal Train U330-05 derailed 38 cars. The train crew included a locomotive engineer and conductor with the train consisting of two locomotives and 96 cars. The derailment occurred on the CSX Florence Division, CN&L Subdivision single main track at milepost (MP) C 37.0 near Prosperity, South Carolina (SC). A total of 716 feet of track was damaged or destroyed.

No hazardous materials were released, no evacuations ordered, and no injuries reported. The weather at the time of the derailment was clear andd 29 °F. As a result of the derailment, damages included $45,000 in track and $2,398,120 in equipment.

The two man train crew was taken to Examination Management Services Inc. in Columbia, SC for post accident drug and alcohol testing. Post accident drug and alcohol results were negative for both crew members.

The probable cause of this derailment is a broken rail due to a detail fracture from head checking.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

CSX Unit Coal Train U330-05 departed Spartanburg, SC on November 10, 2007, at 4:30 p.m. enroute southward to Cayce, SC on the CSX Spartanburg subdivision. The train switched from the Spartanburg to the CN&L Subdivision and stopped in the Newberry Siding at MP C 41.0. A relief crew boarded the train for continuance to Cayce, SC.

The relieving train crew of CSX Train U331-05 consisted of a locomotive engineer and conductor who went on duty at 10:21 p.m. EST on November 10, 2007, in Greenwood, SC, their home terminal. Each crew member received more than the required statutory off duty rest period prior to reporting for duty. The crew was transported from Greenwood, SC to Newberry, SC where they boarded CSX Train U330-05 at 12:20 a.m EST on November 11, 2007. CSX Train U330-05 consisted of two locomotives, CSXT 256 and CSXT 120, with 96 loaded coal hopper cars weighing 12,157 tons. The relieving train crew, prior to departing the Newberry Siding, completed the required train air brake test.

At 3:27 a.m. EST after three northbound trains passed the standing train, the crew received Direct Traffic Control (DTC) block authority No. 57303 from the train dispatcher authorizing them to proceed from the Newberry Siding onto the single Main Track. DTC block authority No. 57303 included the Newberry, Colony Church, Prosperity, Zane, Irmo, Saluda Dam, and Columbia Block, a distance of 39.5 miles. CSX Train U330 -05 entered the single Main Track at MP C 40.3 traveling in a southward direction. The engineer increased the train speed to a maximum of 40 miles per hour (mph) passed MP C 37.0 and had reduced the throttle position from T8 to idle.

CSX Train U330-05 approached the accident location with the engineer seated at the controls on the west side and the conductor seated on the east side of Locomotive CSXT 256. The engineer continued to operate CSX Train U330-05 at 40 mph through tangent track, on a 0.50 descending grade, leading into a 1,576 foot 2 degree right hand curve at MP C37.3 on a 0.26 percent descending grade.

Geographic direction of travel is southeast, timetable direction is south. Timetable directions are used throughout this report.

THE ACCIDENT

At 3:51 a.m. EST CSX Unit Coal Train U330-05, operating at 40 mph with the throttle in the idle position, entered the left hand curve at MP 37.3. The train had steadily increased speed over the last one and one-half miles without an application of the air brakes from 28 mph to the current 40 mph. The event recorder of the leading locomotive recorded all speeds and throttle positions. At 3:51 a.m. as the lead locomotive began to exit the curve, the train experienced an emergency application of the train air brake system and came to a stop 837 feet later. After stopping, the engineer attempted to reset the train air. When the train air failed to restore, the conductor walked toward the rear of the train and discovered the derailed cars. The 9th through the 13th cars were derailed and on their sides with a space of one car length between the 12th and 13th. The 14th through the 45th cars were in a general accordion style pile-up, and the 46th car was upright with the leading trucks derailed. The locomotives and remaining 58 cars stayed upright and on the rails.

About 4:00 a.m. EST the crew notified the train dispatcher of the derailment. The local Newberry County Sheriff and fire officials were called to the scene.

The maximum authorized speed at this location is 49 mph, as designated by CSX Florence Division Timetable No. 4 effective January 1, 2005.

ANALYSIS AND CONCLUSIONS

ANALYSIS - LOCOMOTIVE ENGINEER OPERATING PERFORMANCE:

The event recorder of the controlling locomotive indicated a recorded speed of 40 mph when the undesired emergency air brake application was initiated. The train traveled 837 feet after the application of the emergency brakes before stopping. The locomotive engineer and conductor report that they did not see or feel anything unusual with the track as they passed over the derailment location.

CONCLUSION:

The locomotive engineer was in compliance with all applicable railroad operating and train handling requirements.

ANALYSIS: LOCOMOTIVE CSXT 120

The trailing locomotive, CSXT 120, was equipped with a video/audio recorder. No visual observations could be made from the video recorder due to the darkness at the time of the derailment. Two separate sounds were heard on the audio recording just before the train went into an emergency brake application. The sounds occur 13 seconds and then three seconds prior to the application.

A train operating at 40 mph travels 58.6 feet per second. Adding 176 ft (58.6 x three seconds) to the 837 feet stopping distance results in 1,013 feet from the final stopping location to the second sound. Measuring 1,013 feet back from the trailing locomotive, two rail joints were discovered on the east rail. The time between the first and second sound is ten seconds. The measurement of 586 feet (58.6 x 10 seconds) back from the rail joints ends under the 14th and 15th rail cars, the first two cars in the general pile-up. This is evidence of some type of catastrophic failure at the suspected point of derailment. No other rail joints were discovered during this investigation or on record in this curve. The 13th car, BBFX 64873, was found with a 17 feet 5 inch piece of rail piercing through the first and second hopper doors on the east side of the car. This was also the first car to exhibit signs of having the car trucks at the south end forcefully removed.

No evidence of mechanical failures could be found. All car wheels and axles were intact with no evidence of overheating or breakage. The extensive damage to the rail cars made it impossible to take measurements for compliance. CSXT Train U330-05 did not pass a dragging equipment or hotbox detector after departing the Newberry Siding or prior to the accident.

This portion of the CN&L Subdivision is non-signaled - dark territory. A broken rail could go undetected until

discovered by inspection or observed by train crews. Prior to CSX Train U330-05 passing over this location, three northbound trains passed over the location and crews did not report any unusual occurrences or conditions with the track at MP C37.0.

On November 9, 2008, a CSX qualified track inspector conducted a cold weather inspection and took no exception with the track conditions. CSX replaced the west rail in July 2007, with no other work reported in the area since that time.

The rail in the curve consists of two different sections. The high side (east) rail was 132 lb continuous welded rail (CWR) dated 1950 and exhibited heavy gage corner head checking. The low side (west) rail was new 141 lb CWR. The east rail measured 9/16 inch wear on the tread, and 1/4 inch wear on the gage face. CSX scheduled this rail for replacement in February 2008. There was a full ballast section with effective crossties in good condition that were box anchored every other tie with no visible signs of rail movement.

Two internal rail defects were identified in the east rail by Sperry Rail Corp. during the period from November 10, 2004 through November 10, 2007. The most recent, a 20 percent defective Electric Flash Butt Weld, discovered on September 5, 2007, remained in the track with rail joint bars applied. The remedial action initiated by CSX was consistent with Federal Railroad Administration (FRA) requirements. There were no defects detected in the west rail.

ANALYSIS:

FRA obtained fatigue related information, for the 10-day period preceding this incident including the 10-day work history (on duty/off duty cycles) for all of the employees involved.

CONCLUSION:

Upon analysis of that information FRA concluded fatigue was not probable for any of the employees.

OVERALL CONCLUSION:

The railroad was in full compliance with their own and all applicable Federal standards. The train crew members were the only witnesses to the accident. They could not provide information that could be used to determine any other type failures other than a broken rail. The evidence of the sound recordings from the trailing locomotive is consistent with rail wheels traveling over rail joints or a broken rail. Two existing joints were found at the point of derailment. Rail wear condition visually observed and measured on the east rail are consistent with conditions that lead to broken rails, coupled with the previous defects identified by Sperry Rail Corp. tests.

PROBABLE CAUSE & CONTRIBUTING FACTORS:

The probable cause of the accident is a broken rail due to a detail fracture from head checking. There were no contributing factors.

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