Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-64

Norfolk Southern (NS)
Grant, KY
July 9, 2008

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-2008-64

1.Name of Railroad Operating Train #1: Norfolk Southern Corp. [NS]	1a. Alphabetic Code: NS	1b. Railroad Accident/Incident No.: 033520
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: Norfolk Southern Corp. [NS]A	4a. Alphabetic Code: NS	4b. Railroad Accident/Incident No.: 033520

5. U.S. DOT_AAR Grade Crossing Identification Number: 719983X	6. Date of Accident/Incident: Month 07 Day 09 Year 2008	7. Time of Accident/Incident: 08:20: ☐ 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	central

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Richwood	15.6	N/A	KY	BOONE

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
73 F	3	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
main line	4	39	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	61AT809

29. Speed *(recorded speed, if available)* R - Recorded E - Estimated	Code	31. Method(s) of Operation *(enter code(s) that apply)*	31a. Remotely Controlled Locomotive?
45 MPH	R	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)*	0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter

30. Trailing Tons *(gross tonnage, excluding power units)*: 7500

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

31a. Remotely Controlled Locomotive?: 0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	NS610122	20	yes
(2) Causing *(if mechanical cause reported)*	NS610122	20	yes

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	3	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	59	0	19	0	0
(2) Total Derailed	22	0	15	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$622,950.00	$227,500.00	E49C	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	46. Conductor
Hrs 7 Mi 45	Hrs 7 Mi 45

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	51. Was EOT Device Properly Armed? 1. Yes 2. No
1	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)* R - Recorded E - Estimated	Code	58. Method(s) of Operation *(enter code(s) that apply)*	58a. Remotely Controlled Locomotive?
N/A MPH	N/A	a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track	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. 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

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

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

Rail Equipment Involved

111. 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

112. Position of Car Unit in N/A

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110. Position 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	Code 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	Code N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	Code 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	116. Signaled Crossing *(See instructions for codes)*	Code	117. Whistle Ban 1. Yes 2. No 3. Unknown	Code
Code(s) N/A N/A N/A N/A N/A N/A N/A		N/A		N/A

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

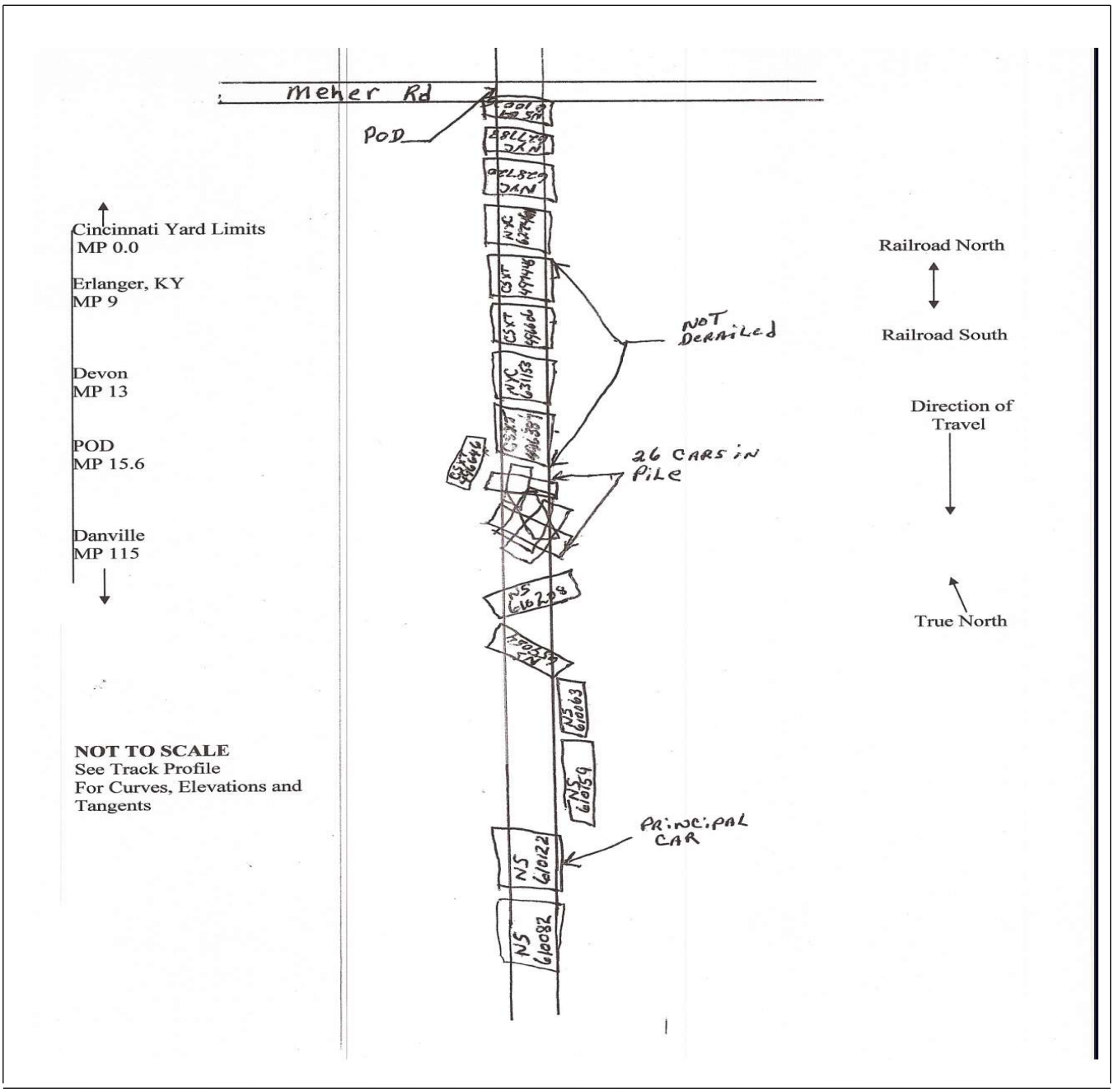
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify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

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

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

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

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



137. SYNOPSIS OF THE ACCIDENT

On July 9, 2008 at approximately 8:20 p.m. EST Norfolk Southern (NS) southbound Train 61AT8-09 consisting of three locomotives, 59 loads, and 19 empty rail cars derailed at milepost (MP) 15.6 in Richwood, Kentucky (KY). The crew consisted of an engineer and a conductor. The crew went on duty at the NS Rail Yard in Sharonville, Ohio (OH) at 12:35 p.m. on July 9, 2008 after completing the required statutory off-duty rest period. The train consist was 4,374 feet in length with 7,496 trailing tons.

The total number of derailed cars was 22 loads and 15 empties. The train consist line items 22 through 54, and line items 59 through 62 derailed. Three locomotives were also derailed.

Rail freight car NS 610122 which is line item number 23 from the head end in the train consist was the first car to derail and is the principal car of the derailment. As the train approached the derailment site the lead wheel (L1) on rail car NS 610122 climbed the west rail at the road crossing and continued to ride the top of the rail across the road crossing before dropping to the outside of the rail resulting in the derailment.

At the accident site trains operate on single main line track and the method of operation is Direct Traffic Control (DTC). Approaching the derailment site the main track rail consists of 132 lb. continuous welded rail (CWR).

NS reported $622,950 in equipment damage and $227,500 in track damage. There were no hazardous material cars involved, no injuries reported, and no damage to personal property.

At the time of the derailment it was daylight, the weather was clear, and the temperature was 73 °F.

The probable cause of the accident is defective truck components on the B-end of the 23rd head car in the train - NS 610122.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

On July 9, 2008 after completing the required statutory off-duty rest period, the train crew consisting of an engineer and conductor went on duty at Sharonville, OH to operate westbound NS Train 61AT8-09 to Danville, KY, a distance of approximately 115 miles. The outbound crew went on duty at Sharonville at 12:35 p.m. EST. The crew's regular reporting point is at the NS Cincinnati Gest Street Yard Crew Shanty. After being advised of the train that they would be operating, both crew members chose to drive their personal vehicles to the Sharonville location, which is approximately 8 miles from the Gest Street Yard where they took charge of the train.

NS Train 61AT8-09 is a solid bulk commodity train carrying both loaded and empty steel coil gondola cars. The train originates at the AK Steel Facility at Middletown, OH and terminates at the AK Steel Facility in Rockport, Indiana (IN). NS Train 61AT8-09 was given a Class I inspection by qualified car-men before departure from the AK Steel Facility at Middletown.

During an interview with the crew the engineer stated that at the time of the derailment he was seated in the engineer seat at the control stand of the lead locomotive and the conductor was seated in the conductor seat across from the engineer. The crew reported no unusual conditions prior to the derailment.

LOCATION AND METHOD OF OPERATION:

At the derailment site trains operate on single main line track and the method of operation is Direct Traffic Control (DTC). NS Central Division Timetable No. 1, effective 12:01 a.m. Eastern Daylight Time, governs train speed and restrictions in this area.

DERAILMENT SITE:

Approaching the derailment site from the north the rail is 132 lb. continuous welded rail (CWR) and the track

is tangent. The track grade is descending southward from 0.16 to 0.04 percent for 8-tenths of a mile and then ascends to 0.34 percent for 2-tenths of a mile. The maximum authorized speed at this location is 50 miles per hour (mph) FRA Class 4 track. The last track inspection prior to the derailment was performed by NS on June 8, 2008. According to the track inspection records provided to the Federal Railroad Administration (FRA) the Main Track in the derailment location indicated no existing FRA track deviations or problems within the location where the train derailed.

THE ACCIDENT

The train was operated at a recorded speed of 45 mph with no Pneumatic or Dynamic Braking actuated when the crew experienced an undesired train line emergency brake application. The speed of the train was verified by reviewing the locomotive event recorder download from the lead locomotive. After the train stopped the crew discovered that 22 loaded rail cars and 15 empty cars were derailed. The rail cars were scattered with some remaining upright, but the majority of the derailed cars were in a concentrated area.

During an interview, the engineer stated that just prior to the derailment he was operating the train at a speed of 45 mph down a slight descending grade and was just preparing to throttle up to engage a hill they were approaching. When he looked back over the train, he noticed what he thought was a dust cloud obscuring the rear portion of the train. They were approaching a left hand curve, and he was about to advise the conductor to check out the portion of the train around the dust to see what was causing it when the train went into emergency.

Prior to the undesired emergency air brake application, the crew took no exception how the train performed in fact the train movement had proceeded smoothly.

During an interview, the conductor stated that he did not take any exception to the way the train was handled. At the time of the emergency brake application, there was no slack action or other train action which would have indicated an emergency application. He stated that the engineer remained with the train and contacted the dispatcher advising him of the situation. The conductor dismounted the train and began a walking inspection of the equipment. During the inspection he discovered several railcars stacked on top of one another about five railcars behind the locomotives.

POINT OF DERAILMENT (POD):

The Point of Derailment (POD) was determined to be at MP 15.6 and rail car NS 610122 was the first car to derail.

ANALYSIS AND CONCLUSION:

The relevant event data recorder was downloaded by the NS Road Foreman of Engines. The analysis data disclosed that the engineer was not using any dynamic breaking and that no train line braking was being used at the time of the derailment.

The train consist indicated that there were blocks (or groups) of empty and blocks of loaded rail cars located throughout the train.

No deficiencies were noted in the track in the area of the POD.

An investigation into the loading pattern of the coil steel disclosed that there was no indication that the load was unbalanced.

On August 18, 2008 (after the derailment), freight car NS 610122 was placed in the NS car shop at Cincinnati, OH for a mechanical inspection and the following conditions were discovered.

1) Three broken inner coils at the BL (B-end [brake end of the car] L-left side of the car) spring nest.

2) Coils less than minimum height: 3 outside plus 1 inside coil in the BR (B-brake end of the car; R- right side of the car) nest, 1 outside coil in the BL nest.

3) Ride control wedge rise: BL 1-15/16", BR 2", AL and AR 1- 9/16"(A-end of car is absent the brake control which is on the B-end). Total amount allowed per AAR Rule 46 is 1-13/16".

4) ASF 5600LT Constant Contact Side Bearing (CCSB) setup height BL 4-1/4", BR 4-7/16"; AL 5-3/8" AR 5-3/16". This is a coil spring CCSB with a solid height of 4-7/16" and a free height of 6-1/8".

5) B-end Gibb clearance averaged approximately 1-1/2", and the A-end averaged approximately 1-1/4". Total amount allowed per AAR Rule 47 is 1-1/2".

No exceptions were taken to the center plate rim clearances and lube condition, but an unusual wear pattern was noticed on the inboard portion of the B-end car body center plate and the truck bolster bowl.

ANALYSIS: - FATIGUE

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 data analysis of that information FRA concluded fatigue was not probable for any of the crew members.

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

The evidence points to the POD being at MP 15.6 and the L1 wheel on Car NS 610122 mounting the west rail at this location. The L1 wheel climbed the top of the west rail approximately five feet onto the road crossing and the wheel remained on top of the rail for an approximate distance of 30 feet across the road crossing before derailing to the field side of the rail.

The investigation disclosed several AAR defective conditions with the truck components (worn and broken truck springs, defective snubber devices, worn truck bolster Gibbs = lateral motion, etc.) on the B-end of freight car NS 610122. Although it could not be determined that any single one of the defective conditions would have caused the derailment, a combination of the defective conditions had a negative effect on the performance of the truck. These conditions caused the L1 wheel of the lead truck (B-end) on car NS 610122 to mount the west rail and derail to the field side of the rail.

The probable cause of the accident is defective truck components on the B-end of the 23rd rail car in the train - NS 610122.

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