Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-09

Norfolk Southern (NS)
Goshen, Indiana
February 21, 2007

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-2007-9

1.Name of Railroad Operating Train #1: Norfolk Southern Corp. [NS]	1a. Alphabetic Code: NS	1b. Railroad Accident/Incident No.: 28192
2.Name of Railroad Operating Train #2: Norfolk Southern Corp. [NS]	2a. Alphabetic Code: NS	2b. Railroad Accident/Incident No.: 28192
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]	4a. Alphabetic Code: NS	4b. Railroad Accident/Incident No.: 28192
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 02 Day 21 Year 2007	7. Time of Accident/Incident: 12:35: ☐ 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: 04

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

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	16. State Code	17. County
Goshen	412	N/A	IN	ELKHART

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
40 F	2	2	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. — Code
Main Track #2	4	64.3	3

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	38EB-221

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?
37 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: 0

30. Trailing Tons (gross tonnage, excluding power units): 5381

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

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	NS 9914	1	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	2	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	44	0	31	0	0
(2) Total Derailed	4	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
360000	100000	H221	H605

Number of Crew Members				Length of Time on Duty	
41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen	45. Engineer/Operator	46. Conductor
1	0	1	0	Hrs 2 Mi 35	Hrs 2 Mi 35

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	1	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: N/A

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
1	1	681BO-21

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?
19 MPH R	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): 3930

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): e | N/A | N/A | N/A | N/A

2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter: 0

59. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	DEEX6643	35	no
(2) Causing (if mechanical cause reported)	0	0	no

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

Alcohol	Drugs
0	0

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

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	0	0	131	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	12	0	0

64. Equipment Damage This Consist: 469000

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

66. Primary Cause Code: H221

67. Contributing Cause Code: H605

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
1	0	1	1

Length of Time on Duty

72. Engineer/Operator: Hrs 8 Mi 35

73. Conductor: Hrs 8 Mi 35

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

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

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

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: 0

84. Trailing Tons (gross tonnage, excluding power units): 0

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)	0	0	N/A
(2) Causing (if mechanical cause reported)	0	0	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	90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	0	0	0	0	0	(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0

91. Equipment Damage This Consist: 0

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

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
0	0	0	0

Length of Time on Duty

99. Engineer/Operator: Hrs 0 Mi 0

100. Conductor: Hrs 0 Mi 0

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	0	0	0
Nonfatal	0	0	0

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 N/A	117. Whistle 1. Yes 2. No 3. Unknown	Code 2
Code(s)	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

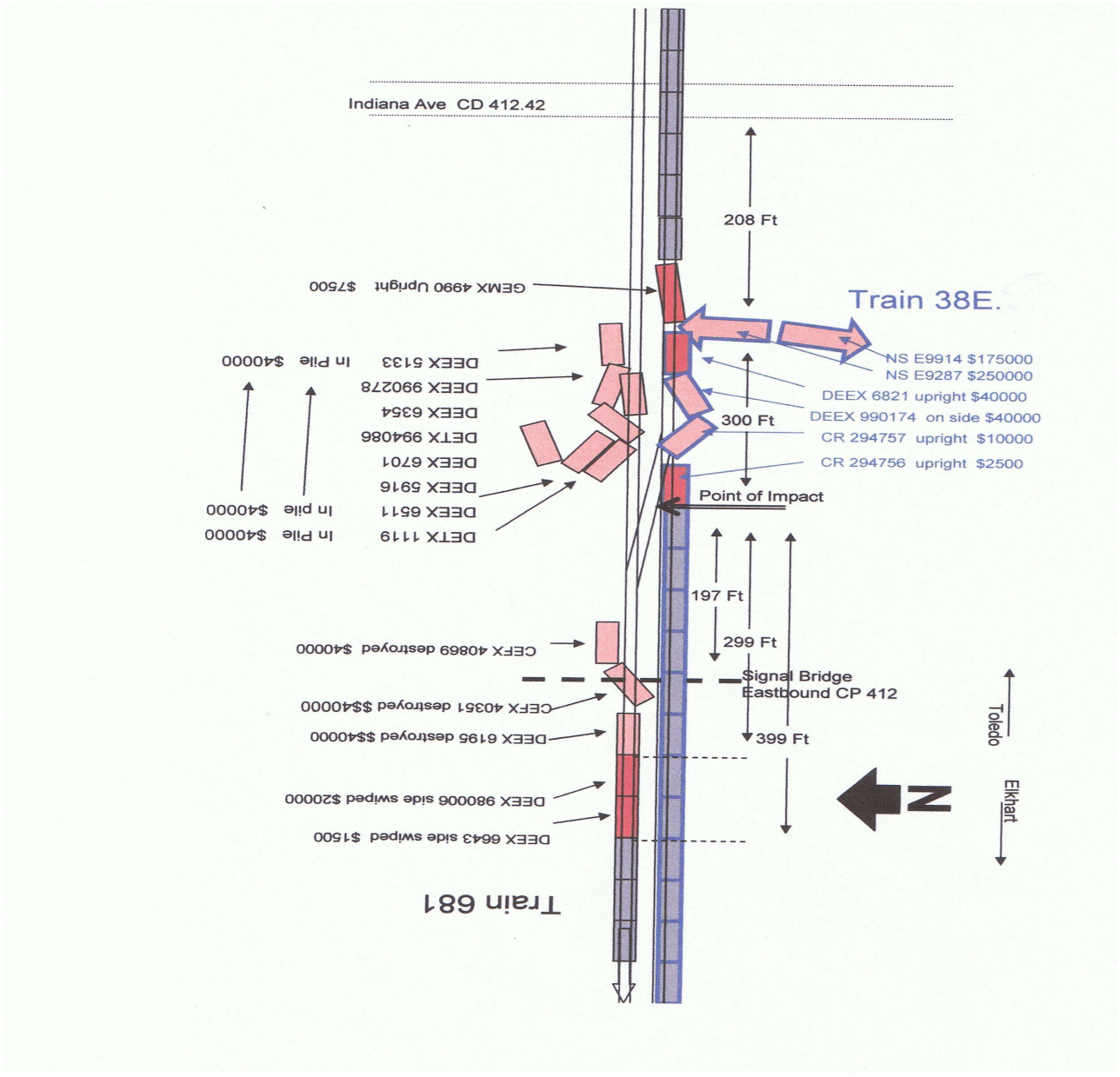
121. Age 0	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 4. Stopped on Crossing 2. Stopped and then Proceeded 5. Other (specify in narrative) 3. Did not Stop	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 3. Passing Train 5. Vegetation 7. Other (specify in narrative) 2. Standing Railroad Equipment 4. Topography 6. Highway Vehicle 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	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 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 February 21, 2007, at 12:35 p.m. e.s.t., a Norfolk Southern Railroad (NS) eastbound freight train collided with the side of a westbound NS freight train. The accident occurred in Goshen, Indiana, at NS Milepost 412, on the Chicago Line of the NS Dearborn Subdivision

The conductor of the eastbound train, NS 38EB-221, suffered minor injuries. The two locomotives on NS 38EB-221 derailed along with the four head cars in the train and the total damage was estimated at $360,000. There were no injuries to the crew of the westbound train, NS 681BO-21, two cars were side swiped and twelve cars derailed and the total damage was estimated at $469,000. Neither train was transporting hazardous material, and there was no evacuation. There was also $100,000 in track, signal, way & structure damage.

At the time of the accident it was daylight and cloudy, with a southwest wind of 5 mph. The temperature was 40 °F.

The accident occurred because the locomotive engineer and the conductor failed to comply with rules and regulations regarding a stop signal indication when they allowed their train, NS 38EB-221, to pass an absolute signal displaying a stop indication at NS Milepost 412 on Main Track No. 2 without authority. Failure to comply with automatic block or interlocking signal displaying stop. Contributing was failure of the crew to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

138. NARRATIVE

Circumstances Prior to the Accident
The crew of NS Train 38EB-221 included a locomotive engineer and a conductor. They first went on duty at 10 a.m., e.s.t., on February 21, 2007, at NS Elkhart Yard in Elkhart, Indiana. The home terminal for this crew is Detroit, Michigan. Each crew member received more than the statutory off duty period prior to reporting for duty.

Their assigned freight train consisted of two locomotives, NS 9914 and NS 9287, 44 loaded and 31 empty cars of mixed freight. It was 5,534 feet long, and weighed 5,648 tons. The train was scheduled to operate from Elkhart to Toledo, Ohio. The train received an initial terminal air test at Elkhart Yard, and departed at 12:15 p.m.

As the train approached the accident area, the locomotive engineer was seated at the controls on the south side of the leading locomotive. The conductor was seated on the north side of the cab of the leading locomotive. The train was operating east on main track number two.

The method of operation is Traffic Control System (TCS) and General Bulletin Order (GBO), and is under the control of the NS Dearborn Toledo East train dispatcher. In this area of the railroad there is a 1-degree curve to the right of about 1,100 feet, followed by a tangent of 4,000 feet to the point of the accident.

The railroad timetable direction of the train was east. The geographic direction was east. Timetable directions are used throughout this report.

The crew of NS Train 681BO-21 included a locomotive engineer, a conductor, and a conductor trainee. They first went on duty at 4 a.m., e.s.t., February 21, 2007, at Monroe, Michigan. The home terminal for all crew members is Detroit, each crew member received the required statutory off duty period prior to reporting for duty.

Their assigned freight train consisted of two locomotives, and 131 empty coal hoppers. It was 7,101 feet long, and weighed 2,863 tons. The train was scheduled to operate from Monroe to Chicago, Illinois. The train received an initial terminal air test at Monroe, and departed at 7:24 a.m.

As the train approached the accident area, the locomotive engineer was seated at the controls on the north side of the leading locomotive. The conductor was seated at the desk on the south side of the leading locomotive and the conductor trainee was seated in the jump seat behind the locomotive engineer. In this area of the railroad there is a 1.5 -degree curve to the left of about 2,000 feet, followed by tangent track of 3,000 feet, and a crossover switch from Main Track No. 2 to Main Track No. 1 at Milepost 412.

The railroad timetable direction of the train was west. The geographic direction was west.

The Accident
Train NS 681BO-21

The train was being operated at a recorded speed of 19 mph approaching the accident area, the maximum authorized speed is 50 mph. The train was proceeding from Main Track No. 2 to Main Track No. 1 through the crossover switch at NS Milepost 412 and operating on a limited clear signal. The locomotive engineer said she noticed an eastbound train operating at a high rate of speed on Main Track No. 2. As the eastbound train passed her train she said she was concerned the eastbound train would not be able to stop for the red signal at Milepost 412. The locomotive engineer said she knew the balance of her train was not clear of the crossover switch at Milepost 412. The locomotive engineer said a few seconds later she felt a tug in her train and the train experienced an undesired emergency application of the train air brake system. The locomotive engineer said the train traveled approximately eight car lengths and stopped, she said she announced "emergency, emergency, emergency" over the railroad radio. The engineer said she contacted the NS Dearborn East train dispatcher and notified the dispatcher of the accident. The conductor and the conductor trainee walked back to determine the damage and confirmed that NS 38EB-221 had collided with the 35th and the 36th cars of their train and derailed the 37th through the 48th cars. The conductor and the conductor trainee continued to walk east along their train and saw the locomotives of NS 38EB-221 derailed. First responders were already on the scene treating the crew of NS 38EB-221. The conductor and the trainee were given a ride by a railroad supervisor back to the head end of their train. The crew of NS Train 681BO-21 was then driven to Goshen Hospital for post accident toxicological testing under FRA authority.

Train NS 38EB-221
The train was operating east on Main Track No. 2 at a recorded speed of 48 mph approaching the accident area. The maximum authorized speed for this train operating at this location is 50 mph. The locomotive engineer said the intermediate signal located at Milepost 414 displayed a clear signal indication. The locomotive engineer said the conductor was announcing the signal indications prior to the accident. As the train approached NS Milepost 412, the locomotive engineer said he saw the locomotives of NS 681BO-21 operating west on Main Track No. 1. The locomotive engineer noticed NS 681BO-21 was moving slowly and he attributed the slow speed to a slow order at NS Milepost 412.7. He could not remember his exact speed but said he was operating the controls in number eight throttle. When he saw NS 681BO-21 crossing over from Main Track No. 2 to Main Track No. 1 he looked at the signal at NS Milepost 412 and saw a red signal indication. He said he took immediate action and applied the emergency train air brake. He placed the throttle in the off position, applied the independent brake and the sanders, placed the reverser lever in reverse, and sounded the audible warning device. He braced himself in the engineer's seat as NS 38EB-221 struck the 35th and 36th cars of NS 681BO-21 about 197 feet east of the signal bridge at NS Milepost 412, and subsequently derailed the 37th through the 48th cars. The locomotives on NS 38EB-221 derailed to the south of Main Track No. 2, going down an embankment. The lead locomotive, NS 9914, spilled about 1,000 gallons of diesel fuel. The first four cars of NS 38EB-221 derailed to the south of Main Track No. 2. The locomotive engineer was not injured and the conductor suffered minor injuries. They were both transported to Goshen Hospital for treatment and FRA post accident toxicological testing.

A signal maintainer and an NS Bridge and Building employee were working in the vicinity of NS Milepost 412 and witnessed the accident. Both employees confirmed that NS 38EB-221 did not have a permissive signal at NS milepost 412.

First responders from the Goshen Police and Fire Departments assisted at the accident scene. Hulcher Services Inc. was dispatched to assist in clearing the accident site and rerailing the railroad equipment. Sun-Pro Environmental was contracted to contain and clean the diesel spill at the scene.

Analysis and Conclusion

Analysis - Locomotive Engineer Operating Performance:
The locomotive engineer of NS 38EB-221, a 47 year old male, was a certified locomotive engineer. He was in possession of a valid certification card at the time of the accident. He was promoted to a locomotive engineer on May 13, 2004, and has operated over the territory where the accident occurred on numerous occasions. He maintains he received a clear signal indication to proceed at NS Milepost 414, he could not remember if the conductor announced the signal at NS Milepost 414 over the railroad radio as required by the operating rules. The locomotive engineer said he was alert and not distracted from his duties.

The conductor of NS 38EB-221, a 26 year old male, who entered service for the NS on July 19, 1999, was promoted to a conductor on January 28, 2000, and to a locomotive engineer on June 16, 2006. The conductor has operated over the territory where the accident occurred for four years. NS Northeast Operating Rules Advisory Committee Operating Rule 94, stipulates that employees are required to announce signal indications over the railroad radio. The conductor said he could not remember if he announced the signal at NS Milepost 414 but did remember the signal aspect was clear. The conductor said he was alert and not distracted from his duties.

The NS Dearborn train dispatching office secured a copy of the voice recordings of the radio transmissions of NS 38EB-221 and NS 681BO-21 that occurred prior to the accident. The NS transcribed the voice recordings onto paper and provided the document to the FRA electronically. This document indicates the crew of NS 38EB-221 did not announce the signal indication at NS Milepost 414 in advance of the signal at NS Milepost 412.

Conclusion:
The crew members of NS 38EB-221 failed to comply with the stop signal indication at NS Milepost 412, which caused the side collision with NS 681BO-21. The NS removed the locomotive engineer and the conductor on NS 38EB-221 from service pending a formal hearing. The locomotive engineer's certification was suspended.

Analysis - Locomotive Safety Devices:
The two lead locomotives of NS 38EB-221 were NS 9914 and NS 9287, both units were equipped with a headlight, auxiliary lights, and an audible warning device, as required by Federal regulation. According to the locomotive engineer, these devices were functioning as intended prior to the accident. NS 9914 was equipped with an operating speed indicator and event recorder. The NS Mechanical Department downloaded the event recorder data from the lead locomotive, NS 9914. The analysis of the data disclosed that NS 38EB-221 was traveling at 48 mph when the locomotive engineer instituted an emergency air brake application, and 37 mph when NS 38EB-221 collided with NS 681BO-21. FRA reviewed the results of this analysis and concurred with the findings of the NS.

Conclusion: The locomotive safety devices were in compliance with Federal regulations.

Signal & Train Control Analysis:
The NS provided an electronic snapshot of the Digicon Train Control System used by the NS train dispatcher. This document

indicates that NS 681BO-21 received a permissive signal indication for movement from Main Track No. 2 to Main Track No. 1. The same document indicates that NS 38EB-221 did not have a permissive signal indication authorizing it to pass the signal at NS Milepost 412. A sight distance test was performed by the FRA and the NS signal department. NS Milepost 414 is the intermediate signal prior to the control point at NS Milepost 412.

The locomotive engineer and the conductor on NS Train 38EB-221 reported no problems with viewing the signal indications prior to the accident.

On February 22, 2007, an NS chief engineer of signals and an FRA signal and train control inspector rode an eastbound NS freight train locomotive number NS 9673 to conduct signal previews at the NS Milepost 414 location and Control Point 412. The locomotive engineer and conductor said they could see a clear signal indication (green) at the NS Milepost 414 location. Both the NS signal engineer and FRA signal inspector were unclear to the signal preview at that point. As the train got closer to the NS Milepost 414 location an approach indication (yellow) was being displayed. There are highway traffic signals in close proximity to the intermediate location. The weather conditions were overcast and cloudy on the day of this observation. The preview of signals at Control Point 412 was obstructed by tree limbs as the train rounded the curve in advance of the signals.

NS signal personnel performed all appropriate tests at Control Point 412 and NS Milepost 414 signals with FRA signal and train control inspector monitoring the testing. No exceptions were taken to equipment inspected and the wayside signal system functioned as designed.

NS signal personnel recreated train movements by placing shunts on the track rails so a comparison of dispatchers screens could be reviewed. This recreation was conducted on March 7, 2007, after testing of the wayside signal equipment was completed. The comparison revealed no anomalies when compared to the dispatcher screen the day of the collision.

Conclusion: The signal and train control systems were functioning as designed.

Analysis - Toxicological Testing:
The accident met the Federal threshold pursuant to Title 49 Part 219, Subpart C, Post Accident Toxicological Testing. NS conducted post accident toxicology testing on crew members of NS 38EB-221, NS 681BO-21, and the signal maintainer working in the vicinity of NS Milepost 412 under this authority. The results of the toxicology tests were negative for all employees.

Conclusion: Impairment was not a factor.

Analysis - Fatigue
FRA obtained fatigue related information, including a 10-day work history, for four employees involved in this accident, including the locomotive engineer and conductor of NS Train 38EB-221 and the locomotive engineer and conductor of NS Train 681BO-21.

Conclusion: FRA concluded fatigue was not probable for any of the employees.

Overall Conclusion:
The crew members of NS 38EB-221 failed to comply with the stop signal indication at NS Milepost 412, which caused the side collision with NS 681BO-21.

Probable Cause & Contributing Factors

A contributing factor was the failure of the crew to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

The FRA concluded that the accident occurred because the locomotive engineer and the conductor failed to comply with rules and regulations regarding a stop signal indication when they allowed their train, NS 38EB-221, to pass an absolute signal displaying a stop indication at NS Milepost 412 on Main Track No. 2 without authority. Failure to comply with automatic block or interlocking signal displaying stop.

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