Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2009-45

Elgin, Joliet & Eastern Railway Co. (EJE)
Matteson, IL
October 3, 2009

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-2009-45

1.Name of Railroad Operating Train #1: Elgin, Joliet & Eastern Rwy Co. [EJE]	1a. Alphabetic Code: EJE	1b. Railroad Accident/Incident No.: 648226
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: Elgin, Joliet & Eastern Rwy Co. [EJE]	4a. Alphabetic Code: EJE	4b. Railroad Accident/Incident No.: 648226
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 10 | Day 03 | Year 2009	7. Time of Accident/Incident: 11:53:00 ☑ 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: 12

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
2	2	0	0	CHICAGO

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
MATTESON	21.6	N/A	IL	COOK

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
60 F	2	1	2

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
YARD TRACK NO. 1	1	N/A	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	E28091-03

29. Speed *(recorded speed, if available)* R - Recorded E - Estimated — Code	30. Trailing Tons *(gross tonnage, excluding power units)*	31. Method(s) of Operation *(enter code(s) that apply)*	31a. Remotely Controlled Locomotive?
30 MPH — R	2892	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): g, j, N/A, N/A, N/A	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)*	UP3936	1	N/A
(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: 1; Drugs: 0

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

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	0	0	54	0	0
(2) Total Derailed	0	0	0	0	0

37. Equipment Damage — This Consist: $71,437.00

38. Track, Signal, Way, & Structure Damage: $300.00

39. Primary Cause Code: H702

40. Contributing Cause Code: H101

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 3 Mi 40	Hrs 3 Mi 40

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	2	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
6	2	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?
0 MPH — E	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 | 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)*	EJE44446	0	yes
(2) Causing *(if mechanical cause reported)*	0	0	N/A

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

Alcohol	Drugs
1	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
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	1	0	4	0	0
(2) Total Derailed	0	0	0	0	0

64. Equipment Damage This Consist: $12,462.00

65. Track, Signal, Way, & Structure Damage: $0.00

66. Primary Cause Code: H702

67. Contributing Cause Code: H101

Number of Crew Members

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

Length of Time on Duty

72. Engineer/Operator: Hrs 0 Mi 0

73. Conductor: Hrs 0 Mi 0

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: 2

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: 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)*: N/A

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

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

Rail Equipment Involved

111. Equipment Code: 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)*: 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	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

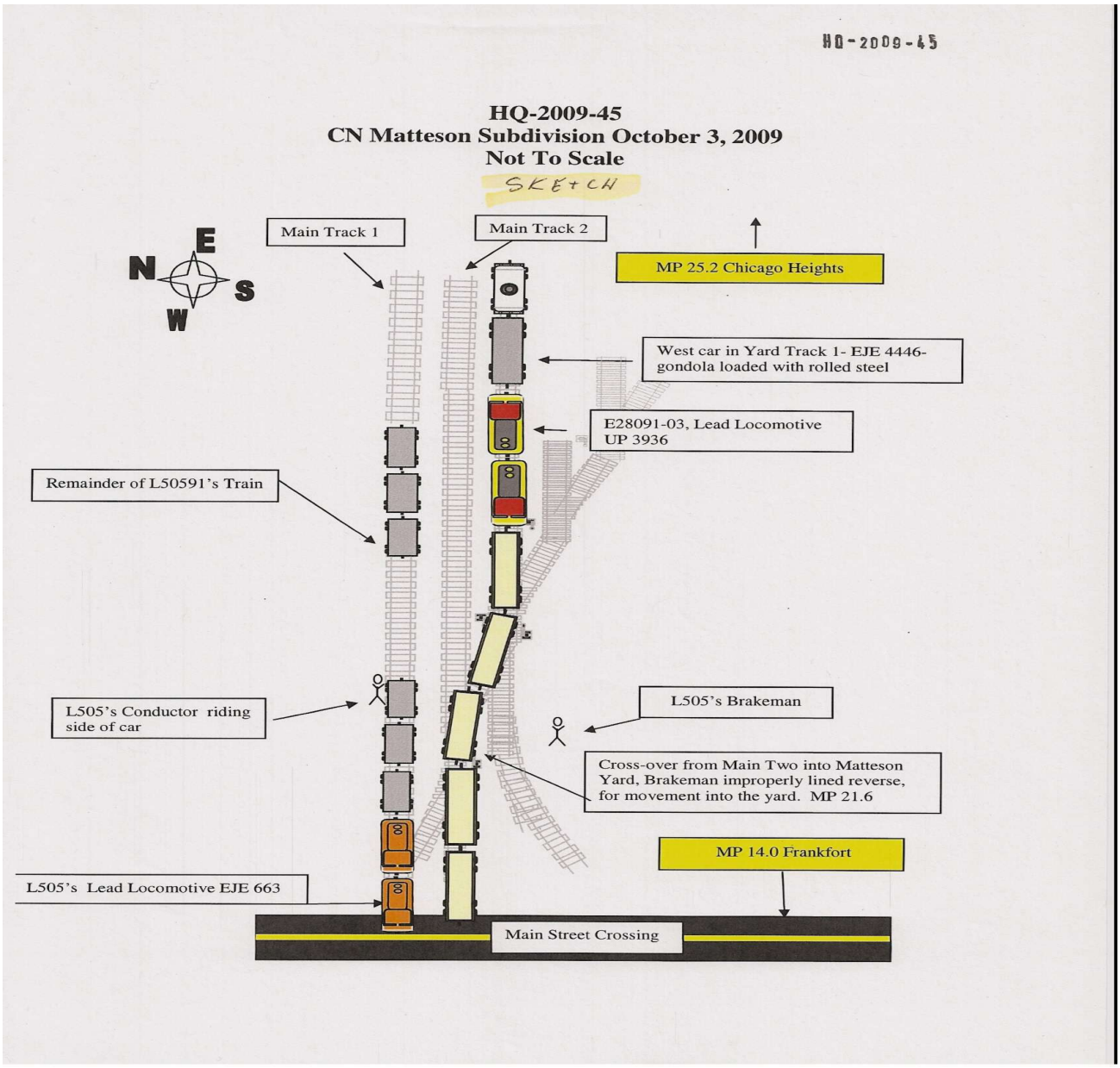
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify 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 October 3, 2009, at 11:53 a.m., c.d.t., eastbound Elgin,Joliet & Eastern Rwy Co. (CN) Train E28091-03 (E280), operating on the CN's Matteson Subdivision's Main Track No. 2, at milepost 21.6, was diverted into CN's Matteson Yard in Matteson, Illinois. E280 collided with a standing cut of five cars on Yard Track No. 1, in Matteson Yard. The method of operation on the main tracks at the incident site was Track Authority supplemented by an Automatic Block Signal System. Westbound CN Train L50591-03 (L505) was operating in the accident location on Main Track No. 1, preparing to set out 22 cars into Matteson Yard.

The locomotive engineer and the conductor on E280 sustained reportable injuries. No crewmembers on L505 were injured. No equipment derailed as a result of the collision. There was no hazardous material release, no fire, and no evacuation. The Matteson Fire Department and Ambulance Service and the CN Police Department responded to the accident site. There was $84,199 in damages: $71,437 to the locomotive consist of E280, $12,462 to the equipment in Yard Track No. 1, and $300 in track damage. The third and fifth cars in Yard Track No. 1 were residue hazardous material cars which sustained minor damage.

At the time of the accident it was daylight, clear, and the temperature was 60 ºF.

The probable cause of the accident was L505's brakeman's failure to allow E280 to pass through the Joint Authority before lining the Main Track No. 2 switch for movement into the yard. It was determined the brakeman was under the influence or impaired by alcohol at the time of the accident and this may have been a contributing cause.

138. NARRATIVE

Circumstances Prior to the Accident
E280
The crew of E280 consisted of a locomotive engineer and a conductor. The crew went on duty at 8 a.m., October 3, 2009, at CN's Joliet Yard, Joliet, Illinois. This was the home terminal for both crew members. Both received more than the statutory off duty period of 10 hours, prior to reporting for duty. The locomotive engineer was off duty for 14 hours and 52 minutes. The conductor was off duty for 14 hours and 38 minutes.

E280 consisted of two locomotives (UP 3936 and UP 4409) and 54 empty auto racks, was 5,076 feet long and weighed 3,096 tons. Their train was scheduled to be operated from West Chicago, Illinois, to Griffith, Indiana. The crew made no setouts or pickups prior to the accident. The crew was transported via taxi, to West Chicago where the CN had received the train in interchange from the Union Pacific Railroad. The train had previously received a Class I air brake test.

E280 operated from West Chicago to Matteson without incident. They received Track Authority No. 11123 at East Joliet to operate from milepost 2 to West Frankfort on the Matteson Subdivision Single Main Track and from West Frankfort to East Frankfort on the Matteson Subdivision Siding. They received Track Authority No. 11124 at 11:17 a.m., to operate from East Frankfort to Spring Switch Matteson, milepost 20.4, and Spring Switch Matteson to Chicago Heights on Main Track No. 2, with a Box 8 Joint Authority with EJE 663 (L505) between milepost 21 and milepost 22.

As E280 approached milepost 17, the conductor contacted the crew of L505 via radio and requested permission to enter the Joint Authority. L505's conductor granted permission to E280 to enter the Joint Authority between milepost 21 and 22 on Main Track No. 2.
According to E280's crew, they had a clear signal at milepost 20.1 which allowed them to operate at maximum authorized speed through the Joint Authority.

E280's engineer was seated at the control stand on the south side of the leading locomotive. The conductor was seated in the conductor's seat on the north side of the locomotive. The locomotive was being operated

with the short hood forward.

The timetable and geographic direction are east and west. From the west, there is a 2 degree right hand curve followed by 2,300 feet of tangent track to the location of the Matteson Yard West Switch. The grade in the area of the accident is practically level.

L505
The crew of L505 consisted of a locomotive engineer, conductor, and brakeman. They went on duty at 8:45 a.m., October 3, 2009, at CN's Kirk Yard Office in Gary, Indiana. This is the home terminal for the conductor and the brakeman. The engineer normally reports for duty at Joliet Yard. He was deadheaded to Kirk Yard for this duty tour. All three crewmembers received more than the statutory off duty period of 10 hours, prior to reporting for duty. The locomotive engineer was off duty for 24 hours. The conductor was off duty for 26 hours and 40 minutes and the brakeman was off duty for 16 hours and 45 minutes.

L505 consisted of two locomotives, 33 loads, and 10 empties. The lead locomotive was EJE 663. The crew was to operate their train from Kirk Yard to Joliet Yard, a distance of 45 miles. The crew was to set out 22 cars at Matteson Yard, milepost 21.7.

The crew of L505 received their paperwork and instructions from the trainmaster and held a job briefing prior to leaving the yard office. The crew was given a ride to their locomotives by the trainmaster. The crew coupled the locomotives to their train and received a Class I air brake test from a car department employee. The crew also armed and tested their two-way end of train device. L505 departed Kirk Yard at approximately 10:15 a.m.

L505 entered the Main Track at milepost 45.4 and proceeded west on CTC signal indication. The crew received Track Authority No. 11121 at 10:30 a.m., to operate from CTC Griffith to Spring Switch Matteson, on Matteson Subdivision Main Track No. 1. At 10:41 a.m., the crew was issued Track Authority No. 11122 with a Box 6 Work Between, from milepost 22 to 21, and a Box 8 Joint Authority on Main Track No. 2, on the Matteson Subdivision.

The CN Rail Traffic Controller (RTC) informed the crew of L505 that E280 would have to operate through Matteson before L505 could make their set out. L505 made no stops until they arrived at Matteson Yard. As L505 was approaching Matteson Yard, E280's conductor contacted them via radio and requested permission to enter and operate through the Joint Authority on Main Track No. 2. The conductor on L505 granted permission to E280's conductor to operate through the Joint Authority.

After L505 stopped on Main Track No.1 at Matteson, the conductor held a job briefing on the lead locomotive with his crew. The conductor informed the crew members they would be able to cross over from Main Track No. 1 to Main Track No. 2 to make their set out after E280 passed their location. Following the job briefing, the brakeman walked over to the yard to be in position to line the switches for their pending move into Matteson Yard.

The conductor uncoupled the head 22 cars from the train. At the time of the accident, the engineer was seated at the control stand on the north side of the lead locomotive. The conductor was riding the sill step on the north side of the 22nd car. The brakeman was positioned on the south side of the yard lead.

The Accident
E280-East
Approaching the accident area, E280 was operating on a clear signal indication at a recorded speed of 41 mph. The locomotive engineer's view of the track ahead was not obstructed. The crew noticed L505's brakeman standing between Main Tracks No. 1 and 2. The brakeman walked from between Main Track No.1 and No. 2 to a location on the south side of the tracks. The engineer of E280 was sounding the locomotive horn for the Main Street highway-rail grade crossing located approximately 60 feet west of the crossover switch. The crew of E280 observed the main line switch was lined for movement from Main Track No. 2 into Matteson Yard. The engineer initiated an emergency brake application. The event recorder data from E280's lead locomotive (UP 3936) indicated the train had slowed to 30 mph when it collided with the cut of five standing cars on Yard Track No. 1.

The maximum authorized speed for Main Track No. 2 is 45 mph. There were no temporary speed restrictions

in effect.

E280's conductor transmitted an emergency call on the radio. The dispatcher answered the radio transmission and the crew told him they had just collided with a cut of cars in Matteson Yard and were requesting an ambulance. The dispatcher informed them he was calling an ambulance and asked them if they had received permission from L505 to enter the Joint Authority. The crew responded they had received permission into the limits from L505's conductor and had passed a clear signal.

The crew was transported, via ambulance, to Saint James Hospital in Olympia Fields, Illinois. The conductor remained in the hospital overnight as a result of serious injuries to his left knee. The engineer was treated and released that evening.

L505-West

L505 was operating west on Main Track No. 1 with a cut of 22 cars at the time of the accident. The conductor was riding on the north side of the rear car positioned to stop the movement once the rear car was west of Main Street. The crew had planned to wait for E280 to pass on Main Track No. 2 before placing the cut of 22 cars into Matteson Yard. The brakeman mistakenly lined the switch from Main Track No. 2 into the yard prior to E280 passing their location and was standing by the switch at the east end of the cross-over between Main Tracks No. 1 and 2.

According to the brakeman, he realized his mistake and attempted to line the switch back as he saw E280 approaching Main Street. He was unable to line it back because he had re-locked the switch. The brakeman moved to a position clear of the tracks on the south side of the Yard Lead and waited for E280 to come to a stop.

The CN Trainmaster at the scene asked the crew of L505 what happened. The brakeman told him he mistakenly lined the Main Track No. 2 switch into the yard prior to E280 coming through their Joint Authority.

The trainmaster transported the crew to CN's Markham Yard office to conduct reasonable cause breathalyzer testing. After the breath test, CN management transported the crew to a medical facility for mandatory post accident toxicology testing. The trainmaster obtained written statements from the crew members after the specimen collection and the crew was released from duty at 7:25 p.m.

Analysis and Conclusions

Analysis Fatigue:

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to a blood alcohol content (BAC) of 0.05. At or above this baseline, we do not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings. FRA obtained fatigue related information, including a 7-10 day work history, for the employees involved in this accident.

Conclusion Fatigue: FRA concluded fatigue was not probable for any of the crew members of E280. Fatigue also was not probable for the conductor or engineer of L505. The Fatigue Analysis Program results indicated that the brakeman of L505 was probably not cognitively or physiologically fatigued due to his work/rest cycle of circadian rhythms. It should be noted that he was using three prescription drugs. He informed FRA during his interview that he felt tired prior to the accident.

Analysis Toxicological Testing: An FRA authorized breath alcohol test was conducted on the crew of L505 approximately two and three-quarters hours after the accident. The conductor's and the engineer's results were negative. Under Federal standards, a positive confirmation result of 0.024 was obtained for the brakeman at approximately 2:34 p.m. using a DOT-qualified evidential breath testing device. Assuming the brakeman did not consume alcohol after the accident, the brakeman would have been under the influence or impaired by alcohol at the time of the accident (approximately 11:53 a.m.). It is estimated by FRA toxicology experts that his alcohol concentration during the accident was likely between 0.05 and 0.11, which would have been a violation of FRA regulation part 219.101.

FRA Post-Accident Forensic Toxicology tests of blood and urine collected from the three crewmembers of L505 more than 6 hours after the accident indicated that the three employees tested had negative test results.

Conclusion: According to FRA toxicology experts, the brakeman would have been under the influence or impaired by alcohol at the time of the accident. Impairment due to alcohol may have been a contributing cause to the accident.

Analysis-Brakeman of L505: In the CN Discipline Hearing, the brakeman testified the conductor informed him E280 had to pass before they could make their set out. The brakeman told the FRA in an interview that he forgot E280 was coming and he should not have lined the switch.

Conclusion: The brakeman's actions were the probable cause of the accident.

Analysis- Locomotive Engineer of L505: The engineer participated in the job briefing and said he had a clear understanding that E280 had to clear the Joint Authority before they could make their set-out into Matteson Yard. He was seated on the north side of the locomotive and was not in position to see the brakeman. The locomotive was approximately 35 car lengths west of the collision point.

Conclusion: The engineer's actions were not a contributing cause to the accident.

Analysis- Conductor of L505: The conductor granted E280 permission to come through their Joint Authority. All three crewmembers were in the control compartment of the lead locomotive when the conductor granted E280 permission through the limits. The conductor held a job briefing and told the crewmembers they would make their set-out after E280 cleared the Joint Authority. He believed the crew had a clear understanding as how the move would be made. In the CN Discipline Hearing, the brakeman substantiated the conductor's statement that E280 had to pass through the limits before they could make their set out. The conductor was not located in a position where he could see the brakeman operate the switches. He was positioned on the north side of the cars and the cars blocked his view of the brakeman.

Conclusion: The conductor's actions were not a contributing cause to the accident.

Analysis- E280's Crew: The video from lead locomotive UP 3936 was viewed by the FRA's Inspector in Charge. The video was in black and white. Due to the lack of color and the fact the signal has a single head; the aspect of the signal could not be determined. The engineer and conductor testified they had a green (clear) signal indication as they approached the Spring Switch Signal at milepost 20.1. They were operating in compliance with signal indication and were not exceeding maximum authorized speed.

Prior to entering the Joint Authority the crew received permission into the limits from the conductor of L505. The engineer initiated an emergency brake application action when he noticed the switch was lined into the yard. The evidence indicated the switch was lined for the yard after the train passed the clear signal at the Spring Switch.

Conclusion: The crew was in compliance with railroad rules and their actions were not a contributing cause to the accident.

Analysis-Signal System: On October 9, 2009, representatives from the FRA, CN management, and CN maintenance personnel, conducted a field analysis regarding the manipulation of the switches to verify the signal indications for the Spring Switch Signal.

Conclusion: Examination of the signal maintenance records and signal plans did not identify any condition that would have prevented the signal system from functioning as designed. The signal system was not a contributing cause to the accident.

Probable Cause and Contributing Factors
The probable cause of the accident was L505's brakeman's failure to allow E280 to pass through the Joint Authority before lining the Main Track No. 2 switch for movement into the yard. It was determined the brakeman was under the influence or impaired by alcohol at the time of the accident and this may have been a contributing cause.

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