Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-88

Union Pacific (UP)
Woolridge, MO
November 13, 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-2008-88

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 1108SL010
2.Name of Railroad Operating Train #2: Union Pacific RR Co. [UP]	2a. Alphabetic Code: UP	2b. Railroad Accident/Incident No.: 1108SL010
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: Union Pacific RR Co. [UP]	4a. Alphabetic Code: UP	4b. Railroad Accident/Incident No.: 1108SL010
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 11 | Day 13 | Year 2008	7. Time of Accident/Incident: 03:55: ☐ 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: 03

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

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr / Code	17. County
Boonville	163.5	N/A / MO	COOPER

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
62 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. West — Code
Single Main	4	104.1	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
A	1	BTS9701

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

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

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): g | h | p | 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)*	BTS9701	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	Drugs
0	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	0	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	2	0	0	0	0
(2) Total Derailed	0	0	0	0	0

37. Equipment Damage — This Consist: $150,000.00

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

39. Primary Cause Code: H402

40. Contributing Cause Code: N/A

Number of Crew Members

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

Length of Time on Duty

45. Engineer/Operator: Hrs 8 Mi 55

46. Conductor: Hrs 0 Mi 0

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 — N/A

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

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	AFXAS13

56. Speed *(recorded speed, if available)* — Code: R - Recorded; E - Estimated
0 MPH | R

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)*: 3455

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): g | h | p | 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)*	TTGX158653	54	no
(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
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
(1) Total in Train	2	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	47	0	5	0	0
(2) Total Derailed	0	0	0	0	0

64. Equipment Damage This Consist: $4,216.00

65. Track, Signal, Way, & Structure Damage: $200.00

66. Primary Cause Code: H402

67. Contributing Cause Code: N/A

Number of Crew Members

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

Length of Time on Duty

72. Engineer/Operator: Hrs 7 Mi 25

73. Conductor: Hrs 7 Mi 25

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: 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		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

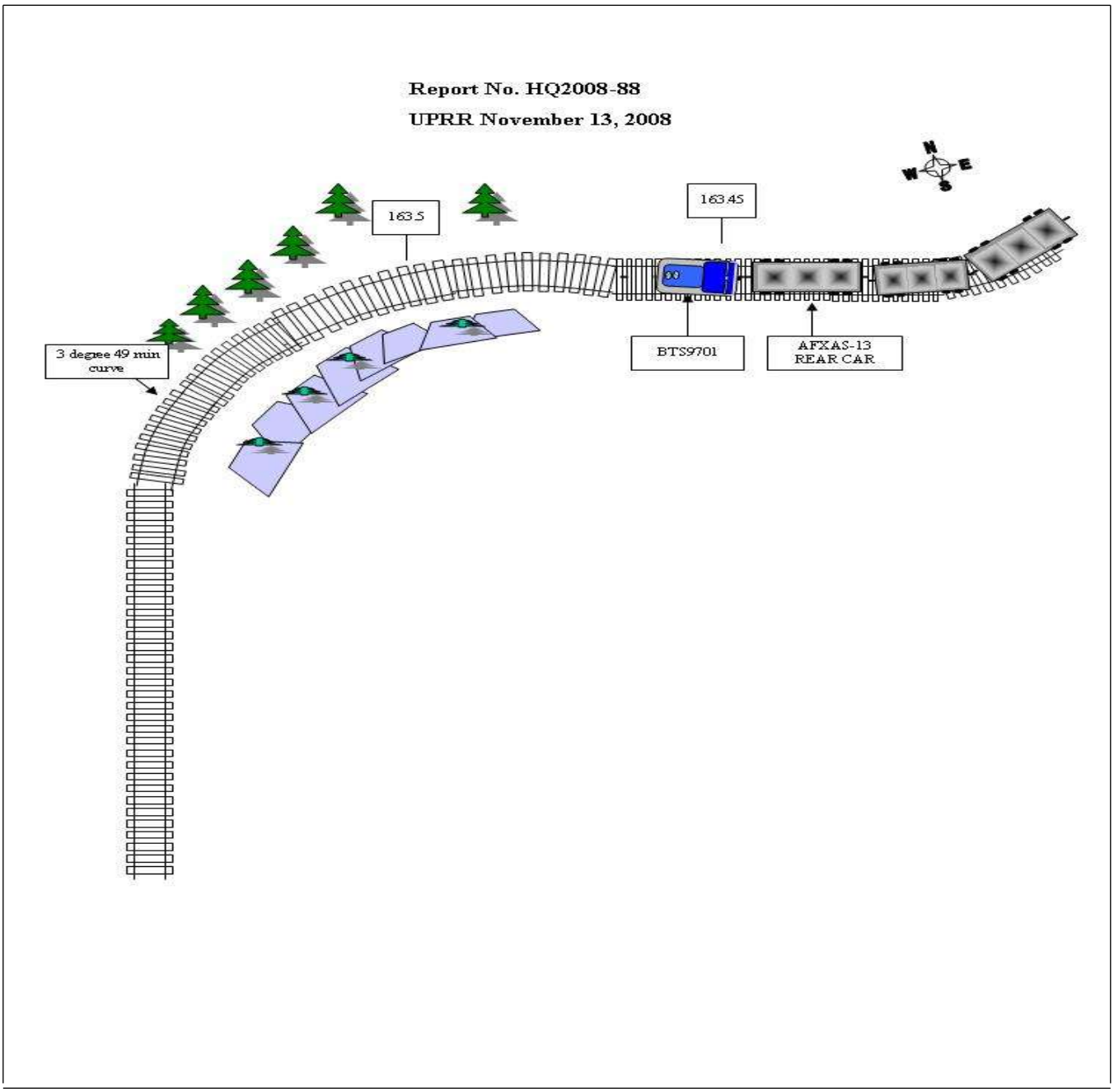
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify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

At 3:55 p.m. CST, on November 13, 2008, eastbound Union Pacific Railroad (UP) ballast track stabilizer machine # BTS 9701 operating on single Main Track collided with the rear of standing UP Train AFXAS-13, on the UP River Subdivision. The accident occurred near Boonville, Missouri approximately 7 miles east of town at UP Milepost (MP) 163.45. The equipment damage was estimated to be $150,000 to the ballast track stabilizer; $4,216 to train equipment; and $200 track damage. There was no signal damage or hazardous material spill. The equipment operator reported lower back and leg pain.

At the time of the accident it was daylight and cloudy. The temperature was to be 62 °F.

The FRA's investigation determined the probable cause of the accident was Cause Code H402 - Motor car or on-track equipment rules, failure to comply. The operator was traveling too fast for his range of vision seen to be clear due to the rock bluffs, the curvature of the track, and the trees.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

BALLAST TRACK STABILIZER BTS 9701

Ballast track stabilizer BTS 9701 was part of the surfacing crew of Gang 9711 that consisted of five machine operators and a foreman. They first went on duty at 7:00 a.m., on November 13, 2008, at the tool-house in Lexington, Missouri.

The crew began the day with the required job briefing covering the work for the day. Machine spacing, curves, red zones, and watching for trains in the same permits were topics that were discussed. The daily inspection of the track machines was performed by the machine operators. The initial job briefing discussed was to travel the track machines from Lexington in a Timetable eastwardly direction toward Jefferson City, Missouri; the geographic direction is southeast. Timetable direction will be used in the rest of this report. At approximately 10:30 a.m. the foreman of Gang 9711 received information that three of his operators would need to drive to Eureka, Missouri. This left Gang 9711 with two operators and a foreman to move the two track machines toward Jefferson City. A new job briefing was conducted with all the men of Gang 9711 informing them of the change that was to take place. Around 11:00 a.m. the first of seven track and time permits was issued for Gang 9711 to travel eastward.

Machine BTS 9701 was to be the lead piece of equipment in Gang 9711 followed by Track Machine Tamper CATP 0501. The operator was seated at the front of the equipment on Machine BTS 9701. Track and Time Permit No. 2932 was issued at 3:46 p.m. authorizing movement to travel from Control Point (CP) MP169 to MP155 on the River Subdivision. The track and time permit was marked behind three trains, the AFXAS 13 (with locomotive CSXT 9049), CWEPA 10 (with locomotive UP 5722), and the CNANK 9 (with locomotive UP 5738).

The operator of machine BTS 9701 while traveling east at approximately 20 mph and coming around a 3-degree 49-minute, right-hand curve, observed BNSF Train AFXAS 13 stopped ahead. The track machine

Tamper CATP 0501 was approximately 1 mile behind to the west of machine BTS 9701. There is no ascending or descending grade; however, there are trees on the north side and a rock bluff with some trees on the south side of the track obstructing visibility.

BNSF TRAIN AFXAS 13

The crew of BNSF Train AFXAS 13 included a locomotive engineer and a conductor. They first went on duty at 8:30 a.m. on November 13, 2008 at Fairfax Yard in Kansas City, Kansas. Jefferson City, MO is the home terminal for both the crewmembers, and each had received the required statutory off-duty rest period prior to reporting for duty.

The assigned freight train consisted of 2 locomotives, 47 loads, 5 empties (19 box cars and 33 auto racks), and an End-Of-Train Device (EOTD) UPRQ 60388. The train was 4,768 feet long, and weighed 3,455 tons. The train received a Class I air brake test from the mechanical department personnel at Fairfax Yard. The train departed Fairfax Yard at 9:25 a.m. heading toward Jefferson City. The train stopped at Intermediate Signal 162.6 waiting for a train ahead. The engineer was seated at the controls on the right (south) side of the locomotive. The conductor was seated in the front seat on the left (north) side of the locomotive.

THE ACCIDENT

The machine operator was operating Machine BTS 9701 eastwardly at approximately 20 mph. UP Maintenance-of-Way (MOW) Rule 42.2.2 states that machines must be operated at a speed that will allow the operator to stop in half the distance seen to be clear. There are 3 curves starting at MP 164; a right-hand, 1-degree 26-minute curve followed by a left-hand 3-degree 4-minute curve before approaching the final right-hand curve where BNSF Train AFXAS 13 was stopped. The rock bluff, trees, and curves limited the visibility of the machine operator to see the stopped train ahead. As the track machine operator came around the final right-hand 3-degree 49-minute curve, he noticed the train stopped about 60 to 80 yards ahead. A brake application was made and the radio handset fell to the cab floor. The operator unbuckled his seat belt and went toward the back of the cab as impact was imminent. Estimated speed at the time of impact with the standing train was two mph. The impact threw the machine operator into the floor at the front part of the cab.

ANALYSIS AND CONCLUSION

ANAYSIS: - TOXICOLOGICAL:
Three members of Track Gang 9711 were tested per UP reasonable cause toxicologically testing procedures. The test results were negative.

CONCLUSION:
FRA concluded that drugs and alcohol were not factors in this accident.

ANALYSIS: - BALLAST TRACK STABILIZER:
Inspection of the machine's braking system following the accident revealed the braking components on the east end of the machine were broken and the west end was still applied. A representative of the machine manufacture inspected the brake system and could not make a determination of the systems operating ability prior to the collision. He did find all parts both intact and broken were the proper part for the equipment. The UP manager of Maintenance of Way (MOW) equipment noted the brake shoes were in near new condition and there had been no reports of braking problems in the past.

CONCLUSION:
There were no indications that the brakes failed to operate as intended. FRA concluded the brake system was not a factor in this accident.

ANALYSIS: - FATIGUE FOR MACHINNE OPERATOR:
FRA uses an overall effectiveness rate of 77.5 percent as a baseline for fatigue analysis, which is equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline, FRA does not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained for each employee. If an

employee does not provide sleep information, FRA uses the default software settings. FRA obtained fatigue related information, including a 10-day work history for the operator in this accident. The railway worker's effectiveness level at the time of collision was 97.33 percent.

CONCLUSION:
FRA concluded fatigue was not probable for the operator of the Machine BTS 9701. Information for the operator of the ballast track stabilizer follows:

1. Operator of BTS 9701
   Lapse index of .5
   Reaction Time 103
   Chronic Sleep Debt 4.38
   Hours of continuous Wakefulness 10.70 Hours
   Time of day was 4:11 p.m.
   Blood Alcohol Equivalency of approximately <0.05

OVERALL CONCLUSIONS:

The collision occurred because the machine operator was not able to stop the track machine in half the distance seen to be clear. Travel for this type of equipment operating under UP MOW Rule 42.2 has a maximum speed allowed of 30 mph. The speed is further restricted under UP MOW Rule 42.2.2 which states: Track cars and machines must be operated at a speed that will allow the operator to stop in half the distance the track is seen to be clear. On July 23, 2008 the operator received training under UP Safety Meeting QS 65: Preventing On-Track Equipment Collisions in which Rule 42.2.2 is specifically covered. No other contributing factors were noted.

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

The FRA's investigation determined the probable cause of the accident was Cause Code H402 - Motor car or on-track equipment rules, failure to comply. The operator was traveling too fast for obstructing conditions lessening the range of vision seen to be clear due to an obstruction of the rock bluffs, the curvature of the track, and the trees.