Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-96

Union Pacific
Dover, MO
December 5, 2006

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-2006-96

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 1206SL003
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP]	3a. Alphabetic Code: UP	3b. Railroad Accident/Incident No.: 1206SL003
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 12 / Day 05 / Year 2006	6. Time of Accident/Incident: 06:30: ☑ AM ☐ PM

7. 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): 01

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

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Hodge	233.7	N/A	MO	LAFAYETTE

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

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Single Main Track		4	84		3

OPERATING TRAIN #1

25. 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: 1

26. Was Equipment Attended? 1. Yes 2. No: 1

27. Train Number/Symbol: CNAAE -03

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 41 MPH; Code: R

29. Trailing Tons (gross tonnage, excluding power units): 18981

30. 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): h N/A N/A N/A N/A

30a. 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; 2. South 4. West: 0

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	66	yes
(2) Causing (if mechanical cause reported)	0	0	N/A

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

Alcohol	Drugs
0	0

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

34. 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	1
(2) Total Derailed	0	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	135	0	0	0	0
(2) Total Derailed	41	0	0	0	0

36. Equipment Damage This Consist: 1747975

37. Track, Signal, Way, & Structure Damage: 214000

38. Primary Cause Code: T221

39. Contributing Cause Code: N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator: Hrs 6 Mi 45

45. Conductor: Hrs 6 Mi 45

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

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

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

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

OPERATING TRAIN #2

52. 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

53. Was Equipment Attended? 1. Yes 2. No: N/A

54. Train Number/Symbol: N/A

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

57. 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

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. Trailing Tons (gross tonnage, excluding power units)	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)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
N/A			N/A N/A N/A N/A N/A	N/A

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First involved (derailed, struck, etc)	N/A	N/A	N/A		N/A	N/A
(2) Causing (if mechanical cause reported)	N/A	N/A	N/A	60. Was this consist transporting passengers? (Y/N)	N/A	

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	N/A	N/A	N/A	N/A	N/A	(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	(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
N/A	N/A	N/A	N/A

Number of Crew Members				Length of Time on Duty	
67. Engineer/ Operators N/A	68. Firemen N/A	69. Conductors N/A	70. Brakemen N/A	71. Engineer/Operator Hrs N/A Mi N/A	72. Conductor Hrs N/A Mi N/A

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

76. EOT Device? 1. Yes 2. No	77. Was EOT Device Properly Armed? 1. Yes 2. No
N/A	N/A

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

Highway User Involved

79. Type — Code: N/A
C. Truck-Trailer. F. Bus J. Other Motor Vehicle
A. Auto D. Pick-Up Truck G. School Bus K. Pedestrian
B. Truck E. Van H. Motorcycle M. Other (spec. in narrative)

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

81. Direction geographical) — Code: N/A
1.North 2.South 3.East 4.West

82. Position — Code: N/A
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing
4. Trapped

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

83. Equipment — Code: N/A
1.Train(units pulling) 3.Train (standing) 6.Light Loco(s) (moving)
2.Train(units pushing) 4.Car(s) (moving) 7.Light(s) (standing)
5.Car(s) (standing) 8.Other (specify in narrative)

84. Position of Car Unit in Train: N/A

85. Circumstance — Code: N/A
1. Rail Equipment Struck Highway User
2. Rail Equipment Struck by Highway User

86b. Was there a hazardous materials release by — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning	1.Gates	2.Cantilever FLS	3.Standard FLS	4.Wig Wags	5.Hwy. traffic signals	6.Audible	7.Crossbucks	8.Stop signs	9.Watchman	10.Flagged by crew	11.Other (spec. in narr.)	12.None
Code(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					

88. Signaled Crossing Warning (See instructions for codes) Code	89. Whistle Ban Code 1. Yes 2. No 3. Unknown
N/A	N/A

90. Location of Warning Code 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	91. Crossing Warning Interconnected with Highway Signals Code 1. Yes 2. No 3. Unknown	92. Crossing Illuminated by Street Lights or Special Lights Code 1. Yes 2. No 3. Unknown
N/A	N/A	N/A

93. Driver's Age	94. Driver's Gender Code 1. Male 2. Female	95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train Code 1. Yes 2. No 3. Unknown	96. Driver Code 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)
N/A	N/A	N/A	N/A

97. Driver Passed Standing Highway Vehicle Code 1. Yes 2. No 3. Unknown	98. View of Track Obscured by (primary obstruction) Code 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
N/A	N/A

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	N/A	N/A

99. Driver Was Code 1. Killed 2.Injured 3. Uninjured	100. Was Driver in the Vehicle? Code 1. Yes 2. No
N/A	N/A
102. Highway Vehicle Property Damage (est. dollar damage) N/A	103. Total Number of Highway-Rail Crossing Users (include driver) N/A

104. Locomotive Auxiliary Lights? Code 1. Yes 2. No	105. Locomotive Auxiliary Lights Operational? Code 1. Yes 2. No
N/A	N/A
106. Locomotive Headlight Illuminated? Code 1. Yes 2. No	107. Locomotive Audible Warning Sounded? Code 1. Yes 2. No
N/A	N/A

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

109. SYNOPSIS OF THE ACCIDENT

A Union Pacific Railroad Company (UP) loaded coal train derailed 41cars on December 5, 2006, at 6:30 a.m. (c.s.t). The accident occurred approximately 2 miles west of Hodge, Missouri, at milepost (MP) 233.7, on the UP River Subdivision. The timetable direction of the train was eastbound.

There were no injuries or hazardous material spills as a result of the derailment. Damages reported for the derailment totaled $1,961,975.

At the time of the accident, it was dawn with clear skies, and the temperature was 16 degrees Fahrenheit.

The probable cause of the derailment was determined to be a broken rail (Vertical Split Head).

110. NARRATIVE

Circumstances Prior to the Accident

The train crew of Train Symbol CNAAE-03 consisted of an engineer and conductor. They first went on duty at 11:45 p.m. (c.s.t) December 4, 2006, at Kansas City, Missouri. This was the engineer's away terminal and the conductor's home terminal. Both had received more than the statutory off-duty period prior to reporting for duty.

Their assigned train consisted of two locomotives on the head-end, 135 loaded coal cars, and a remote unit on the rear-end. The train was 7,532 feet long with 18,981 trailing tons. This crew was scheduled to take the train to Jefferson City, Missouri. An air brake test was conducted in North Platte, Nebraska, on November 25, 2006, at 1:10 a.m. (c.s.t.) by mechanical personnel.

There was no work performed en route after departing. The train experienced a delay at Renick, Missouri, MP 256.6, where it was stopped from 3:10 a.m. until 5:50 a.m. The delay was caused by a broken rail at MP 250.9, which was repaired before train traffic. There were no other delays prior to the point of derailment (POD).

As the eastbound train approached the accident area, the locomotive engineer was seated at the controls on the south side of the lead locomotive. The conductor was seated on the north side of the same locomotive. The railroad timetable direction and geographical direction of the train at the point of derailment was eastward. Timetable directions will be used throughout this report.

The track at and leading up to the POD is on a level grade with a 1-degree 47-minute right-hand curve. It is constructed of 136-pound CWR rail on wood ties. There are no switches, turnouts, bridges, or culverts in the immediate area.

The Accident

The train was being operated at 41 mph approaching the derailment area. According to the train crew, they did not observe or feel anything unusual prior to the derailment. The speed at the time of derailment was also 41 mph. Both speeds were recorded by the event recorder of the controlling locomotive. Maximum authorized speed for the track and this train is 50 mph as designated in the current UP Kansas City Area Timetable. After the train experienced an undesired emergency application of the air brake system, the conductor then walked back and found the 31st through 72nd head cars had derailed.

As a result of the derailment, there was 1,950 feet of track structure and roadbed damaged.

Analysis and Conclusion

Analysis

The two crew members of Train Symbol CNAAE-03 were mandatory post-accident toxicologically tested because this accident exceeded the major $1 million accident threshold. The test results obtained from the Federal Railroad Administration (FRA) Alcohol and Drug Control Manager were negative.

The last ultrasonic rail detection test through this area was on October 25, 2006, with the railroad's DC-13 car. Four rail defects were found in the general location of the POD, but were repaired prior to the derailment. The last geometry car survey with the railroad's Car No. EC-4 was on August 18, 2006, with no defects noted in

the immediate area. The track was inspected by hi-rail vehicle on December 3, 2006, with no exceptions taken in the area. Track inspection records revealed that this track was inspected well within the required frequency the month before the accident, with no exceptions noted in the immediate area.

A suspect piece of rail was recovered with rail end batter, consistent with a broken rail derailment from the accident and sent to the UP Technical Research Department and Lab in Omaha, Nebraska, for analysis. The rail was 136-pound standard strength, "A" rail manufactured by Tennessee in March of 1976.

The suspect rail was a vertical split head (VSH) consistent with approximately 92 other defective rails found of this nature in the previous 2 years on this subdivision. No suspicious mechanical equipment was found in the wreck or during clean up activities. There were marks on the tread portion of the wheels of 12 open hopper cars east of the derailment indicating the rail broke under the train.

Conclusion

The railroad was in compliance with their own and all applicable FRA standards. There were no witnesses to the accident. The two pieces of rail found at the POD were consistent with a VSH, with a receiving end batter on one of the two rails. A darkened area of the tread portion of the rails found were also present substantiating this type of break. UP Technical Research Department and Lab results agreed that the VHS was the probable cause of this derailment.

The data reviewed from the event recorder ruled out train handling as a cause. There were no marks found on the rail or ties prior to the pile up. There were also no track components, i.e., bridges, turnouts, grade crossings in the POD area that could have contributed to the cause. Marks discovered on the tread portion of the wheels of 12 open hoppers east of the derailment indicated the rail broke under the train. No marks were found on the flange or tread portion of the wheels on the head locomotives suggesting the crew did not encounter anything prior to the derailment.

Probable Cause and Contributing Factors

The Federal Railroad Administration's investigation of this catastrophic derailment was substantiated by the UP Technical Research Department and Lab results which together concluded that the probable cause was a broken rail (T221 - Vertical split head).