Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-19

Union Pacific (UP)
Broadwater, Nebraska
April 8, 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-2007-19

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 0407NP014
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: Union Pacific RR Co. [UP]	4a. Alphabetic Code: UP	4b. Railroad Accident/Incident No.: 0407NP014
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 04 | Day 08 | Year 2007	7. Time of Accident/Incident: 08:45: ☑ AM ☐ PM

8. Type of Accident/Indicent (single entry in code box)						Code
1. Derailment	4. Side collision	7. Hwy-rail crossing	10. Explosion-detonation	13. Other (describe in narrative)		01
2. Head on collision	5. Raking collision	8. RR grade crossing	11. Fire/violent rupture			
3. Rear end collision	6. Broken Train collision	9. Obstruction	12. Other impacts			

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

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	Code	17. County
Broadwater	105.2	N/A	NE	MORRILL

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
24 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 No 2		5	226		3

OPERATING TRAIN #1

26. Type of Equipment Consist (single entry)				A. Spec. MoW Equip.	Code	27. Was Equipment Attended? 1. Yes 2. No	Code	28. Train Number/Symbol
1. Freight train	4. Work train	7. Yard/switching						
2. Passenger train	5. Single car	8. Light loco(s).						
3. Commuter train	6. Cut of cars	9. Maint./inspect.car			1		1	CNAAE07

29. Speed (recorded speed, if available) R - Recorded E - Estimated			Code
	40	MPH	R

30. Trailing Tons (gross tonnage, excluding power units): 19028

31. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions	
b. Auto train control	h. Current of traffic	n. Other than main track	
c. Auto train stop	i. Time table/train orders	o. Positive train control	
d. Cab	j.Track warrant control	p. Other (Specify in narrative)	
e. Traffic	k. Direct traffic control	Code(s)	
f. Interlocking	l.Yard limits	e N/A N/A 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)	CMO288306	85	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
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	2	0	0	0	1
(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	134	0	0	0	0
(2) Total Derailed	29	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
1691635	75608	T201	N/A

Number of Crew Members

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

Length of Time on Duty

45. Engineer/Operator	46. Conductor
Hrs 4 Mi 0	Hrs 4 Mi 0

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

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

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)				A. Spec. MoW Equip.	Code	54. Was Equipment Attended? 1. Yes 2. No	Code	55. Train Number/Symbol
1. Freight train	4. Work train	7. Yard/switching						
2. Passenger train	5. Single car	8. Light loco(s).						
3. Commuter train	6. Cut of cars	9. Maint./inspect.car			N/A		N/A	N/A

56. Speed (recorded speed, if available) R - Recorded E - Estimated			Code
	0	MPH	N/A

58. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions
b. Auto train control	h. Current of traffic	n. Other than main track

58a. Remotely Controlled Locomotive?
0 = Not a remotely controlled
1 = Remote control portable

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-19

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

c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; o. Positive train control; p. Other (Specify in narrative)

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

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

59. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	0	0	N/A
(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
N/A	N/A

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

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

64. Equipment Damage This Consist: 0

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

66. Primary Cause Code: N/A

67. Contributing Cause Code: N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
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: N/A

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

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

OPERATING TRAIN #3

80. Type of Equipment Consist (single entry): 1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s); 9. Maint./inspect.car; A. Spec. MoW Equip. Code: N/A

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

82. Train Number/Symbol: N/A

83. Speed (recorded speed, if available) Code
R - Recorded
E - Estimated N/A MPH: 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
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-19

110. Position	Code	113. Circumstance	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A	1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	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	N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	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
Code(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					

116. Signaled Crossing (See instructions for codes)	Code	117. Whistle 1. Yes 2. No 3. Unknown	Code
	N/A		N/A

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

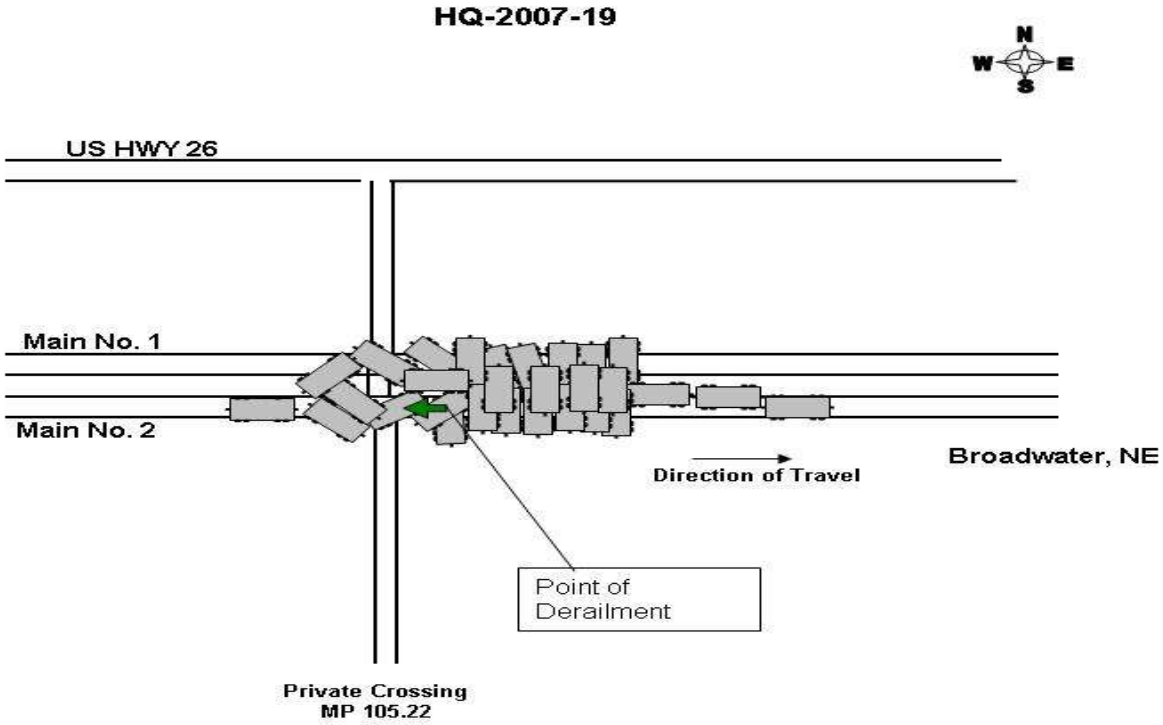
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)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

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

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code	128. Was Driver in the Vehicle? 1. Yes 2. No	Code
				N/A		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	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code
	N/A		N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code
	N/A		N/A

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



Point of derailment is on south rail, east end of road crossing of Main Track No. 2.

137. SYNOPSIS OF THE ACCIDENT

An eastbound Union Pacific Railroad Company (UP) loaded coal train, Train Symbol CNAAE 07, derailed on Sunday, April 8, 2007, at 8:45 a.m., m.d.t. The derailment occurred 4.6 miles west of the town of Broadwater, Nebraska, at UP Milepost (MP) 105.2, on Main Track No. 2 of the North Platte Service Unit, South Morrill Subdivision, in Morrill County. The crew reported an undesired emergency brake application while traveling at a recorded speed of 40 miles per hour. The crew inspected their train and found 29 cars, the 85th through the 113th cars of the train consist, derailed. No injuries were reported. No hazardous materials were involved.

Damage estimates to equipment total $1,691,634. Damage estimates to track total $65,608. Damage estimates to signal equipment total $10,000.

At the time of the derailment, the conditions were daylight and cloudy with a temperature of 24 degrees Fahrenheit and wind SSE at 16 mph.

The cause of the derailment was determined to be a bolt hole fatigue crack which allowed the rail to open and caused the train to derail.

138. NARRATIVE

Circumstances prior to the accident:

The crew of UP Train Symbol CNAAE 07 consisted of an engineer and a conductor. The crew went on duty at 4:45 a.m., m.d.t. on April 8, 2007, at South Morrill, Nebraska, which was the crews away-from-home terminal. Both crew members received the required off-duty time prior to reporting for duty.

Their assigned train consisted of three locomotives, two at the head-end and one at the rear, and 134 loaded cars of coal. The train was 7,458 feet in length with 19,028 gross trailing tons, excluding power units. The initial terminal air brake test and inspection had been performed on this train at North Platte on April 6, 2007, as empty coal Train Symbol CAENA 05. Loaded coal Train Symbol CNAAE 07 departed South Morrill at 5:38 a.m., on April 8, 2007, en route to North Platte. The maximum authorized speed for this train is 50 mph as outlined in the North Platte Area Timetable No. 2, effective October 27, 2002. No pick-ups or set-outs were scheduled for this train while en route.

As the eastbound train approached the location where the derailment occurred, the engineer was seated at the controls on the south side of the leading locomotive. The conductor was seated on the north side of the lead locomotive. The timetable and geographic direction for the train is east.

Main Track No.2 is 133-pound rail attached to concrete ties and was constructed in 1996. The track at the accident site is tangent and level for approximately 1 mile to the west. Prior to that, the track is tangent and descending to the east at a varying rate of 0.24 and 0.14 percent for approximately 2 miles.

The Accident:

UP Train Symbol CNAAE 07 was traveling eastward on Main Track No. 2 with its speed decreasing from 47 mph as they approached the accident area, as recorded by Locomotive No. UP 6999 which was the second locomotive in the consist. Speed at the time the derailment occurred was 40 mph. The maximum authorized speed for this unit coal train was 50 mph, as designated in the current UP Timetable No. 2. The event recorder of the lead locomotive was determined to be defective after the derailment occurred. The engineer had taken the locomotives out of dynamic braking approximately 5 seconds after the head-end of the train passed over the private crossing at MP 105.22. Approximately 48 seconds later, the crew experienced an undesired emergency application of the air brakes; the conductor notified the dispatcher. Upon inspecting the train, the crew discovered 29 cars of their train were derailed at MP 105.22, lines 85 through 113 of the train consist, blocking both Main Track No. 1 and Main Track No. 2.

Analysis and Conclusions:

Analysis

UP track inspection records indicate that Main Track No. 2 at MP 105.2 received 27 inspections by a qualified track inspector in the previous 31 days, prior to the derailment. No track defects were noted at this location.

On March 22, 2007, 18 days prior to the accident, Detector Car No. 35 made an inspection of this portion of the South Morrill Subdivision, Main Track No. 2, with no defects noted at or near the private crossing at MP 105.22.

A broken rail at a joint was found at the point of derailment (POD); the rail sections and joint bars were sent to the Rail Sciences, Inc. Lab for analysis. The analysis report states that the overall condition of the joint indicates movement had been present in the joint for some time. The fatigue crack which originated from the bolt hole is the cause of the derailment. The location of the joint at the road crossing is consistent with variable track modulus that allows pumping joints to occur. .

Both crew members received the required FRA Post-Accident Toxicological Testing. The results were negative for both the engineer and conductor.

Conclusion

The railroad was found to be in compliance with their own and all applicable Federal regulations. The railroad and the FRA agree that the cause of this derailment was a bolt hole fatigue crack that resulted in a broken rail. A broken rail allowed the rail to "open" and caused the train to derail. This defect was likely not detectable during recent internal rail testing or normal track inspections.

Probable Cause and Contributing Factors:

The probable cause of this derailment as determined by an FRA investigation is T201 Broken Rail - Bolt hole crack or break.