

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2005-39

> Union Pacific (UP) Gait, Illinois May 3, 2005

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 | F TRA DAD A | ANSPORT DMINIST | TATIO TRATI | ON ON | FRAFA | ACTUA | L RA | ILR | OAD A | ACC | CIDENT I | REPC | ORT | | FRA Fi | le # | HQ-200 |)5-39 | 2 |
|--|------------------------------|-----------------------|------------------|--|-------------------------------|-----------------------|-----------------------------------|-----------------------------------|---|--------------|-----------------------|------------------------------------|---------------|--|--------------|------------------------|-----------|-------|---------|
| 1.Name of Railroad Op | 1a. Alphabetic Code | | | | | 1b. | b. Railroad Accident/Incident No. | | | | | | | | | | | | |
| 2.Name of Railroad Op | 2a. Alphabetic Code 2 | | | | | 2b. F | 26. Railroad Accident/Incident | | | | | | | | | | | | |
| N/A 3 Name of Pailroad Per | N/A | | | | | 36 | Pailroad / | N/A | t/Inci/ | lent No | | | | | | | | | |
| N/A | | | | | | 50. | Kani Oau 7 | N/A | / men | ient ivo. | | | | | | | | | |
| 4. U.S. DOT_AAR Gra | 5. Date of Accident/Incident | | | | | | 6. Time of Accident/Incident | | | | | | | | | | | | |
| | Month Day Year | | | | | | | | | | | | | | | | | | |
| 7 Tune of Assident/Inc | diaant | 1 Dancil | | | | | | | 05 03 2005 | | | | 5 | 05:37:00 AM V P | | | | | PM |
| (single entry in code | (hox) | 2. Head of | ment on colli | 4. Side collision sion 5 Raking collision | | | | 7.1 | 7. Hwy-rail crossing 10. Explosic 8. RR grade crossing 11. Fire/viol | | | | | n-detonation 13. Other ent rupture (describe in | | | | | |
| (onigie only in code | | 3. Rear e | nd coll | sion 6. Broken Train collision | | | | 9. (| 9. Obstruction 12. Other | | | | | narrative) | | | | | 01 |
| 8. Cars Carrying | s | 10. Cars Releasin | | | | g 11. People | | | | | | 12. Division | | | - | 01 | | | |
| HAZMAT 0 | Damaged/Derailed | | | | ed 0 HAZMAT | | | | 0 |] | Evacuated | | | 0 | 12. 51 | CHICAG | | 0 | |
| 13 Nearest City/Town | | | | | 14. Milepost | | | | | 15. | 5. State | | | 16. County | | | | | |
| | | GAI | LT | (to nearest t | | | | enth) | 13.5 | | Abbr Code N/A IL | | | | WH | WHITESIDE | | | |
| 17. Temperature (F) | | 18. Visit | oility | (sing | le entry) | 19. W | Weather (single er | | | entry) Code | | | 20. Tvr | e of Tra | of Track | | | Code | |
| (specify if minus) | (specify if minus) 1. Dawn | | | 3.Dusk | | | 1. Clear 3 | | | Rain 5.Sleet | | | 1 | | 1. Main 3. S | | | | |
| 55 F 2. Day | | | 4.D | ark | | 2 | 2. Clou | oudy 4. Fog | | 6.Snow | | 1 | 2. Yard 4. In | | | ndustry 1 | | | |
| 21. Track Name/Number | | | | | 22. FRA Clas | Δ Track 38 (1-9, Σ | (X) | Code | e 23. Annual Tra (gross ton | | | ck Density s in | | 24. Time Table D | | Direction (3. East | | Code | |
| | R I MA ACK | AIN | N 5 1 | | | | | | | 113 | 1. Hornin 5. Edist | | | | 3 | | | | |
| | | | | | | | OPER | ATI | NG TRA | AIN | #1 | | | | | | | | |
| 25. Type of Equipment 1. Freight train 4. Work train 7. Yard/switching A. Spec. MoW Equip. Code 26. Was Equipment Code 27. Train Number/S | | | | | | | | | | | | | /Symbol | | | | | | |
| Consist (single entry) 2. Passenger train 5. Single car 8. Light loco(s). | | | | | | | | | Atten | | | | | $\frac{207}{100}$ | | | | | |
| 3. Commuter train 6. Cut of cars 9. Maint,/inspect.car 1 1. Yes 2. No 1 QNPSK | | | | | | | | | | | | | ive? | | | | | | |
| $\begin{bmatrix} 20. \text{ Speced} (recorded speed, if available) & Code & 30. \text{ Method(s) of Operation} & (enter code(s) that apply) & 30a. \text{ Kemotely Controlled L} \\ \hline R - \text{Recorded} & a. \text{ATCS} & g. \text{ Automatic block} & m. \text{Special instructions} & 0 = Not 32 - South v AoWestl. \\ \hline \end{pmatrix}$ | | | | | | | | | | | | Monled | , inot | | | | | | |
| E - Estimated 44 MPH R b. Auto train control h. Current of traffic n. Othe | | | | | | | | | | | Other than m | ther than main track 1 = Remote co | | | | | ortable | | |
| 29. Trailing Tons (m | ross tor | nnage | | - c. | Auto trair | ıstop i | . Time ta Track w | able/tra | ain orders | so.l | Positive train | n contro | 1 | 2 = Rem | ote cont | trol to | wer | | |
| excluding power units) e. Traffic | | | | | | | k. Direct traffic control | | | | Code | arrative) | transm | itter - m | ore th | an one | | | |
| 12149 f. Interlocking 1.Y | | | | | | | | nits | control | a | N/A N | | | N/A remote control transmitter 0 | | | | | |
| 31. Principal Car/Unit | | a. Initial | and Nu | ımber | b. Positio | on in Traiı | n c. l | Loade | d(ves/no) | 32 | 2. If railroad | employ | vee(s) test | ed for drue | v/alcoho | ol use | | - | |
| (1) First involved | | | | | 35 | | | | (900,110) | enter the | number | that were | e positive i | in | | Alcohol | | Drugs | |
| (derailed, struck, etc | :) | | N/A | | | | | у | yes the appro | | | priate t | ox. | | | | N/A | | N/A |
| (2) Causing (if mech cause reported) | 0 | | | | N | N/A 33. Was this cons | | | | transport | ing passer | ngers? (| Y/N) | | | N/A | | | |
| 34. Locomotive Units a. Head | | | Mid Train | | Re | ar End | | 35. Cai | rs | | | Lo | ade | Er | | mpty | | | |
| (1) Tetelin Terin | _ | End | b. Ma | nual | c. Remote | d. Manua | l c. Rei | mote | (1) T-4- | 11. 1 | | | a. Freight | b. Pass. | c. Fre | ight | d. Pass. | e. (| Caboose |
| | _ | 0 | | 0 0 | | 0 | 0 | , | | | | | 0 | 0 | 0 | | 0 | | 0 |
| (2) Total Derailed | | 0 | <u> </u> | 0 | 0 | 0 | 0 |) | (2) Tota | l Der | ailed | | 0 | 0 | (|) | 0 | | 0 |
| This Consist 0 | | | | 37. Tra | ck, Signal, V | | 38. Primary Cause Code N1/A | | | | | Code N/A | | | | | | | |
| This Consist | | Numbe | r of Cr | | mbers | mage | | | I enoth of Time on Duty | | | | | | | | 1 | | |
| 40. Engineer/ 41. Firemen | | | | | 42. Conductors 43. Brakemen | | | | 44 Engineer/Operator | | | | | 45. Conductor | | | | | |
| Operators N/A N/A | | | N/A N/A | | | N/A | Hrs 0 Mi | | | | | 0 | | Н | lrs | 0 | Mi | 0 | |
| Casualties to: 4 | 6. Railr | Railroad Employees 47 | | | n Passenger | s 48.0 | 48. Other | | 49. EOT Device? | | | | | 50. Was EOT Device Properly Arme | | | ned? | | |
| Fatal | | 0 | | | 0 0 | | | 1. Yes 2. 1 | | | 2. No | 2. No N/A | | | 1. Yes 2. No | | | | N/A |
| Nonfatal | | | | | 0 | | | [| 51. Caboose Occupied by | | | y Crew' | ? | | | | | | |
| N/A U 0 1. Yes 2. No N/A | | | | | | | | | | | | N/A | | | | | | | |
| | 1 | Eraishtt | in | 4 101 | rle train 7 | Vord/ | PERA | TING | TRAI | n #2 | | | | | | | | | |
| 52. Type of Equipment 1. Freight uant 4. work uant 7. Tatu/switching A. Spec. MoW Equip. Code 53. Was Equipment Code 54. Train Number/Symb | | | | | | | | | | | | Symbol | | | | | | | |
| Consist (single entr | y) 2. 3. | Commuter | r train | 6. Cut | of cars 9. | Maint./in | spect.ca | r | | | N/A | | 1. Yes | 2. No 1 | N/A | | N/2 | A | |
| 55. Speed (recorded sp | beed, if | available) | Code | 57. | Method(s) | of Operati | on (| (enter | code(s) |) that | t apply) | | | 57a. Ren | notely C | ontro | lled Loco | omot | ive? |
| R - Recorded a. ATCS g. Auto | | | | | | | | atic block m.Special instructions | | | | | | 0 = Not a remotely controlled | | | | | |
| E - Estimated 0 |) | MPH | N/A | b. | Auto train | control h | . Curren | nt of tra | affic | n. (| Siner than m | ain trac | к | 1 = Rem | note con | trol p | ortable | | |

| DEPARTMENT FEDERAL RAIL | OF TRA ROAD AI | NSPOR DMINIS | ΓΑΤΙ ΓRAT | ON ION | FRA FA | ACTUA | L RAILR | OAD AC | CCIE | DENT I | REPO | ORT | F | RA File # | <u>HQ-200</u> | <u>5-39</u> | |
|--|---|---------------------------|---|---|---|------------------------|--|--|---|--|------------------|----------------------------|--|------------------|---------------|-------------|--|
| 56. Trailing Tons (gross tonnage, excluding power units) | | | | | . Auto train . Cab . Traffic | n stop i. j.] k. | Time table/train orde Frack warrant control Direct traffic control | |). Positive train control). Other (Specify in narrative) Code(s) | | | | 2 = Remo 3 = Remo transmit remote c | N/A | | | |
| 50 Driverine I Confliction | | | | | Interlocking | g l. | Yard limits | | N/A | N/A | N/A | N/A N/A | | IV/A | | | |
| 58. Principal Car/Unit a. Initial and Nu | | | | | b. Posit | on in Trair | i c. Loac | ed(yes/no) | 59.1 | 59. If railroad employee(s) tested for drug/alcohol use, | | | | | | Drugs | |
| (derailed, struck, etc) 0 | | | | | | 0 | | N/A | | the appro | opriate | box. | 1 | N/A | | | |
| (2) Causing (if mechanical cause reported) 0 | | | | | | 0 | - | N/A | 60. Was this consist transporting passengers? (Y/N) | | | | | |) | N/A | |
| 61. Locomotive Unit | s | a. Head End | b. M | Mid anual _I | Mid Train nual c. Remote | | ar End | 62. Cars | | | Lo a. Freight | ade b. Pass. | Err c. Freight | pty d. Pass. | e. Caboose | | |
| (1) Total in Trai | (1) Total in Train 0 (| | 0 0 | | 0 | 0 (1) Tota | | in Equipment Consist | | | 0 | 0 | 0 | 0 | 0 | | |
| (2) Total Derail | Fotal Derailed 0 | | 0 0 | | 0 | 0 | (2) Total Derailed | | | | 0 | 0 | 0 | 0 | 0 | | |
| 63. Equipment Damage 6 This Consist 0 | | | | | ack, Signal, Structure Da | Way, amage | 0 | 65. Primar Code | i5. Primary Cause 66. Contributing Cause Code | | | | use | N/A | | | |
| - | | Numbe | er of Ċ | rew Me | embers | | | | | | | Length of | Time on D | uty | | | |
| 67. Engineer/ Operators 0 | 68. Fire | remen 69 0 | | | onductors 0 | 70. Bra | akemen 0 | 71. Engineer/Operator72. ConductorHrs0Hrs | | | | | | 0 | Mi 0 | | |
| Casualties to: | 73. Railr | oad Empl | oyees | 74. Tra | in Passenge | rs 75. Oth | ier | 76. EOT Device? | | | | | 77. Was | Armed? | | | |
| Fatal | | 0 | | | 0 | | 0 | | 1. Yes 2. No N/A 1. Yes 2. No 78. Others Operatid to C 2 2 2 2 | | | | | | | | |
| Nonfatal | | 0 | | | 0 | | 0 | 78. Cabot | 1. Yes 2. No | | | | | | | | |
| | olved | | | | Rail Equipment Involved | | | | | | | | | | | | |
| 79. Type C. Truck- A. Auto D. Pick-U | icle | Code | Code 83. Equipment 6.Light Loco(s) (moving) 1.Train(units pulling) 4.Car(s) (moving) 7.Light(s) (standing) | | | | | | | | | | | | | | |
| B. Truck E. Van | er (spec. in | narrative) | N/A 2.Train(units pushing) 5.Car(s)(standing) 8.Other (specify in narrative) Code 84. Position of Car Unit in Train | | | | | | | | | N/A | | | | | |
| (est. MPH at in | 4.West | N/A | 01.105100 | N/A | | | | | | | | | | | | | |
| 82. Position | | | Code | 85. Circumstance | | | | | | | | | | | | | |
| 1.Stalled on Cro 4 Trapped | Crossing | N/A | 1. Rail Ec 2. Rail Ec | quipm quipm | ent Struc | k High k by H | way User ighway Use | er | | | N/A | | | | | | |
| 86a. Was the highw | | Code | 86b. Was t | 86b. Was there a hazardous materials release by | | | | | | | | | | | | | |
| 1. Highway User | 2. Rail I | g nazardo Equipmen | us mat t 3. | Both | 4. Neither | | N/A | 1. High | way U | Jser 2. | Rail E | quipment | 3. Both | 4. Neithe | r | N/A | |
| 86c. State here the na | 1. Inginway User 2. Kaii Equipment 5. Boin 4. Neimer 1. Inginway User 1. I | | | | | | | | | | | | | | | | |
| 87. Type of 1.Ga Crossing 2.Ca | 7.Cross als 8.Stop | bucks 10 signs 11 | .Flagged by .Other (spec | crew | 88. S | ignaled C | Crossin | g Warning | Code | 89. Whis | tle Ban s | Code | | | | | |
| Warning 3.Standard FLS 6.Audible | | | | | 9.Wate | hman 12 | None | , | | ee mou u | | | 2. No | | | 1 | |
| Code(s) N/ | A | N/A | N// | A | N/A | N/A | N/A | N/A | | | | | | 5. 01 | KIIOWII | N/A | |
| 90. Location of Warr 1. Both Sides | 91. Crossi with | ng Warning Highway Sig | y Warning Interconnected Code 92. Crossing Illuminated by Street ighway Signals Lights or Special Lights | | | | | | | Code | | | | | | | |
| 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach N/A | | | | | | | . Yes . No | | N/A | | | | 1. Yes 2. No 3. Unknown | | | | |
| 93. Driver's 94. Driver's Gender Code 9 | | | | 95. Dr | iver Drove | 3. Behind or in | ain Code 96. Driver | | | | | | | Code | | | |
| Age 1. Male 0 2. Female N/A | | | | | and Struck or was Struck by Second T1. Yes2. No3. Unknown | | | | 'rain 1. Drove around or thru the Gate 4. Stopped on Crossing 2. Stopped and then Proceeded 5. Other (specify in narrative) | | | | | | | | |
| 97. Driver Passed Standing Code 98. View of Track Obscure | | | | | | cured by | (primary ob | struction) | • | J. Diu li | or 2101 | , | | | | Code | |
| Highway Vehicle 1. Yes 2. No 3 U | e nknown | N/A | | 1. Perr 2. Star | nanent Stru ding Railro | cture ad Equipm | 3. Passi ent 4. Topo | ng Train ⁶ 5. graphy 6 | Veget Highv | ation vav Vehi | 7. cle 8 | . Other (s . Not obstru | pecify in n | arrative) | | N/A | |
| 101. Casulties to Highway-Rail Crossing Users Killed Ir | | | | | Injured | 99. Driver | Was | | | Code | e | 100. Was E | Driver in th | e Vehicle? | | Code | |
| Crossing Users | | | | | | 1. Killed 102. High | 2.Injured 3. way Vehicle | Jninjured N/A 1. Yes 2. No Property Damage 103. Total Number of Highway-Rail Cross | | | | | | N/A ing Users | | | |
| 104 L | rilia T | htal | 0 | | U | (est. c | lollar damag | (e) | - | 0 | | (incluc | le driver) | | 0 | ~ · | |
| 104. Locomotive Au 1. Yes | xiliary Lig | nts? 2. No | D | | | I | Code N/A | 105. Locoi | motive Vec | e Auxilia | ry Ligł | ts Operatio | nal? | | | Code | |
| 106. Locomotive Hea | | Code | Code 107. Locomotive Audible Warning Sounded? | | | | | | | Code | | | | | | | |
| 1. Yes 2. No | | | | | | | N/A | 1. | 1. Yes 2. No | | | | | | | N/A | |

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

109. SYNOPSIS OF THE ACCIDENT

On May 3, 2005, at 5:37 p.m. CDT, a Union Pacific (UP) eastbound mixed freight train, Symbol QNPSKP-02, derailed 31 cars near Galt, Illinois (IL). As the train traversed a bridge at milepost 113.5, it experienced an emergency application of the air brakes, and came to an abrupt stop. There were no placarded cars in the train consist, and no evacuation was ordered. The entire train was operating on tangent track when the derailment occurred.

There were no reportable injuries to the crew members. Track damage was estimated at \$1,848,000. Equipment damage was estimated at \$955,487.

The weather was clear and dry, with an ambient temperature of 55 °F.

The probable cause of the derailment was a broken rail.

110. NARRATIVE

Circumstances Prior to the Accident

A train crew, consisting of an engineer and conductor reported for duty at 3:10 p.m. on May 3, 2005, at Clinton, Iowa (IA). They were assigned to operate Freight Train Symbol QNPSKP-02, with 106 loads and 10 empties, to Chicago, IL, with no scheduled stops en route. The train was 7,632 feet long with 12,149 trailing tons. The engineer was seated at the controls on the right side of the locomotive cab, and the conductor was seated on the left side. Both crew members received more than the statutory off-duty period prior to their tour of duty.

The train departed Clinton Yard at 3:50 p.m., and did not require an air brake test prior to departure. It was operating eastward on a clear cab signal indication on the Geneva Subdivision No. 1 Main Track. The maximum authorized speed, as indicated by UP Timetable No. 3 effective 0001 Sunday, December 12, 2004, was 70 mph for freight trains. Train QNPSKP-02 was restricted to 50 mph by timetable special instruction.

Approaching the accident site, the track was tangent for several miles with a 0.06 percent descending grade. The track was constructed of 136 pound continuous welded rail (CWR) manufactured in 1983. The bridge was a 142 foot open deck through truss steel structure with concrete piers and abutments.

The Accident

As the train traversed the Elkhorn River Bridge at milepost 113.5, it reached a recorded speed of 44 mph. The crew suddenly felt a severe slack action, followed by a train induced application of the emergency air brakes from the rear of the train. When the train came to a stop, the conductor walked back to check the source of the problem and discovered that thirty-one cars had derailed. Upon further investigation the conductor radioed this information to the engineer who then called the train dispatcher via the emergency channel.

Analysis and Conclusions

The last carrier track inspection before the accident was conducted on May 1, 2005, by the regular assigned track inspector. During that inspection, he hi-railed the Geneva Subdivision westward from milepost 95 to 138.9 on No. 2 Main Track, and recorded a total of 25 defects. He inspected the No. 1 Main Track from the adjacent track. The inspector recorded and repaired a joint bolt defect on the No. 1 Main Track at milepost 113.7. No other defects were recorded in the area of the derailment. The track inspector stated that the condition of the rail in the area of the Elkhorn River Bridge appeared satisfactory. He indicated that the bridge approaches had been surfaced with a tamper during the last week of April 2005.

The UP DC17 Rail Detector conducted a survey through the derailment area on March 14, 2005. According to the exception report, a total of eight defects were found that day. One rail defect, a 12 inch crushed head, was identified east of the bridge at milepost 113.52. The defective rail was repaired the same day by cutting in a plug (new section of rail).

A joint inspection was conducted by FRA Track and Motive Power & Equipment inspectors. The inspectors examined the wheels of the last 12 cars ahead of the first derailed car and the track approaching the derailment site. The three cars nearest to the first derailed car had identical marks on the wheel tread and flanges indicating they may have passed over a defective rail. There was no damage to the rail leading into the derailment area.

During the field investigation and site clean-up, several pieces of rail and car components were collected and sent to Rail Sciences, Inc. in Omaha, Nebraska (NE), for analysis. A fractured brake beam was located four miles west of the derailment. However, laboratory tests confirmed that it did not match any of the derailed

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cars or contribute to the cause. According to the lab report, a section of rail enclosed by joint bars, had severe receiving batter and a three inch piece missing. Examination of the rail revealed only overload fracture. A detail fracture with significant head checking in the rail was also examined. Neither of the specimens were suspected as being the cause of the derailment. Due to the extent of track damage, it is believed that all of the rail segments were not found. There were seven rail joints located in the area of the derailment.

The conclusion of the lab report indicated a broken rail as the probable cause of the derailment. This conclusion was based on the severity of the receiving batter, which was considered to have occurred before the wheel damage. The rail damage was more severe, indicating that numerous wheels passed over the damaged rail just prior to the derailment.

A review of the DC17 rail test records from February 28 to April 8, 2005, revealed a total of 100 rail defects recorded on the Geneva Subdivision between milepost 46 and 139. This represents one test over the subdivision, which is currently on a 45 day testing cycle due to the rail condition and tonnage. The high number of defects supports the probability that a broken rail caused the derailment.

Probable Cause and Contributing Factors

The probable cause of the derailment was a broken rail.