Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2013-02

Union Pacific Railroad Company (UP)
Fairbury, NE
February 3, 2013

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, 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.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2013-2

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0213NP003

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0213NP003
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	2/3/2013	12:41 AM

5. Type of Accident/Incident
Derailment

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
				Council Bluffs

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Fairbury	184.5	NE	JEFFERSON

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
34 °F	Dark	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Main Track No 2	Freight Trains-80, Passenger Trains-90	224	East

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	CATNT-02

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross exluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
50 MPH	R	20164		0

6. Type of Territory

Signalization:

N/A

Method of Operation/Authority for Movement:

N/A

Supplemental/Adjunct Codes:

A, Q, N/A

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. 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.)*	CAEG99351	30	yes		0	0
(2) Causing *(if mechanical, cause reported)*	0	0		9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	1	(1) Total in Equipment Consist	142	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	39	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
2339245	278337

14. Primary Cause Code

T001 - Roadbed settled or soft

15. Contributing Cause Code

Number of Crew Members				Length of Time on Duty	
16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen	20. Engineer/Operator	21. Conductor
1	0	1	0	Hrs: 6 Mins: 6	Hrs: 6 Mins: 6

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	27. Caboose Occupied by Crew?	
Nonfatal	0	0	0		N/A

28. Latitude	29. Longitude

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CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type		5. Equipment
2. Vehicle Speed *(est. mph at impact)*	3. Direction *(geographical)*	6. Position of Car Unit in Train
4. Position of Involved Highway User		7. Circumstance
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? N/A		8b. Was there a hazardous materials release by N/A

8c. State here the name and quantity of the hazardous material released, if any.

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

12. Location of Warning	13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights
N/A	N/A	N/A

15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User

19. Driver Passed Standing Highway Vehicle	20. View of Track Obscured by *(primary obstruction)*

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
23. Highway-Rail Crossing Users			24. Highway Vehicle Property Damage *(est. dollar damage)*	25. Total Number of Vehicle Occupants *(including driver)*

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?
N/A	N/A
28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?
N/A	N/A

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SYNOPSIS

An eastbound Union Pacific Railroad Company (UP) loaded coal train derailed on February 3, 2013, at 12:41 a.m., CST. The derailment occurred at Fairbury, Nebraska, milepost (MP) 184.50, on Main Track No. 2, of the Council Bluffs Division, Marysville Subdivision.

Train Symbol CATNT-02 consisted of 3 locomotives and 142 loaded coal cars. They were traveling at a recorded speed of 50 mph when the crew experienced an undesirable emergency brake application. A total of 39 loaded coal cars derailed. The derailed cars were the 30th through the 68th cars from the head-end of the train. The train crew reported having an uneventful trip to that point.

No injuries or hazardous materials were involved. The equipment damage cost was $2,339,245 and the track and signal damages were $278,337. The total monetary damages were $2,617,582.

At the time of the derailment, the conditions were dark and clear with a temperature of 34 °F.

The Federal Railroad Administration's (FRA) investigation determined the probable cause of the accident was Cause Code T001 - Roadbed settled or soft, which caused a catastrophic track failure as the loaded coal train passed. No contributing factor was identified.

NARRATIVE

Circumstances Prior to the Accident

The operating crew of eastbound loaded coal Train Symbol CATNT-02 consisted of a locomotive engineer and a conductor. They first went on duty at 6:35 p.m., CST, on February 2, 2013, at North Platte, NE; their home terminal. The crew received more than the statutory off-duty period prior to reporting for duty.

Their assigned train consisted of 2 lead locomotives and 142 loaded coal cars with one distributive power unit (DPU) on the rear of the train. A Class I 1,000-mile air brake test was performed at North Platte, with no exceptions. The crew and consist departed North Platte heading eastward to Marysville, Kansas. They made no switching stops prior to the derailment site. The last signal they encountered was a green wayside signal aspect.

Timetable direction for this train was east. Geographical direction of travel was southeast. Timetable direction will be used throughout this report.

As the eastbound coal train approached the accident area, the engineer was seated at the controls in the engineer's seat on the south side of the lead locomotive and the conductor was seated in the conductor's seat on the north side of the lead locomotive.

The area approaching the accident site features tangent track. The grade in this area changes from .25% ascending to 0.08% descending grade.

The Accident

Train Symbol CATNT-02 was traveling eastbound on Main Track No. 2 at a recorded speed of 50 mph, as indicated by the locomotive event recorder on Locomotive No. UP 7126. The governing timetable is Timetable No. 4 of the Council Bluffs Division, Marysville Subdivision; effective February 14, 2011.

The maximum authorized speed in the area of the derailment is 50 mph. The train had a recorded speed of 50 mph.

The train was operating on a green signal thru Fairbury, heading toward Marysville. The engineer stated that he saw nothing; however, he felt a moderate, but noticeable profile bump at the point of derailment (POD), MP 184.5 and soon after that, they went into an undesirable emergency application of the train's air brake system. The train came to a stop near milepost (MP) 184.35. They saw a cloud of dust blow past; they called out emergency on the radio, and then called the dispatcher, who then said he had a signal indication on Main Track No. 1, indicating it was fouled. It was found that 39 cars had derailed, and both main tracks were blocked and damaged.

The cost of the damaged cars was $2,339,245 and track and structure damages were $278,337. The total monetary damages were $2,617,582.

Analysis and Conclusions

Analysis - Railroad Toxicological Test: The train crew was toxicologically tested under FRA's post-accident toxicological testing at the Fairbury Hospital.

Conclusion: FRA post-accident forensic toxicology result reports indicate that the two employees tested had negative test results. Intoxication was not a factor.

Analysis - Fatigue: FRA also obtained fatigue-related information for the 10-day period preceding this accident/incident, including the 10-day work history (on-duty/off-duty cycles) for all of the employees involved.

Conclusions: Upon analysis of that information, the FRA concluded fatigue was not probable for any of the employees.

Analysis - Train Handling: The event recorder data indicated proper train handling and compliance with the operating rules. The Track Bulletin Form "A" No. 43756 dated February 2, 2013, indicates no slow order was in effect at the location, allowing them to operate at maximum authorized speed as indicated by the timetable in effect.

Conclusion: The train was operated in compliance with all train handling rules and procedures. Train handling was not an issue.

Analysis - Mechanical: A Class I air brake test report for this train consist was performed February 2, under the Train Symbol CATNT- 02. The train crew made no prior switch stops before the derailment. No mechanical issues were discovered.

Conclusion: No evidence recovered indicated that mechanical failure was a factor.

Analysis - Weather: The weather at the time of the derailment was clear and dark with a temperature of 34 °F. In the days prior to the derailment, the temperature ranged between 25 and 51 °F. Approximately 0.08 inches of precipitation fell in the week prior to the derailment.

Conclusion: Although little precipitation fell, warming and cooling temperatures may have contributed expansion and contraction forces in the fouled ballast.

Analysis - Track Image Recorder: The Track Image Recorder (TIR) of westbound (opposite direction) Train Symbol CATSY 07, with lead Locomotive UP 5758, traveling on Main Track No. 1, took a timestamp, snapshot video at 12:13:31 to 12:14:57, February 3, 2013, at approximately 25 minutes prior to the derailment on Main Track No. 2, at the area of the accident.

Conclusion: The snapshot recorded by the TIR showed Main Track No. 2, had a span of seven concrete ties with discolored ballast, which indicates that the ballast was fouled. Fouled ballast implies that the subgrade could be soft. UP and FRA investigators confirmed that the fouled ballast in the image is at the same location as the point of derailment (POD).

Analysis - Track Maintenance: The rail is 133-pound premium strength rail, installed in 2000. The test interval for this subdivision and track is 33 days; it had only been 2 days since the last test.

The last inspection of the derailment area was made by a qualified UP track inspector on February 2, one day prior to the derailment. UP Rail Defect Detector Car No. DC169 inspected the area on February 1, two days prior to the derailment. An FRA track inspection of the derailment area was performed January 30, 2013, three days prior to the derailment, from MP 172.20 to 209.20. UP geometry car EC11 inspected the derailment site on October 30, 2012.

Conclusion: The track had been inspected as required and track defects were not evident in the days leading up to the derailment. The track inspection by a UP qualified track inspector uncovered no defective conditions. UP Rail Defect Detector Car No. DC169 revealed no defects. The results of an FRA inspection on January 30 are recorded on FRA Form F 6180.96 No. SMC-014 with one switch condition and a comment regarding shoulder ballast sections are nearing defective status due to insufficient sections. Both of these defects are at a separate location; they did not contribute the derailment .

The fouled ballast condition leading to the settled or soft roadbed condition propagated quickly and failed catastrophically under the dynamic load of a loaded coal train.

Overall Conclusion:

The investigation shows that fatigue and train handling were not factors in the derailment. There was no evidence recovered indicating that any mechanical failure had occurred. A track inspection prior to the incident on Main Track No. 2 indicates no defects at the location, but a track image recorder on a westbound train at the POD minutes before the derailment shows settled or soft roadbed. The location identified by the images in the snapshot matches the area of the derailment. The image revealed a span of seven concrete ties with discolored ballast, which can be an indication of fouled ballast and soft subgrade. Inspection of the accident site verified the existence of these conditions, which under the dynamic load imposed by rolling railroad equipment resulted in a structure failure due to the inability to restrain the track laterally, longitudinally, and vertically.

longitudinally, and vertically.

Probable Cause and Contributing Factors

The FRA has completed its investigation and determined the probable cause of the accident was Cause Code T001 - Roadbed settled or soft, which likely caused a catastrophic track failure. No contributing factor was identified.