



***Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch***

***Accident Investigation Report
HQ-2014-1032***

***Canadian Pacific Railway Company (CP)
Skyline, MN
November 27, 2014***

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.

TRAIN SUMMARY

1. Name of Railroad Operating Train #1 Union Pacific Railroad Company	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 1114TC011
2. Name of Railroad Operating Train #2 Canadian Pacific Railway Company	2a. Alphabetic Code CP	2b. Railroad Accident/Incident No. 1000148704

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance Union Pacific Railroad Company	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 1114TC011
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident 11/27/2014	4. Time of Accident/Incident 2:31 AM
5. Type of Accident/Incident Side Collision		
6. Cars Carrying HAZMAT 0	7. HAZMAT Cars Damaged/Derailed 0	8. Cars Releasing HAZMAT 0
		9. People Evacuated 0
10. Subdivision Mankato		
11. Nearest City/Town Skyline	12. Milepost (to nearest tenth) 88.2	13. State Abbr. MN
		14. County BLUE EARTH
15. Temperature (F) 0 °F	16. Visibility Dark	17. Weather Clear
18. Type of Track Main		
19. Track Name/Number Single Main Track	20. FRA Track Class Freight Trains-60, Passenger Trains-80	21. Annual Track Density (gross tons in millions) 12
		22. Time Table Direction North

FRA FACTUAL RAILROAD ACCIDENT REPORT

OPERATING TRAIN #1

1. Type of Equipment Consist: Freight Train		2. Was Equipment Attended? Yes		3. Train Number/Symbol MNPVP 24							
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 4792		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						
17 MPH					Code 0						
6. Type of Territory Signalization: Signaled Method of Operation/Authority for Movement: Supplemental/Adjunct Codes:											
7. Principal Car/Unit (1) First Involved (derailed, struck, etc.)		a. Initial and Number UP 8758	b. Position in Train 1	c. Loaded (yes/no) no	8. If railroad employee(s) tested for drug/ alcohol use, enter the number that were positive in the appropriate box.						
(2) Causing (if mechanical, cause reported)		NA	0	no	9. Was this consist transporting passengers? No						
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)		a. Head End	Mid Train		Rear End	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded		Empty		
(1) Total in Train		3	b. Manual	c. Remote	d. Manual	e. Remote	a. Freight	b. Pass.	c. Freight	d. Pass.	e. Caboose
(2) Total Derailed		3	0	0	0	0	(1) Total in Equipment Consist 39	0	19	0	0
12. Equipment Damage This Consist 98244		13. Track, Signal, Way & Structure Damage 210567									
14. Primary Cause Code H603 - Train on main track inside yard limits, excessive speed											
15. Contributing Cause Code H199 - Employee physical condition, other (Provide detailed description in narrative)											
Number of Crew Members			Length of Time on Duty								
16. Engineers/Operators 1	17. Firemen 1	18. Conductors 1	19. Brakemen 0	20. Engineer/Operator Hrs: 3 Mins: 31		21. Conductor Hrs: 3 Mins: 31					
Casualties to:		22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device? Yes		26. Was EOT Device Properly Armed? Yes				
Fatal		0	0	0	27. Caboose Occupied by Crew? N/A						
Nonfatal		0	0	0							
28. Latitude 44.155720000			29. Longitude -94.039181000								

OPERATING TRAIN #2

1. Type of Equipment Consist: Freight Train				2. Was Equipment Attended? Yes		3. Train Number/Symbol 470 26							
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 11920		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 0					
6. Type of Territory Signalization: N/A Method of Operation/Authority for Movement: Supplemental/Adjunct Codes:													
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 <i>(derailed, struck, etc.)</i>		SOO118808	1	yes			0	0					
(2) Causing <i>(if mechanical, cause reported)</i>		NA	0	no	9. Was this consist transporting passengers?		No						
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)		a. Head End	Mid Train		Rear End		11. Cars (Include EMU, DMU, and Cab Car Locomotives.)		Loaded		Empty		
			b. Manual	c. Remote	d. Manual	e. Remote			a. Freight	b. Pass.	c. Freight	d. Pass.	e. Caboose
(1) Total in Train		4	0	0	0	0	(1) Total in Equipment Consist		88	0	16	0	0
(2) Total Derailed		0	0	0	0	0	(2) Total Derailed		4	0	0	0	0
12. Equipment Damage This Consist 38533			13. Track, Signal, Way & Structure Damage 0										
14. Primary Cause Code H603 - Train on main track inside yard limits, excessive speed													
15. Contributing Cause Code H199 - Employee physical condition, other (Provide detailed description in narrative)													
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: 46				Hrs: 6 Mins: 46	
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device?				26. Was EOT Device Properly Armed?	
Fatal		0		0		0		Yes				Yes	
Nonfatal		0		0		0		27. Caboose Occupied by Crew?				N/A	
28. Latitude 44.154631000				29. Longitude -94.042973000									

CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved	
1. Type		5. Equipment	
2. Vehicle Speed (<i>est. mph at impact</i>)	3. Direction (<i>geographical</i>)	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?		8b. Was there a hazardous materials release by	
8c. State here the name and quantity of the hazardous material released, if any.			
9. Type of Crossing Warning 1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other (<i>spec. in narr.</i>) 3. Standard FLS 6. Audible 9. Watchman 12. None		10. Signaled Crossing Warning	11. Roadway Conditions
12. Location of Warning		13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights
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 (<i>primary obstruction</i>)	
Casualties to:	Killed	Injured	21. Driver was
23. Highway-Rail Crossing Users		24. Highway Vehicle Property Damage (<i>est. dollar damage</i>)	22. Was Driver in the Vehicle?
26. Locomotive Auxiliary Lights?		25. Total Number of Vehicle Occupants (<i>including driver</i>)	
28. Locomotive Headlight Illuminated?		27. Locomotive Auxiliary Lights Operational?	
		29. Locomotive Audible Warning Sounded?	

10. Signaled Crossing Warning

- 1 - Provided minimum 20-second warning
- 2 - Alleged warning time greater than 60 seconds
- 3 - Alleged warning time less than 20 seconds
- 4 - Alleged no warning
- 5 - Confirmed warning time greater than 60 seconds
- 6 - Confirmed warning time less than 20 seconds
- 7 - Confirmed no warning
- N/A - N/A

Explanation Code

- A - Insulated rail vehicle
- B - Storm/lightning damage
- C - Vandalism
- D - No power/batteries dead
- E - Devices down for repair
- F - Devices out of service
- G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
- H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
- J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
- K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/island circuit
- L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
- M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
- N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
- O - Warning time less than 20 seconds attributed to violation of special train operating instructions
- P - No warning attributed to signal systems failure to detect the train
- R - Other cause(s). Explain in Narrative Description

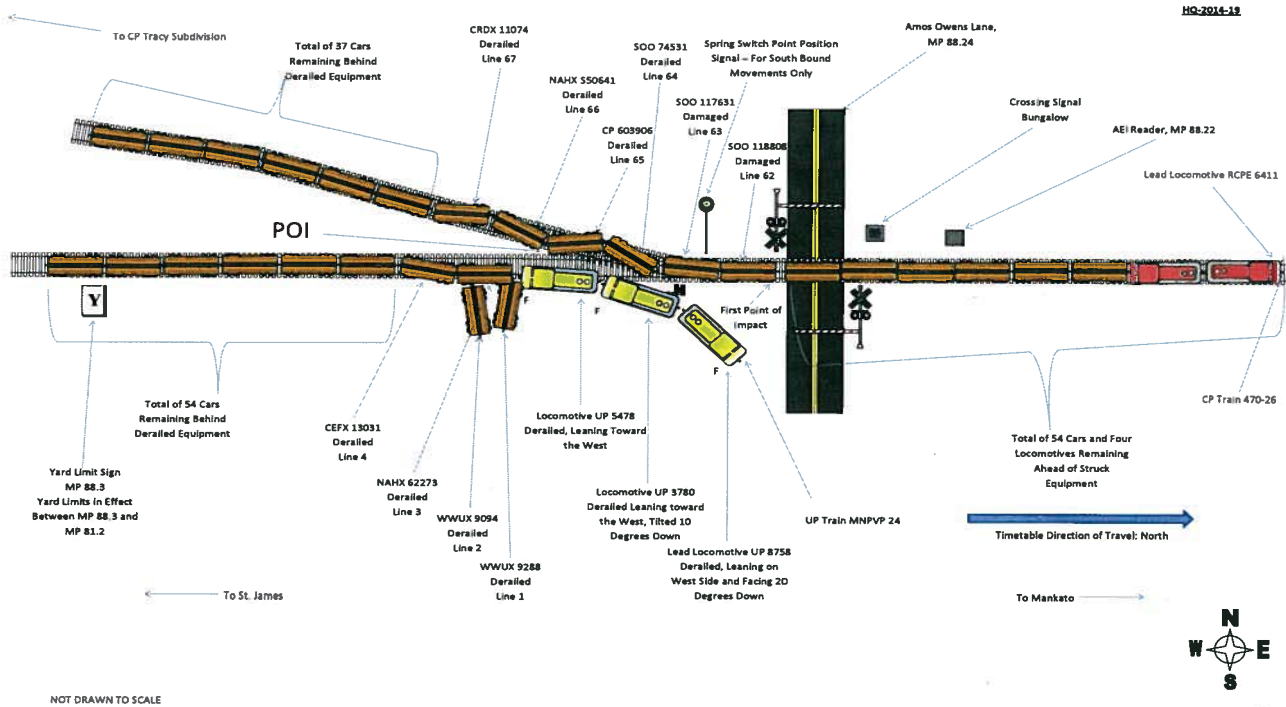
SKETCHES

HQ-2014-19

HQ-2014-19

FRA Sketch of Collision Site

HQ-2014-19



NOT DRAWN TO SCALE

1 of 1

SYNOPSIS

On November 27, 2014, at 2:31 a.m., CST, a northbound Union Pacific Railroad (UP) train, MNPVP, impacted the side of Car 55 of northbound Canadian Pacific Railway (CP) Train CP 470. The collision occurred in Skyline, Minnesota, at Milepost (MP) 88.2.

Train MNPVP was traveling at 17 mph at the time of the collision. Train CP 470 was traveling at 8 mph at the time of impact. The method of train operation on this territory is yard limits. The timetable directions are north and south on UP's Mankato Subdivision. Timetable direction is used throughout this report. No crew members of either train were injured.

Three locomotives and four rail cars were derailed from Train MNPVP. Train CP 470 had four cars derailed and two damaged. No hazardous material cars were involved and no evacuation was made as result of the collision.

There was a total of \$136,777 in equipment damage. Reportable damage for track and signal is \$210,567.

The weather at the time of the accident was clear and 0 degrees F.

Probable cause of the accident was the excessive speed of Train MNPVP on the Main Track inside yard limits. Prior to the train crew initiating an emergency application of the train brakes, Train MNPVP was being operated at 42 mph in an area that had a maximum authorized speed of 30 mph.

NARRATIVE

Circumstances Prior to the Accident

Union Pacific (UP) Train MNPVP

The crew of Train MNPVP consisted of a locomotive engineer, a fireman-in-training (FIT), and a conductor. They reported for duty at 11 p.m., CST, November 26, 2014, at Union Pacific's (UP) St. James Yard office in St. James, Minnesota. This was the away-from-home terminal for the crew. The conductor and locomotive engineer had a rest period of 29 hours and 42 minutes prior to reporting for duty. The FIT had a rest period of 13 hours and 48 minutes prior to reporting for duty. The timetable directions are north and south on UP's Mankato Subdivision. Timetable direction is used throughout this report.

Train MNPVP consisted of three locomotives, 39 loads, and 19 empty rail cars. The train weighed 4,792 trailing tons and was 3,639 feet in length. Locomotive UP 8758 was the leading and controlling locomotive throughout the trip. Train MNPVP received a Class I air brake test in North Platte, Nebraska, on November 24, 2014.

The method of train operation between Milepost (MP) 120.9 and MP 88.3 is track warrant control (TWC). The track speed of this track segment is 49 mph. The method of train operation between MP 88.3 and MP 86.5 is yard limits. Train MNPVP operated on the Main Track with the authority of TW Number 6449, which gave them authority to proceed from St. James to Mankato on the Main Track.

Train MNPVP was operated by the FIT. The locomotive engineer was seated in the fireman's seat in the middle of the cab. The conductor was seated in the conductor's seat, behind the desk, on the left side of the locomotive cab, throughout the trip.

Canadian Pacific (CP) 470

The crew of northbound Train CP 470, consisting of a locomotive engineer and a conductor, reported for duty at 7:45 p.m., CST, November 26, 2014, at CP's Tracy Yard office in Tracy, Minnesota. This was the away-from-home terminal for the crew. The locomotive engineer and the conductor had a rest period of 24 hours prior to reporting for duty.

Train CP 470 consisted of four locomotives, 88 loaded rail cars, and 16 empty rail cars. The train weighed 11,920 trailing tons and was 6,502 feet in length. Locomotive RCPE 6411 was the lead and controlling locomotive. The short hood of the locomotive was facing forward. The train was to be taken 120 miles to Waseca, Minnesota, over Canadian Pacific's (CP) Tracy Subdivision. The crew coupled the train together and completed a Class I air brake test before departing.

CP uses trackage rights over UP's Mankato Subdivision, for a distance of 8 miles, to operate trains across CP's Tracy Subdivision. The Conductor of Train CP 470 called UP's Mankato Yardmaster as the train passed MP 147 on CP's Tracy Subdivision on radio channel 62. This location was 5 miles west of the spring switch used to enter UP's Mankato Subdivision Main Track. The yardmaster gave Train CP 470 authority to occupy UP's West Industrial Lead and to come out onto the Main Track at the spring switch. Train CP 470 operated from UP's West Industrial Lead, through the spring switch, onto UP's Mankato Subdivision Main Track at MP 88.25, continuing northbound at 8 mph. The engineer was at the control stand on the east side of the locomotive and the conductor was on the west side of the locomotive.

The Accident

Train MNPVP 24

At 2:29:22, Train MNPVP was operating northbound on the Mankato Subdivision at 43 mph. Train MNPVP was being controlled with dynamic braking in throttle position B8. At 2:30:27, the train had passed MP 89 at 42 mph. Maximum authorized speed from MP 89 to the yard limit board at MP 88.3 is 30 mph.

While traveling at 38 mph, the train was placed into an emergency air application by the FIT from the locomotive control stand. At 2:31:44, while operating at 17 mph, Train MNPVP impacted the side of northbound Train CP 470 as it was entering through the spring switch at MP 88.25. The impact caused Train CP 470 to separate between Cars 54 and 55, and derailed Cars 57, 58, 59, and 60. The impact caused Train MNPVP's three locomotives and head four cars to derail to the east of the movement.

Analysis and Conclusions

Analysis – Post Accident Train Air Brake and Locomotive Inspections:

UP and Federal Railroad Administration (FRA) personnel conducted an air brake inspection of all remaining cars of Train MNPVP prior to the train being removed from the collision site. Results indicate that all brakes were operative in the full service brake position.

Conclusion:

There were no problems with the locomotives. Inspections were current and car air brakes were operable. Equipment and braking systems were not a factor in the collision.

Analysis – Post Accident Toxicological Tests:

The crews of Train MNPVP and Train CP 470 were tested under Federal authority.

The results for all tests were negative

Conclusion:

Intoxication was not a factor.

Analysis – Fatigue:

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is considered equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline, the agency does not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from 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 five employees involved in this accident. This included the locomotive engineer assigned to each train involved, the conductor assigned to each train, and the FIT assigned to Train MNPVP.

Information for the train and engine service employees assigned to Train MNPVP:

Fatigue Conclusions:

1. Locomotive Engineer: MNPVP
Sleep setting - Excellent
Overall effectiveness = 61.63%
Lapse Index = 7.2
Reaction Time = 160%
Chronic Sleep Debt = 9.40
Hours of Continuous Wakefulness = 5.53
Time of Day 02:31

Time of Day 02:31
BAC Equivalent = >0.08
Finding: Fatigue was probable for this employee.

2. Fireman-In-Training: MNPVP
Sleep setting - Excellent
Overall effectiveness = 72.29%
Lapse Index = 4.4
Reaction Time = 135%
Chronic Sleep Debt = 6.58
Hours of Continuous Wakefulness = 7.53
Time of Day 02:31
BAC Equivalent = >0.05
Finding: Fatigue was probable for this employee.

3. Conductor: MNPVP
Sleep setting - Excellent
Overall effectiveness = 75.38%
Lapse Index = 3.8
Reaction Time = 131%
Chronic Sleep Debt = 5.43
Hours of Continuous Wakefulness = 10.53
Time of Day 02:31
BAC Equivalent = >0.05
Finding: Fatigue was probable for this employee

Information for the train and engine service employees assigned to Train CP 470:

1. Locomotive Engineer: CP 470
Sleep setting - Excellent
Overall effectiveness = 64.92%
Lapse Index = 6.4
Reaction Time = 153%
Chronic Sleep Debt = 8.49
Hours of Continuous Wakefulness = 21.53
Time of Day 02:31
BAC Equivalent = >0.08
Finding: Fatigue was probable for this employee.

2. Conductor: CP 470
Sleep setting - Excellent
Overall effectiveness = 65.66%
Lapse Index = 6.1
Reaction Time = 151%
Chronic Sleep Debt = 8.24
Hours of Continuous Wakefulness = 21.53
Time of Day 02:31
BAC Equivalent = >0.08
Finding: Fatigue was probable for this employee

Conclusion:

FRA concluded fatigue was probable for all five crew members assigned to Train MNPVP and Train CP 470.

Analysis - FIT Operating Performance:

The event recorder data indicates UP Locomotive 8758 was operating at 42 mph by MP 89. While traveling 38 mph the FIT placed the train into an emergency air application. Additionally, the data clearly demonstrates that the train was operated for several minutes between 38 and 43 mph prior to impact with the side of Train CP 470.

Conclusion:

The engineer was not in compliance with several UP Operating Rules and Federal regulations. The FIT failed to comply with authorized speed on a Main Track inside yard limits.

Analysis - Engineer Certificate and Training

Locomotive certificates, hearing and vision testing, driver license checks, and other training were current and in compliance with Title 49 Code of Federal Regulations Part 240. The engineer and FIT of Train MNPVP had a current certificate and had received a current monitoring and skills ride.

Conclusion:

Engineer training, monitoring rides, and certification were current and not a factor in the collision.

Probable Cause and Contributing Factors

FRA determined that the cause of the accident was the excessive speed of Train MNPVP on the Main Track inside yard limits.

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