



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

***Accident Investigation Report
HQ-2021-1429***

***BNSF Railway
Murray, Iowa
May 27, 2021***

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.

SYNOPSIS

Synopsis

On May 27, 2021, at approximately 3:51 p.m., CDT, BNSF Railway (BNSF) unit sand train U-CPFHGP0-05T (Train 1) with 3 locomotives (1 head end and 2 remote rear end), handling 130 loads, 0 empties, at 5,459 feet with 18,493 trailing tons was moving westbound^[1] on the BNSF Chicago Division's Ottumwa Subdivision and struck a pickup truck at Milepost (MP) 366.8 (DOT 074077S Kansas Street) resulting in fatal injuries to 3 of the occupants, and critical injuries to the driver.

The accident occurred approximately 3 miles east of Murray, Iowa which is approximately 57.5 miles south of Des Moines, within Clarke County, IA.

The Ottumwa Subdivision is comprised of two main tracks under Direct Traffic Control, Track Warrant Control with Centralized Traffic Control/Automatic Block Signal System and Positive Train Control overlay with a maximum authorized speed of 60 mph for trains not restricted and 55 mph for trains exceeding 100 tons per operative brake (TOB). Train 1 was operating on Main Track 1 and restricted to 55 mph (TOB 142.3) per the Ottumwa Subdivision Timetable effective October 1, 2020.

There was no derailment of rail equipment, no hazardous material involved, and no injuries to the train crew.

This accident was not Positive Train Control (PTC) preventable.

This subdivision is an Amtrak route, but no trains were delayed by the accident.

Total estimated damages were \$18,542 (Track: \$0 / Equipment: \$18,542).

At the time of the accident the weather was daylight, cloudy, with a temperature of 75°F.

The Federal Railroad Administration (FRA) determined the probable cause of the accident to be M302-Highway user inattentiveness.

^[1] This is timetable direction, which will be used throughout this report.

TRAIN SUMMARY

1. Name of Railroad Operating Train #1 BNSF Railway Company	1a. Alphabetic Code BNSF	1b. Railroad Accident/Incident No. CH-0521-202
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GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance BNSF Railway Company	1a. Alphabetic Code BNSF	1b. Railroad Accident/Incident No. CH-0521-202
2. U.S. DOT Grade Crossing Identification Number 074077S	3. Date of Accident/Incident 5/27/2021	4. Time of Accident/Incident 3:51 PM
5. Type of Accident/Incident Hwy-Rail Crossing		
6. Cars Carrying HAZMAT 0	7. HAZMAT Cars Damaged/Derailed 0	8. Cars Releasing HAZMAT 0
		9. People Evacuated 0
10. Subdivision -		
11. Nearest City/Town MURRAY	12. Milepost (to nearest tenth) 366.80	13. State Abbr. IA
		14. County CLARKE
15. Temperature (F) 75 °F	16. Visibility Day	17. Weather Cloudy
		18. Type of Track Main
19. Track Name/Number SIMN	20. FRA Track Class Freight Trains-60, Passenger Trains-80	21. Annual Track Density (gross tons in millions) 22
		22. Time Table Direction West
23. PTC Preventable No	24. Primary Cause Code [M302] Highway user inattentiveness	25. Contributing Cause Code(s)

OPERATING TRAIN #1

1. Type of Equipment Consist: Freight Train					2. Was Equipment Attended? Yes			3. Train Number/Symbol U-CPFHGP-0-05T			
4. Speed (recorded speed, if available) R - Recorded 35.0 MPH E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 18493		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: <u>Signaled</u> Method of Operation/Authority for Movement: <u>Direct Train Control</u> Supplemental/Adjunct Codes: <u>P, D, J</u>											
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>		BNSF 5202	1	no				0	0		
(2) Causing <i>(if mechanical, cause reported)</i>		0	0	no	9. Was this consist transporting passengers?			N/A			
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		e. Caboose
		b. Manual	c. Remote	d. Manual	e. Remote		a. Freight	b. Pass.	c. Freight	d. Pass.	
		(1) Total in Train	1	0	0		0	2	(1) Total in Equipment Consist	130	
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0
12. Equipment Damage This Consist 18542			13. Track, Signal, Way & Structure Damage 0								
Number of Crew Members						Length of Time on Duty					
14. Engineers/Operators 1		15. Firemen 0		16. Conductors 1		17. Brakemen 0		18. Engineer/Operator Hrs: 8 Mins: 36		19. Conductor Hrs: 8 Mins: 36	
Casualties to:		20. Railroad Employees		21. Train Passengers		22. Others		23. EOT Device? Yes		24. Was EOT Device Properly Armed? Yes	
Fatal		0		0		3		25. Caboose Occupied by Crew?		N/A	
Nonfatal		0		0		1					
26. Latitude 41.041540000				27. Longitude -93.888870000							

CROSSING INFORMATION

Highway User Involved			Rail Equipment Involved		
1. Type Pick-Up Truck			5. Equipment Train (Units Pulling)		
2. Vehicle Speed (<i>est. mph at impact</i>) 35	3. Direction (<i>geographical</i>) East		6. Position of Car Unit in Train 1		
4. Position of Involved Highway User Moved over Crossing			7. Circumstance Rail Equipment Struck Highway User		
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. N/A					
9. Type of Crossing 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 7			10. Signaled Crossing Warning		11. Roadway Conditions Sand, Mud, Dirt, Oil, Gravel
12. Location of Warning Both Sides		13. Crossing Warning Interconnected with Highway Signals N/A		14. Crossing Illuminated by Street Lights or Special Lights N/A	
15. Highway User's Age 16	16. Highway User's Gender Male	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train No		18. Highway User Did not stop	
19. Driver Passed Standing Highway Vehicle No		20. View of Track Obscured by (<i>primary obstruction</i>) Not Obstructed			
Casualties to:		Killed	Injured	21. Driver was Injured	22. Was Driver in the Vehicle? Yes
23. Highway-Rail Crossing Users	3	1	24. Highway Vehicle Property Damage (<i>est. dollar damage</i>)	2500	25. Total Number of Vehicle Occupants (<i>including driver</i>) 4
26. Locomotive Auxiliary Lights? Yes			27. Locomotive Auxiliary Lights Operational? Yes		
28. Locomotive Headlight Illuminated? Yes			29. Locomotive Audible Warning Sounded? Yes		

10. Signaled Crossing Warning

Explanation Code

- | | |
|--|--|
| 1 - Provided minimum 20-second warning | A - Insulated rail vehicle |
| 2 - Alleged warning time greater than 60 seconds | B - Storm/lightning damage |
| 3 - Alleged warning time less than 20 seconds | C - Vandalism |
| 4 - Alleged no warning | D - No power/batteries dead |
| 5 - Confirmed warning time greater than 60 seconds | E - Devices down for repair |
| 6 - Confirmed warning time less than 20 seconds | F - Devices out of service |
| 7 - Confirmed no warning | 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 |
| N/A - N/A | 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 |

NARRATIVE**Circumstances Prior to the Accident**

The crew, consisting of an Engineer and Conductor, for Train 1 was called on duty at 7:15 a.m., CDT, May 27, 2021 at Galesburg, Illinois. Both crew members had received more than the statutorily required rest prior to reporting on duty.

Train 1 consisted of 3 locomotives (1 head end and 2 rear remote units) handling 130 loads, with 0 empties, at 5,459 feet and 18,493 trailing tons. Train 1 received the required air brake test and inspection at 8:00 a.m., CDT, in Ottumwa, Iowa on May 27, 2021. All locomotives had received their daily inspections, required by regulation, prior to departure from Ottumwa, Iowa, without exception.

The method of operation on the Ottumwa Subdivision is Direct Traffic Control, Track Warrant Control with Automatic Block Signal System and Positive Train Control overlay. The maximum authorized speed is 60 mph for freight trains not restricted and 55 mph for trains exceeding 100 tons per operative brake (TOB). Train 1 was restricted to 55 mph (TOB 142.3) per the Ottumwa Subdivision Timetable effective October 1, 2020.

The crew reported no train handling issues or consist changes prior to the accident.

At the time of the accident, the Engineer was seated at the controls on the right side of the locomotive cab and the Conductor was seated on the left side of the locomotive.

The weather was reported as daylight, cloudy, and 75°F.

The Accident

Train 1 was moving westbound on the Ottumwa Subdivision at a recorded speed of 35 mph approaching public crossing DOT 074077S at MP 366.8 when a north bound Chevrolet Silverado pick-up truck with four occupants attempted to cross ahead of the train and was struck.

The Iowa State Patrol and the Clarke County Sheriff's Department responded to the accident along with local emergency services personnel.

The collision resulted in the death of two of the vehicle occupants at the scene with the other two transported via helicopter to Mercy One Medical Center in Des Moines, Iowa where another passenger succumbed to his injuries.

Post-Accident Investigation

The FRA and the BNSF Railway investigated the accident.

Analysis and Conclusions

Analysis – Toxicological Testing: This accident did not meet the criteria for Title 49 Code of Federal Regulations (CFR) Part 219, Subpart C, Post-Accident Toxicological Testing. The train crew was not tested under FRA guidelines or company authority for reasonable cause for the use of alcohol or drugs.

Conclusion: Drug or alcohol use by the train crew were not considered a factor in this event.

Analysis – Fatigue: FRA uses an overall effectiveness rate of 63 as the baseline for fatigue analysis. This is the level at which the risk of a human factors related accident is calculated to be equal to chance. Any schedule that violates the overall effectiveness rate on the date of the accident or in the days leading up to the accident is at risk of fatigue contributing to the accident. The higher the fatigue assessment (FAID) score, the higher fatigue exposure. Below this baseline, fatigue is not considered as probable for an

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 work history, for all train operating employees involved in this accident. FRA concluded that excessive fatigue was not present.

Conclusion: FRA determined fatigue did not cause or contribute to the severity of the accident.

Analysis-Train Crew Performance: Post-accident interviews with the train crew, view of lead locomotive video, and analysis of event recorder data from the lead and controlling locomotives, found the Engineer's actions to be consistent with safe practices and proper train-handling procedures. Per the event recorder on the lead locomotive, the train horn and brakes were operated as required. A review of the video recording by FRA from the outward facing Track Image Recorder onboard the lead locomotive BNSF 5202 clearly showed the pick-up truck failed to stop before traversing Main 2 and into the path of Train 1 on Main 1. Main 1 runs parallel to Main 2 through the highway rail-grade crossing. Main 1 is the track furthest north.

Conclusion: FRA determined that crew performance did not contribute to the cause or severity of this accident.

Analysis – Motive, Power and Equipment: FRA requested and reviewed locomotive inspection reports for all locomotives involved in the collision without exception. The Class I Airbrake Test record was also reviewed without exception.

Conclusion: FRA determined that motive power or railcar equipment did not contribute to the cause or severity of this accident.

Analysis – Track & Structures: BNSF's Ottumwa Subdivision consists of 230.5 miles of multiple main tracks. The Ottumwa Subdivision extends timetable west between Galesburg, Illinois (MP 162.4) to Creston, Iowa (MP 392.9). Trains operating on the Ottumwa Subdivision utilize Track Warrant Control, Automated Block System and Centralized Traffic Control at various locations with Positive Train Control overlay.

The Ottumwa Subdivision track is constructed with 9-inch by 7-inch standard timber crossties measuring 8-foot 6-inch long and spaced on 24-inch centers (nominal). The running rail section consisted of 136-pound (per the American Railway Engineering Standards) is control cooled continuous welded rail. The running rails were fastened to the crossties through double shoulder tie plates with standard cut spikes to secure the track gauge. The spike pattern consisted of one rail hold spike on the field side of the rail and two rail holding spikes in the gauge of the rail. Every other crosstie was box anchored with double shoulder anchors / anti-creepers that assist in restraining longitudinal movement of the continuous welded rail and consisted of a standard ballast section.

The track, approaching the accident area at Kansas street MP 366.88 westbound, is slightly ascending at 0.31% coming out of a right-hand curve of 1 degree 22 minutes into tangent track. Train 1 traverses approximately 1600 feet out of the curve to the accident area.

Conclusion: FRA determined that track did not cause or contribute to the severity of the accident.

Analysis – Sight Distance: FRA inspectors conducted a clearing and approach sight distance evaluation field study of the Public Highway-Rail Grade Crossing on the public road Kansas Street (DOT# 074077S). The crossing is equipped with crossbucks only. Sight evaluation measurements showed the pick-up truck had a clear line of sight to the east (train's approach) of 1,300 feet from the crossing to 300

feet west (vehicle's approach).

An approximate vehicle speed was calculated using the locomotive outward facing camera and, using landmarks for measuring distance and seconds lapsed on the locomotive camera, prior to impact. The estimated distance from the crossing when the vehicle came into camera view was 300 feet. It took 6 seconds for the vehicle to travel 300 feet. The formula used to calculate an approximate vehicle speed was distance divided by time. The estimated vehicle speed was 34.9 mph.

Approaching the accident area westbound, the track describes a right-hand curve of 1 degree 22 minutes into tangent track on an undulating grade. This public crossing is equipped with crossbucks, and Emergency Notification System (ENS) signs on both sides of the crossing. The annual average daily traffic count for the crossing is 30 vehicles (as of 2016), with 0-percent of the vehicles being trucks - with no school bus traffic noted.

Conclusion: FRA determined that the driver's sight distance did not contribute to the cause or severity of the accident.

Overall Conclusion

FRA determined the action of the train crew was not a factor in this accident. Sight visibility was not a factor in this accident. Neither locomotive nor car conditions contributed to the accident. Failure of the driver to attend to the approaching train and comply with all applicable laws was the cause of the accident.

Probable Cause

FRA determined the probable cause of the accident to be M302 - Highway user inattentiveness.