



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

***Accident Investigation Report
HQ-2019-1365***

***CSX Transportation (CSX) Derailment
Smyrna, Tennessee
September 25, 2019***

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

On September 25, 2019, at approximately 2:59 p.m., CDT, a southbound CSX freight train M97225 (Train 1) derailed at CSX Milepost (MP) J22 on the CSX Nashville Division, Chattanooga Subdivision in Smyrna, Tennessee.

Train 1 was making a shoving movement with 85 loaded autoracks at a recorded speed of 6 mph, when the train coupled with a boxcar at an excessive speed. The excessive speed coupling caused the 33rd autorack in the train to derail. The Engineer and Conductor were unaware of the derailed equipment and proceeded northbound causing 31 additional autoracks to derail. All autoracks remained upright and parallel to the track.

At the time of the derailment, it was daylight, cloudy and the temperature was 85 °F.

No injuries were reported initially; however, the Conductor reported being injured two days after the derailment. Damages reported by CSX were estimated to be \$102,883 for equipment and \$251,200 for track, totaling \$354,083.

FRA determined the probable cause of the derailment was H601 – Coupling speed excessive.

Additionally, FRA determined contributing factors to be H210 – Radio Communication, failure to comply; H599 -- Other causes relating to train handling or makeup (Engineer failure to attempt to slow or stop his train); and H999 -- Other train operation/human factors (Failure to rebrief after the work activity changed and failure to acknowledge or repeat radio instructions given).




TRAIN SUMMARY

1. Name of Railroad Operating Train #1 CSX Transportation	1a. Alphabetic Code CSX	1b. Railroad Accident/Incident No. 000185580
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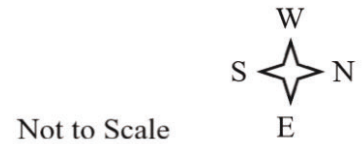
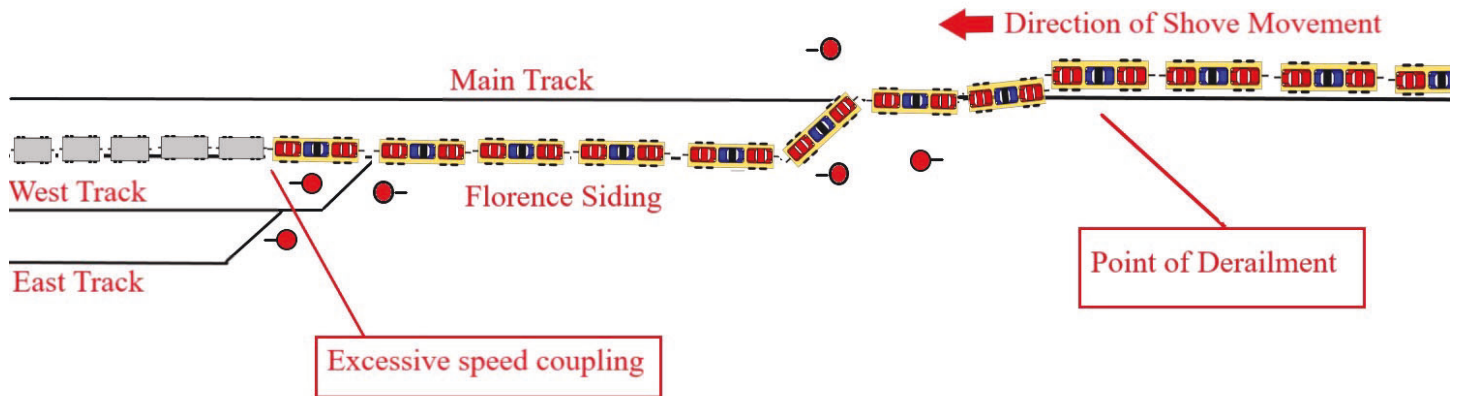
GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance CSX Transportation		1a. Alphabetic Code CSX		1b. Railroad Accident/Incident No. 000185580	
2. U.S. DOT Grade Crossing Identification Number		3. Date of Accident/Incident 9/25/2019		4. Time of Accident/Incident 2:59 PM	
5. Type of Accident/Incident Derailment					
6. Cars Carrying HAZMAT 0		7. HAZMAT Cars Damaged/Derailed 0		8. Cars Releasing HAZMAT 0	
9. People Evacuated 0					
10. Subdivision CSX TRANSPORTATION - CHATTANOOGA					
11. Nearest City/Town Smyrna		12. Milepost (<i>to nearest tenth</i>)		13. State Abbr. TN	
				14. County RUTHERFORD	
15. Temperature (F) 85 °F		16. Visibility Day		17. Weather Cloudy	
				18. Type of Track Main	
19. Track Name/Number Main track		20. FRA Track Class Freight Trains-60, Passenger Trains-80		21. Annual Track Density (<i>gross tons in millions</i>) 50	
				22. Time Table Direction South	
23. PTC Preventable No		24. Primary Cause Code [H601] Coupling speed excessive		25. Contributing Cause Code(s) H599, H999, H210	

 U.S. Department of Transportation Federal Railroad Administration		FRA FACTUAL RAILROAD ACCIDENT REPORT				FRA File # HQ-2019-1365									
OPERATING TRAIN #1															
1. Type of Equipment Consist: Freight Train						2. Was Equipment Attended? Yes		3. Train Number/Symbol M97225							
4. Speed (recorded speed, if available) R - Recorded 6.0 MPH E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 7955		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>Signal Indication</u> Supplemental/Adjunct Codes: <u>Q</u>															
7. Principal Car/Unit (1) First Involved <i>(derailed, struck, etc.)</i>		a. Initial and Number PW 402092		b. Position in Train 33		c. Loaded (yes/no) yes		8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box		Alcohol 0	Drugs 0				
(2) Causing <i>(if mechanical, cause reported)</i>		0		0		no		9. Was this consist transporting passengers?		No					
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)		a. Head End		Mid Train b. Manual c. Remote		Rear End d. Manual e. Remote		11. Cars (Include EMU, DMU, and Cab Car Locomotives.)		Loaded a. Freight b. Pass.		Empty c. Freight d. Pass.		e. Caboose	
(1) Total in Train		2		0 0		0 0		(1) Total in Equipment Consist		85 0		35 0		0	
(2) Total Derailed		0		0 0		0 0		(2) Total Derailed		32 0		0 0		0	
12. Equipment Damage This Consist 102883				13. Track, Signal, Way & Structure Damage 251200											
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: 3 Mins: 59		19. Conductor Hrs: 3 Mins: 59					
Casualties to:		20. Railroad Employees		21. Train Passengers		22. Others		23. EOT Device? Yes		24. Was EOT Device Properly Armed? Yes					
Fatal		0		0		0		25. Caboose Occupied by Crew?		N/A					
Nonfatal		1		0		0									
26. Latitude 35.563500000				27. Longitude -86.000000000											

SKETCHES

Sketch - Smyrna Sketch





NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

CSX Transportation (CSX) freight train M97225 (Train 1) consisted of 2 locomotives, 85 loaded auto racks, and 35 empty cars of various types. Train 1 was approximately 10,100 feet in length, and approximately 7,955 trailing tons. Train 1 originated at Nissan Yard in Smyrna, Tennessee, on September 25, 2019, with a destination of Nashville, Tennessee.

A crew consisting of a locomotive engineer and a conductor reported for duty on September 25, 2019, at 11 a.m., CDT, at Kayne Avenue Yard located in The Nashville Terminal Subdivision, Nashville, Tennessee. Nashville was the home terminal for both employees, and both had received more than the statutory time off prior to reporting for duty. After reporting for duty, the train crew deadheaded for one hour to Smyrna, via Railcrew taxi, arriving at 12 p.m., CDT, where they were briefed by the Trainmaster.

The derailment occurred on the Nashville Division, Chattanooga Subdivision, in Smyrna. The Chattanooga Subdivision travels geographically and timetable north and south. The area of the derailment consists of a single main track, with a maximum authorized speed of 60 mph, a controlled siding (Florence Siding) with a maximum authorized speed of 25 mph, and two other than main tracks (East Track and West Track). The method of operation for this subdivision is Traffic Control. No permanent or temporary speed restrictions were in effect.

The single main track and Florence Siding are tangent with a maximum descending grade of 0.50 percent and a maximum ascending grade of 0.98 percent. The track profile in this area is best described as rolling hills.

The crew of Train 1 took their assigned locomotives from the East Track, performed a Class I brake test on the 35 cars in Florence Siding, then returned to the East Track with just the locomotives. The crew of Train 1 then prepared to double the 85-loaded auto-racks in East Track to the 35-empties in Florence Siding.

On signal indication, Train 1, with 2 locomotives and 85 auto racks, traveled northbound from the East Track, clear of the Florence Siding signal. The Conductor positioned himself at the rear of Train 1 to protect the shove into Florence Siding, and couple to the 35 cars.

At the time of the derailment, it was daylight, cloudy and the temperature was 85 °F.

THE ACCIDENT

The Conductor of Train 1 told the Engineer he was riding the rear car, and gave instructions to shove south 10 car lengths to a coupling. The Engineer released the train's brakes and began to shove south in throttle position 3. The next command by the Conductor was to continue shoving south for five car

lengths to a coupling. The Engineer did not make any adjustments to the controls, and continued to shove south with the brakes released, and in throttle position 3.

As Train 1 continued south at 6 mph, the Conductor dismounted the moving equipment and instructed the Engineer to stop. The Engineer did not make any adjustments to the controls of the locomotive, and continued to shove south with the brakes released, and in throttle position 3, until Train 1 coupled to the 35-empty cars in Florence Siding traveling 6 mph, at 2:59 p.m., CDT. After the Engineer felt the coupling, he responded by moving the throttle to idle and applying the train brakes. The Conductor instructed the Engineer to pull north to ensure the coupling was made, and then stopped the movement to allow the Trainmaster to apply the EOT to the rear of the train without performing a Class III brake test. At the same time, the Conductor was transported to the head end of the train by the Railcrew taxi.

Once the Conductor joined the Engineer on the lead locomotive, Train 1 began moving north to depart. Train 1 traveled 2,583 feet before stalling. The Conductor walked the train and found 32 derailed auto-racks, line 33 - 65. The derailed cars remained upright and parallel with the track, therefore the train line did not separate and cause an emergency brake application.

No injuries were reported initially; however, the Conductor reported being injured two days after the derailment. Damages reported by CSX were estimated to be \$102,883 for equipment and \$251,200 for track, totaling \$354,083.

POST-ACCIDENT INVESTIGATION

On October 2, 2019, the Federal Railroad Administration (FRA) began its investigation. FRA requested and received all records, forms, and other documentation necessary to conduct their investigation in to the probable cause of the derailment. The following analysis and conclusions represent the findings of FRA's investigation.

ANALYSIS AND CONCLUSIONS

Analysis – Toxicological Testing: This accident met the testing criteria under Title 49 Code of Federal Regulations (CFR) Part 219, Subpart E (Reasonable Cause), and the Engineer was tested under company authority.

Test results for the Train 1 engineer were negative.

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

Analysis – Training, Qualifications, and Operational Testing: FRA requested, and was provided with all training, qualification, and operational testing records for the Train 1 Engineer and Conductor. The crew was found to be properly certified, and qualified for the territory where the derailment occurred. No operational test failures were recorded on either employee for the previous three years.

Conclusion: FRA determined training, experience, and qualifications did not contribute to the cause or severity of this accident.

Analysis – Railroad Employee's Interviews: FRA interviewed the Engineer, Conductor, and Trainmaster on the events leading up to the derailment. The information gathered during the interviews was inconsistent and at times contradictory. Of the three railroad employees interviewed, two details were consistent. The Conductor did give a car count to begin the shoving movement, and the Trainmaster did communicate on the radio at some point during the shoving movement to the crew.

The Engineer stated the last car count received was five car lengths, and the Trainmaster was also communicating to the Conductor of Train 1 over the radio during the shove movement, which prevented the Engineer from hearing any additional instructions from the Conductor. The locomotive's event recorder did not record any manipulation of the controls prior to the hard coupling that would indicate the Engineer was preparing to slow or stop Train 1. Title 49 Code of Federal Regulations (CFR) 220.49 and CSX Operating rules require an Engineer to stop in half the distance specified by the Conductor if additional instructions are not received.

The Conductor stated he was giving shoving instructions over the radio to the Engineer and not getting a response. He also confirmed the Trainmaster was talking to them over the radio during the shove movement. After giving a count of four cars, the Conductor recognized the train was not slowing so he jumped from the moving equipment as he instructed the Engineer to stop. The movement continued until Train 1 coupled into the 35 standing cars.

The Trainmaster stated he heard the Conductor giving car counts, but there was static and the Conductor was cutting out, and he did not hear anything from the Engineer. He also acknowledged he was communicating over the radio, but did not think it interfered with the shove movement. Once the coupling was made, he applied the EOT to the rear of Train 1 and did not notice any cars derailed.

Train 1 failed to conduct a job briefing when the Trainmaster informed the crew that he would attach the EOT to the rear of their train. CSX Operating Rule 2002.2 states a job briefing must be conducted before beginning a work activity, when the work activity or conditions change, and when another employee joins the crew or workgroup. Furthermore, the Engineer of Train 1 failed to repeat the shoving instruction given by the Conductor which was confirmed during the interviews by both the Trainmaster and the Conductor of Train 1. In addition, the Trainmaster hung the EOT to the rear of Train 1 even though CSX did not have any (attaching) procedures in place for managers to perform work that requires protection while fouling equipment.

Conclusion: FRA determined the Engineer's failure to comply with radio instructions and other train operation/human failures contributed to the cause of the derailment. (Contributing cause code H210 and H999).

Analysis - Locomotive Event Recorder: The locomotive event recorder displayed Train 1 began the shoving movement at 14:56:08. Train 1's automatic brake and independent brake were released and the throttle was placed in T1. At 14:56:17, the throttle was placed in T3. At 14:56:42, Train 1 began moving south in throttle T3 with a Tractive Effort of 95 klbs. Train 1 shoved a total of 999 feet, reaching a maximum speed of 6 mph and Tractive Effort of 56 klbs. The train remained in Throttle T3 the entire distance of the shove. At 14:59:01, after being stopped, Train 1 throttle position is in idle, automatic brake pressure changes from 88 psi to 85 psi, and the independent brake is 0 psi (released). At 14:59:02, Train 1's speed drops from 6 mph to 4 mph and the Tractive Effort jumps from 57 klbs to 70 klbs; the throttle position is still in T3. All of Train 1 brakes remain in the released position. Analysis of the event recorder data indicated when the shove move began the Engineer released the train's brakes and placed the locomotive in throttle position T3. During the shove move the throttle remained in T3 and the brakes remained released. At no time during the shove move did the Engineer attempt to slow the train using throttle modulation or the train's brakes. The Engineer did not reduce throttle position or apply the train's brakes until after the train was stopped by the excessive speed coupling. After the Engineer received the instruction of five cars to a coupling, the Engineer should have taken measures to control the train's speed and have the train completely stopped within 2 ½ car lengths. The Engineer's failure to stop the train allowed the train to travel at a rate (6 mph) greater than normal coupling speed which caused the loaded auto rack (PW402092) line 33 in the train to derail.

Conclusion: FRA determined the excessive speed coupling was the primary cause of the derailment. The Engineer's failure to use proper train-handling procedure by attempting to stop the train when he did not hear additional shoving instructions was a contributing factor. (Primary cause code H601 and contributing code H599).

Analysis – Track: FRA reviewed CSX track inspection records for the area of the derailment. CSX conducted an inspection on this segment of track from September 22 - 24, 2019. The inspection was performed by a CSX Track Inspector with no defects found.

Conclusion: FRA determined the track and track structure did not contribute to the cause or severity of the derailment.

Analysis – Equipment: Mechanical records for the locomotives and equipment involved in the derailment were reviewed by FRA.

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

OVERALL CONCLUSIONS

FRA determined the failure of the Train 1 engineer to stop within half the distance given by the conductor during the shoving movement caused the excessive speed coupling. FRA believes the buff force created by the excessive speed coupling, between cars 85 and 86, most likely caused a portion of the train (line

33) to derail. The northbound movement following the initial derailment then caused the rest of the other 31 cars to derail before Train 1 came to a stop.

Furthermore, FRA determined the Engineer failed to properly handle his train and did not attempt to slow or stop the train when he was not receiving any additional shoving instructions while coupling to standing equipment. In addition, the Engineer failed to acknowledge the shoving instruction received from the Conductor by repeating the information given. Also, Train 1 failed to conduct a job briefing when the work activity and condition changed with the Trainmaster assisting the crew by hanging the EOTD on the rear.

PROBABLE CAUSE AND CONTRIBUTING FACTORS

FRA determined the probable cause of the derailment was H601 – Coupling speed excessive.

Additionally, FRA determined contributing factors to be H210 – Radio Communication, failure to comply; H599 -- Other causes relating to train handling or makeup (Engineer failure to attempt to slow or stop his train); and H999 -- Other train operation/human factors (Failure to rebrief after the work activity changed and failure to acknowledge or repeat radio instructions given).