Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2021-1430

Union Pacific Railroad
San Marcos, Texas
June 6, 2021

SYNOPSIS

Synopsis

On June 6, 2021, at approximately 10:45 a.m. [1]CDT, Union Pacific Railroad (UP) grain train GSJO3D-04 (Train 1), handling 107 loads, 0 empties at 6,494 feet and 15,278 tons, was traveling southbound[2]on UP's Austin Subdivision when 39 cars derailed at Milepost (MP) 215.58 in San Marcos, Texas (Hays County), approximately 50 miles north of San Antonio, Texas. Of the 39 rail cars derailed, 32 rail cars were upright, and 7 rail cars were on their side.

The method of operation for UP's Austin Subdivision is a combination of Direct Traffic Control, Automatic Block Signal/Centralized Traffic Control with Positive Train Control (PTC) overlay. The Austin Subdivision has a maximum authorized speed of 60 miles per hour (mph), with a 25-mph speed restriction between MP 215.4 – MP 215.7 per the San Antonio Area (Austin Subdivision) Timetable #6, effective May 10, 2019. The area of the derailment was restricted to a speed of 25 mph due to a track configuration involving back-to-back 4-5 degree opposing curves.

There were no injuries to the public or crew, and no hazardous material involved.

This was an Amtrak route, but no delays occurred. The accident was not PTC preventable.

Weather at the time of the derailment was daylight, cloudy and 80° F.

Total estimated damages were $1,536,943 (Track: $636,912/Equipment: $900,031).

The Federal Railroad Administration (FRA) determined the probable cause to be T001--roadbed settled or soft.

[1]All times are Central Daylight Time (CDT).

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

U.S. Department of Transportation Federal Railroad Administration	**FRA FACTUAL RAILROAD ACCIDENT REPORT**	FRA File # HQ-UP-2021-0606-1430

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0621SX005

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	0621SX005

2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	6/6/2021	10:45 AM

5. Type of Accident/Incident
Derailment

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated
0	0	0	0

10. Subdivision
-

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
SAN MARCOS	215.580	TX	HAYS

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
80 °F	Day	Cloudy	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
MAIN 2	Freight Trains-40, Passenger Trains-60	31.1	South

23. PTC Preventable	24. Primary Cause Code	25. Contributing Cause Code(s)
No	[T001] Roadbed settled or soft	

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-UP-2021-0606-1430

OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	GSJO3D-04

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross excluding 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
22.0 MPH	R	15278		0

6. Type of Territory

Signalization: Signaled

Method of Operation/Authority for Movement: Signal Indication

Supplemental/Adjunct Codes: Q, J

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.)*	CMO112356	23	yes		0	0
(2) Causing *(if mechanical, cause reported)*	CMO112356	23	yes	9. Was this consist transporting passengers?		N/A

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	107	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	39	0	0	0	0

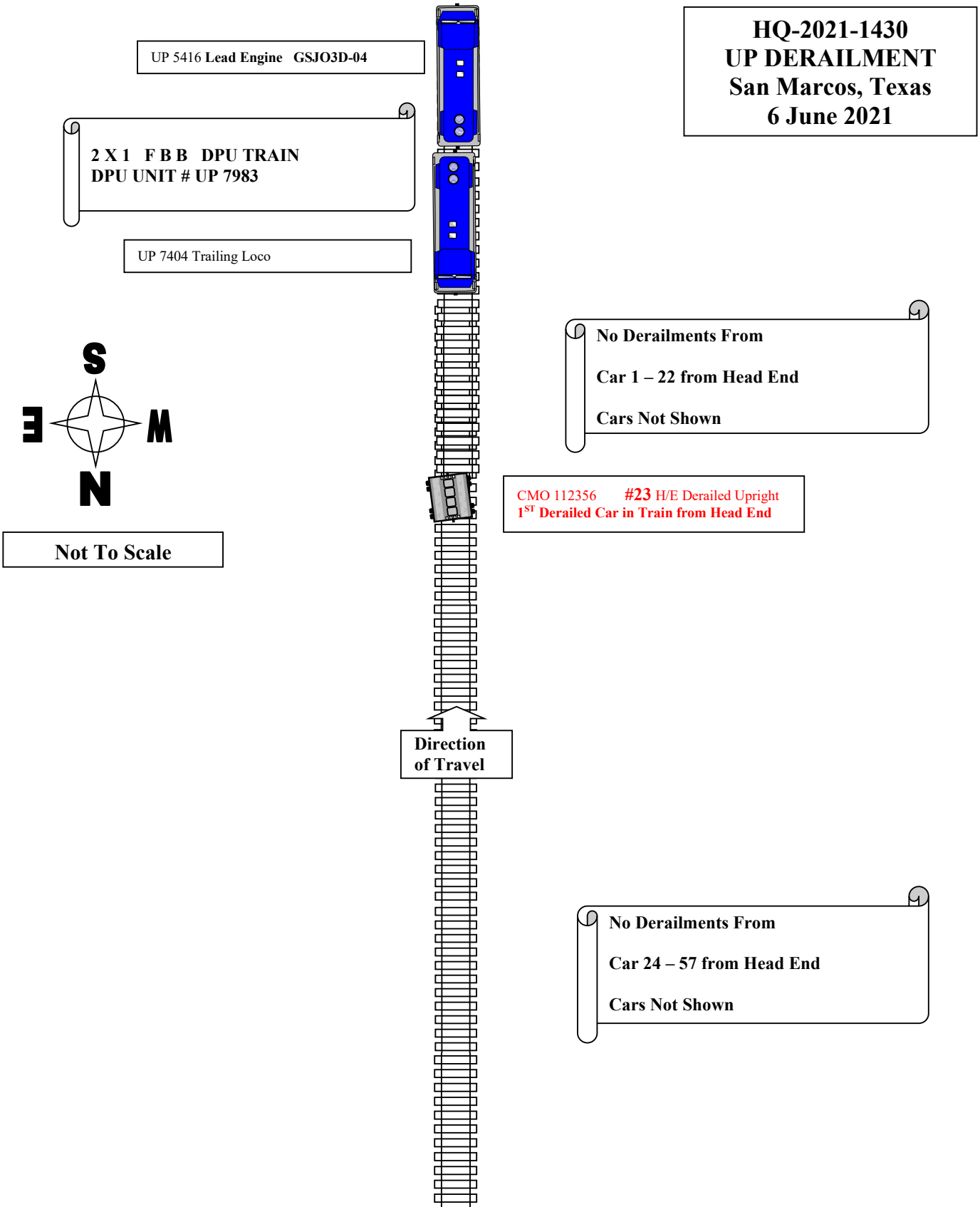
12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
900031	636912

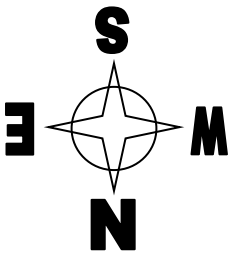
Number of Crew Members				Length of Time on Duty	
14. Engineers/Operators	15. Firemen	16. Conductors	17. Brakemen	18. Engineer/Operator	19. Conductor
1	0	1	0	Hrs: 5 Mins: 5	Hrs: 5 Mins: 5
Casualties to:	20. Railroad Employees	21. Train Passengers	22. Others	23. EOT Device?	24. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	25. Caboose Occupied by Crew?	N/A
Nonfatal	0	0	0		

26. Latitude	27. Longitude
29.818697000	-98.006949000

SKETCHES

Sketch - Sketch





Not To Scale

Direction of Travel

CHTT 721052 #58 H/E Derailed Upright

UP 93222 #59 H/E Derailed Upright

ECNX 170472 #60 H/E Derailed Upright

CMO 101132 #61 H/E Derailed Upright

CMO 20580 #62 H/E Derailed Upright

UP 91665 #63 H/E Derailed Upright

UP 90666 #64 H/E Derailed Upright

UP 99786 #65 H/E Derailed Upright

UP 111144 #66 H/E Derailed Upright

CMO 112333 #67 H/E Derailed Upright

ECNX 170066 #68 H/E Derailed Upright

MP 722754 #69 H/E Derailed Upright

CMO 21084 #70 H/E Derailed Upright

FURX 842954 #71 H/E Derailed Upright

EFNX 160118 #72 H/E Derailed Upright

CHTT 721016 #73 H/E Derailed Upright

UP 111569 #74 H/E Derailed Upright

CMO 101148 #75 H/E Derailed Upright

No Derailments From

Car 76 – 78 from Head End

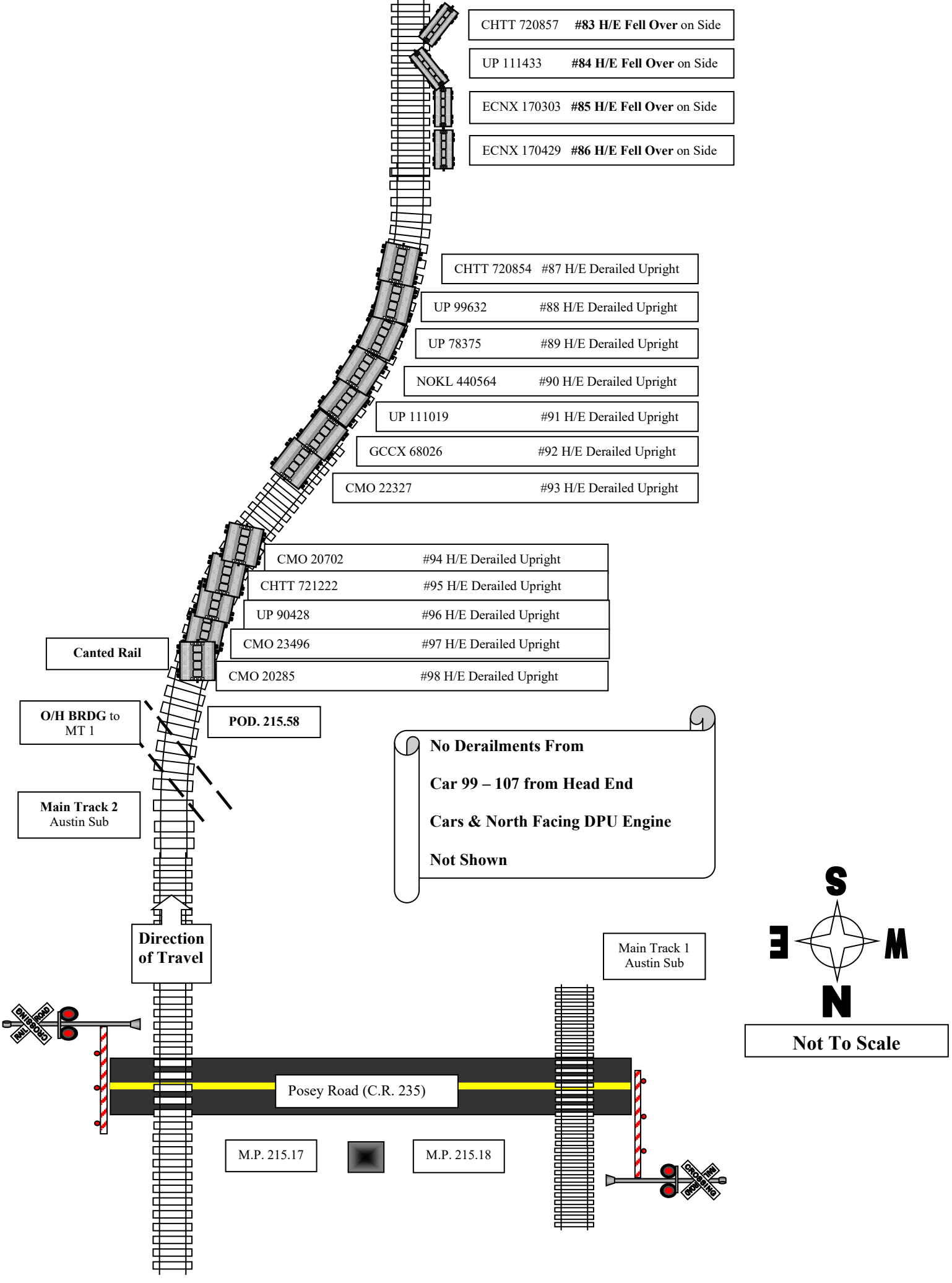
Cars Not Shown

NOKL 846015 #79 H/E Derailed Upright

CMO 21262 **#80 H/E Fell Over** on Side

UP 99917 **#81 H/E Fell Over** on Side

CMO 200173 **#82 H/E Fell Over** on Side


CHTT 720857 #83 H/E Fell Over on Side
UP 111433 #84 H/E Fell Over on Side
ECNX 170303 #85 H/E Fell Over on Side
ECNX 170429 #86 H/E Fell Over on Side
CHTT 720854 #87 H/E Derailed Upright
UP 99632 #88 H/E Derailed Upright
UP 78375 #89 H/E Derailed Upright
NOKL 440564 #90 H/E Derailed Upright
UP 111019 #91 H/E Derailed Upright
GCCX 68026 #92 H/E Derailed Upright
CMO 22327 #93 H/E Derailed Upright
CMO 20702 #94 H/E Derailed Upright
CHTT 721222 #95 H/E Derailed Upright
UP 90428 #96 H/E Derailed Upright
CMO 23496 #97 H/E Derailed Upright
CMO 20285 #98 H/E Derailed Upright
Canted Rail
O/H BRDG to MT 1
POD. 215.58
No Derailments From
Car 99 – 107 from Head End
Cars & North Facing DPU Engine
Not Shown
Main Track 2 Austin Sub
Direction of Travel
Main Track 1 Austin Sub
S
E
M
N
Not To Scale
Posey Road (C.R. 235)
M.P. 215.17
M.P. 215.18

NARRATIVE

Circumstances Prior to the Accident

On June 6, 2021, the crew of Train 1 was called on duty at Valley Jct., Texas at 5:40 a.m. The crew consisted of an Engineer and Conductor that had received the statutorily required rest prior to reporting for duty.

The train originated at St. Joseph Yard in St. Joseph, Missouri, and was destined for Laredo, Texas. After departing, there were no changes to the consist, nor were there any reported train handling issues prior to the accident.

At the time of the accident, the Engineer was seated at the controls on the forward right side of the leading locomotive, while the Conductor was seated on the left side of the lead locomotive.

The Accident

At approximately 10:45 a.m., Train 1 approached MP 215.58 at a recorded speed of 22 mph and encountered soft, settled roadbed, derailing 39 loaded cars (line 23, lines 58-75 and lines 79-98). Seven of the cars were on their sides and 32 remained upright. No Emergency Services were requested. UP personnel responded to the accident. Archived local weather reports indicate that several inches of rain had fallen in the days leading up to the derailment.

Post-Accident- Investigation

The FRA and UP investigated the accident.

Analysis and Conclusions

Analysis – Toxicological: FRA Post-Accident Forensic Toxicology Result Reports were conducted on both crew members and each had negative test results.

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

Analysis – Fatigue: FRA performed a fatigue analysis using (FAID). 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 are considered to be at risk of fatigue contributing to the accident. The higher the FAID score, the higher fatigue exposure. Below this baseline, fatigue is not considered as probable for an employee. Software sleep settings vary according to the 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 train's Engineer and Conductor. Based on the results of the analysis, fatigue was not likely for both employees involved in the accident.

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

Analysis – Motive Power and Equipment: A mechanical inspection was performed on Train 1. Car CMO 112356 (line 23 in the train) was discovered during the inspection to have a thin-flange at the L-3 position on the A-end wheels, which remained on the rail, and did not exhibit signs of derailment damage; however, the wheels and the brake beam on the B-end of the car had extensive damage as a result of

the derailment. No defects were noted on the additional 38 derailed cars inspected during the initial on-scene investigation.
Conclusion: FRA determined damage to cars was a result of the derailment, and no mechanical conditions or issues disclosed contributed to the cause or severity of the accident.
Analysis – Operating Practices: The Engineer and Conductor were found to be compliant with all applicable FRA Regulations, railroad operating rules, and train handling rules and requirements. The relevant event recorder data was downloaded by UP and analyzed by UP and FRA with no exceptions noted.
Conclusion: FRA determined the operating crew's performance did not contribute to the cause or severity of the accident.
Analysis – Track & Structures: This segment of the Austin Subdivision main track consists of 136 lb. rail on wood ties. The ballast is made up of 1.5 to 2.75-inch clean rock. Fasteners throughout the location consisted of cut spikes with a standard anchor pattern. Curve blocks were also installed on every 4th tie. The point of derailment (POD) was identified to be at MP 215.58 on Main track #2.
The last UP geometry car test at this location was EC4 on February 22, 2021, with no defects recorded. In the review of the UP track inspection records, for the period of May 1, 2021, to June 6, 2021, a track inspection was conducted at this location nine times as part of the required weekly inspection of the main line, with no defects noted during those inspections.
Following the derailment, a total of 72 track panels were used to reconstruct the main track and restore service.
Previous FRA track inspections on May 4, 2021, noted fouled ballast defects approximately forty feet in length at MP 215.58 on the Austin Subdivision Main Track #2. Upon review of the outward facing locomotive camera, it appeared the fouled ballast was still present. Post derailment inspection on June 7, 2021, showed the subgrade at the location where the previous defect was noted at MP 215.58 contained a significant amount of mud.
Conclusion: FRA determined the cause of the accident to be T001--Track (roadbed, settled or soft).
Overall Conclusion: FRA concluded the condition or functionality of the crew, locomotives, cars, or safety appurtenances did not contribute to the cause or severity of the accident, and that soft, settled roadbed was the probable cause.
Probable Cause: The FRA determined the probable cause to be T001--Track (roadbed, settled or soft).