

# National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



RRD22FR013

## **LOCOMOTIVE EVENT RECORDER**

Specialist's Factual Report

March 10, 2023

## **A. ACCIDENT**

Location: El Paso, Texas  
Date: August 29, 2022  
Time: 21:14 mountain standard time (MDT)  
Locomotive: Union Pacific (UP) 7132<sup>1</sup>

## **B. LOCOMOTIVE EVENT RECORDER SPECIALIST**

Specialist Cassandra Johnson  
Mechanical Engineer  
National Transportation Safety Board (NTSB)

## **C. DETAILS OF THE INVESTIGATION**

A locomotive event recorder group was not convened. The NTSB Vehicle Recorder Division received a hard drive containing the event recorder data files from locomotive UP 7132.

### **1.0 Recording Description**

Using the wheel size of 42.15 inches for UP 7132, the locomotive event recorder data were extracted using the Wabtec Railway Electronics Event Recorder - Data Analysis Software III (referred to as DAS III). The software outputted the locomotive event recorder parameters including distance and speed. The exported data have a sampling rate of one hertz (one data sample per second); therefore, the data have an accuracy of +/- 1 second. Only data relevant to this event are provided in this report.

### **1.1 Parameters**

Table 1 lists the parameters verified and provided in this report for UP 7132. Additionally, table 2 contains the unit and discrete state abbreviations for the parameters.

#### **1.1.1 Distance Traveled**

The default output for the distance traveled is the distance decreasing in time.

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<sup>1</sup> In this report, locomotive Union Pacific 7132 is referenced as UP 7132.

### **1.1.2 Speed**

The resolution of speed is 1 mile per hour (mph). Thus, any movement less than 1 mph will not be shown.

### **1.2 Recorded Timing**

The data was recorded in coordinated universal time (UTC). The timing was adjusted to local time, MDT, by subtracting 6 hours. Therefore, the times used in this report are expressed as MDT.

## **D. FIGURES AND TABULAR DATA**

Figure 1 is from 20:25:00 MDT to 21:20:00 MDT and contains locomotive event recorder data from UP 7132 recorded during the event on August 29, 2022. All the parameters listed in table 1 are plotted, except feet traveled.

The event recorder data indicated from 20:25:58 MDT to 20:49:39 MDT, UP 7132 traveled forward for 8.32 miles reaching a maximum speed of 37 mph. During this time, the front ditch light (DL Front) was initially on and subsequently turned off to back on seven times. At 20:57:36 MDT, while UP 7132 had stopped, the front ditch light changed from on to off and remained off for the rest of the event. Additionally, at 21:08:42 MDT, the direction of travel (Dir Call) changed to reverse.

At 21:09:27, UP 7132 started moving in reverse and at 21:09:39 MDT, speed increased to 1 mph and 2 minutes later at 21:11:39 MDT speed reached a maximum of 10 mph. At 21:13:57 MDT, 2 minutes and 18 seconds later, speed reduced slightly to 9 mph and subsequently, 17 seconds later at 21:14:14 MDT, speed reduced to 8 mph. Two seconds later at 21:14:16 MDT, the train line emergency (TLEM) changed from off to on. At this time, UP 7132 had traveled in reverse for 0.63 miles. Eight seconds later, at 21:14:24 MDT, UP 7132 came to a complete stop.

The corresponding tabular data used to create figure 1 including feet traveled are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Cassandra Johnson  
Sr. Mechanical Engineer

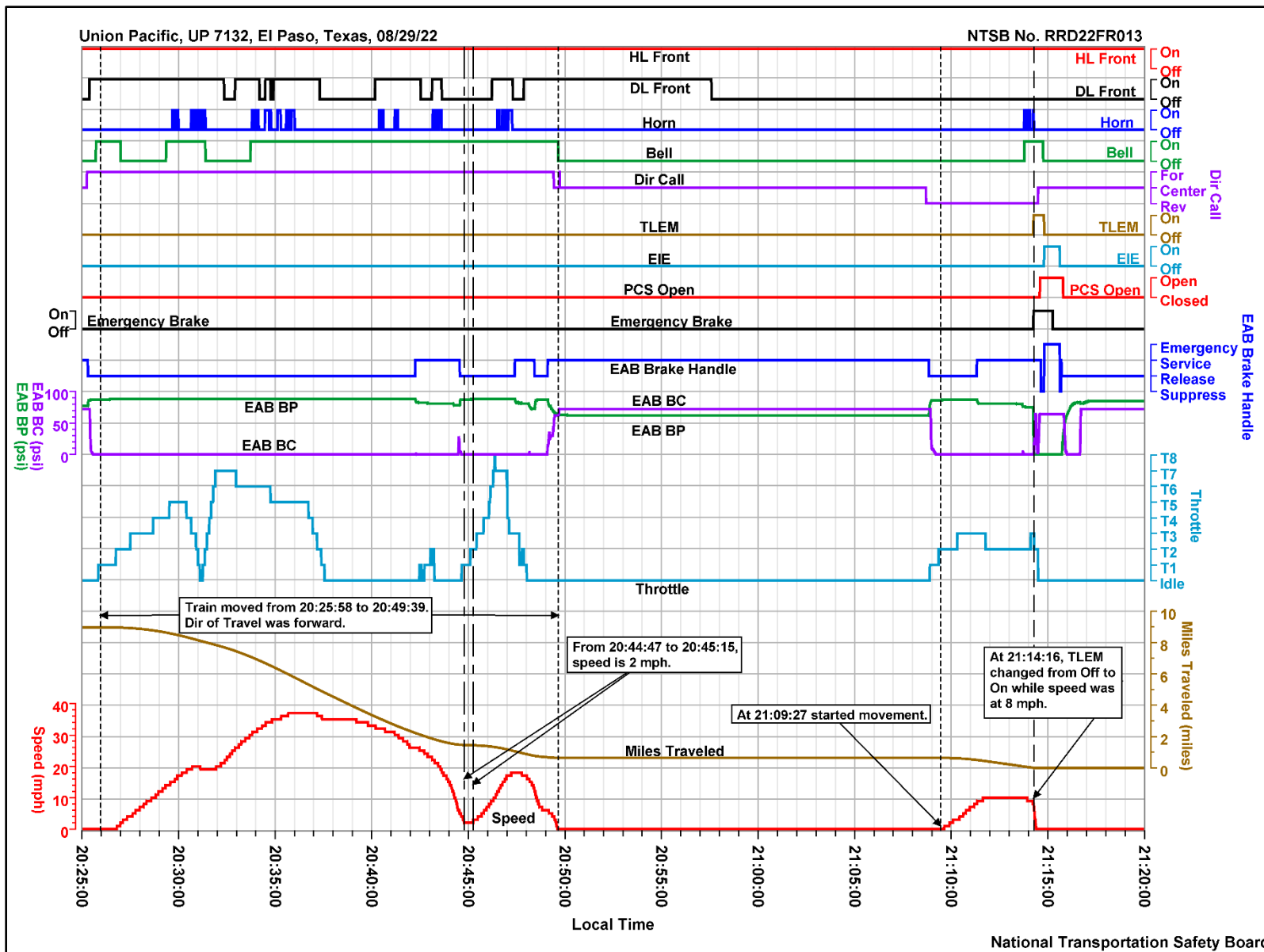


Figure 1. Select event recorder parameters from 20:25:00 MDT to 21:20:00 MDT

## APPENDIX A. VERIFIED AND PROVIDED PARAMETERS

This appendix describes the locomotive event recorder parameters provided and verified for UP 7132. Table 1 lists the plot labels, parameter descriptions, and units. Table 2 contains the unit and discrete state abbreviations for the parameters.

**Table 1.** Verified and provided locomotive event recorder parameters for UP 7132

Plot Label	Parameter Description	Unit
Bell	Bell	
Dir Call	Direction of Travel	
DL Front	Front Ditch Light	
EAB BC	Electronic Air Brake - Brake Cylinder Pressure	psi
EAB BP	Electronic Air Brake - Brake Pipe Pressure	psi
EAB Brake Handle	Electronic Air Brake - Brake handle	
EIE	Engineer Initiated Emergency	
Emergency Brake	Emergency Brake	
Feet Traveled	Feet Traveled	ft
HL Front	Front Head Light	
Horn	Horn	
Miles Traveled	Miles Traveled	miles
PCS Open	Pneumatic Control Switch Open	
Speed	Speed	mph
Throttle	Throttle Position	
TLEM	Train Line Emergency	

Note: Parameters with a blank unit description in table 1 are discrettes. A discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

**Table 2.** Unit and discrete state abbreviations

Unit and Discrete State Abbreviation	Description
For	Forward
ft	feet
mph	miles per hour
psi	pounds per square inch
Rev	Reverse
T1	Throttle Position 1
T2	Throttle Position 2
T3	Throttle Position 3
T4	Throttle Position 4
T5	Throttle Position 5
T6	Throttle Position 6
T7	Throttle Position 7
T8	Throttle Position 8