

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



RRD23FR012

LOCOMOTIVE EVENT RECORDER

Specialist's Factual Report

February 8, 2024

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A. ACCIDENT

Location: Baltimore, Maryland
Date: June 26, 2023
Time: 2006 eastern daylight time (EDT)
Train: CSX Transportation Y231

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 an event recorder file from the controlling locomotive 328 of the CSX Transportation Y231 train.

1.1 Recording Description

Using the wheel size of 42 inches as provided by investigators, locomotive 328's event recorder data were extracted using the Wabtec Railway Electronics Event Recorder - Data Analysis Software III (referred to as DAS III). This 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 a precision of 1 second. Only data relevant to this event are provided in this report.

1.2 Parameters

In the Appendix A, table 1 lists the parameters verified and provided in this report for locomotive 328. Additionally, table 2 contains the unit and discrete state abbreviations for the parameters.

1.2.1 Distance Traveled

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

1.2.2 Speed

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

1.3 Recorded Timing

The data was recorded in coordinated universal time (UTC). Within the DAS III program, the timing was adjusted to local time, EDT, by subtracting 4 hours. Therefore, the times used in this report are expressed as EDT.

D. FIGURES AND TABULAR DATA

Figures 1 and 2 contain event recorder data from locomotive 328 recorded during the event on June 26, 2023. All the parameters listed in table 1 are plotted.

Figure 1 covers data from 19:40:00 EDT to 20:10:00 EDT and figure 2 covers data from 20:04:40 EDT to 20:06:40 EDT.

In summary, locomotive 328's event recorder data indicated the last locomotive movement on June 26 was from 20:04:53 EDT to 20:06:25 EDT. During this time, locomotive 328 traveled in reverse for a total of 616 feet (ft), the maximum speed was 7 mph, and the throttle position moved between Idle and throttle position 3 (T3). Additionally, during this time, the Electronic Air Brake - Brake Cylinder Pressure (EAB BC) remained at about 0 psi until 20:06:08 EDT when it increased, reaching a maximum of 60 psi at 20:06:11 EDT and then subsequently decreased to 0 psi at 20:06:21 EDT and then increased to 54 psi at 20:06:25 EDT when the locomotive came to a complete stop.

In greater detail, the data indicated from 20:04:53 to EDT to 20:04:58 EDT, the EAB BC decreased from 70 psi to 10 psi, the throttle position changed from Idle to T3, and the direction of travel was reverse for the rest of the data. By 20:05:09 EDT, the speed increased to 4 mph, the throttle position changed to throttle 2 (T2), EAB BC decreased to 0 psi, and the locomotive moved 36 ft.

At 20:05:16 EDT, the speed increased to 5 mph, EAB BC increased slightly to 8 psi, the throttle position remained T2, and the locomotive moved 50 ft.

For the next 16 seconds until 20:05:32 EDT, the speed remained 5 mph, EAB BC decreased to 0 psi, and the train moved 132 ft. At 20:05:33 EDT, the speed decreased slightly to 4 mph and remained 4 mph for 5 seconds and then by 20:05:50 EDT increased to 7 mph. During this time, the EAB BC remained 0 psi, the locomotive moved 142 ft, and the throttle position increased to T3 then decreased to T2.

For the next 14 seconds until 20:06:04 EDT, the EAB BC remained 0 psi, the speed remained 7 mph, the throttle position decreased to throttle position 1 (T1) and then to Idle, and the locomotive moved 152 ft.

From 20:06:04 EDT to 20:06:25 EDT, the speed decreased from 7mph to 0 mph and the locomotive moved 97 ft when it came to a complete stop. During this

time, at 20:06:11 EDT, the EAB BC increased to 60 psi then a second later decreased to 53 psi and continued to decrease to 0 psi at 20:06:21 EDT and then increased to 54 psi at 20:06:25 EDT. Also, during this time, at 20:06:13 EDT, the throttle position changed to T1 and 2 seconds later to T2, and then at 20:06:21 EDT changed to Idle and remained Idle for the rest of the data.

The corresponding tabular data used to create figures 1 and 2 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Cassandra Johnson
Mechanical Engineer

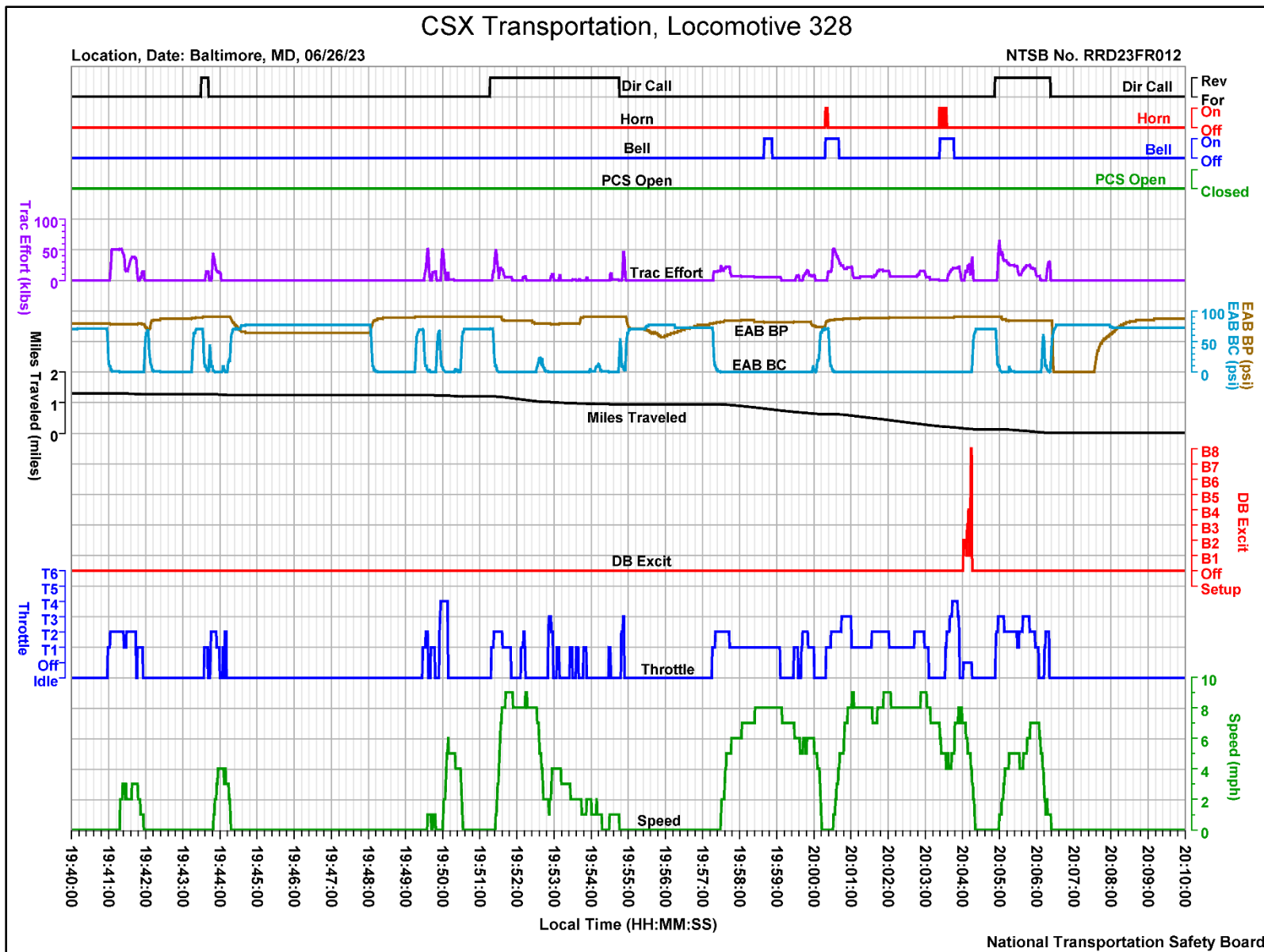


Figure 1. Locomotive 328's locomotive event recorder parameters showing movement from 19:40:00 EDT to 20:10:00 EDT.

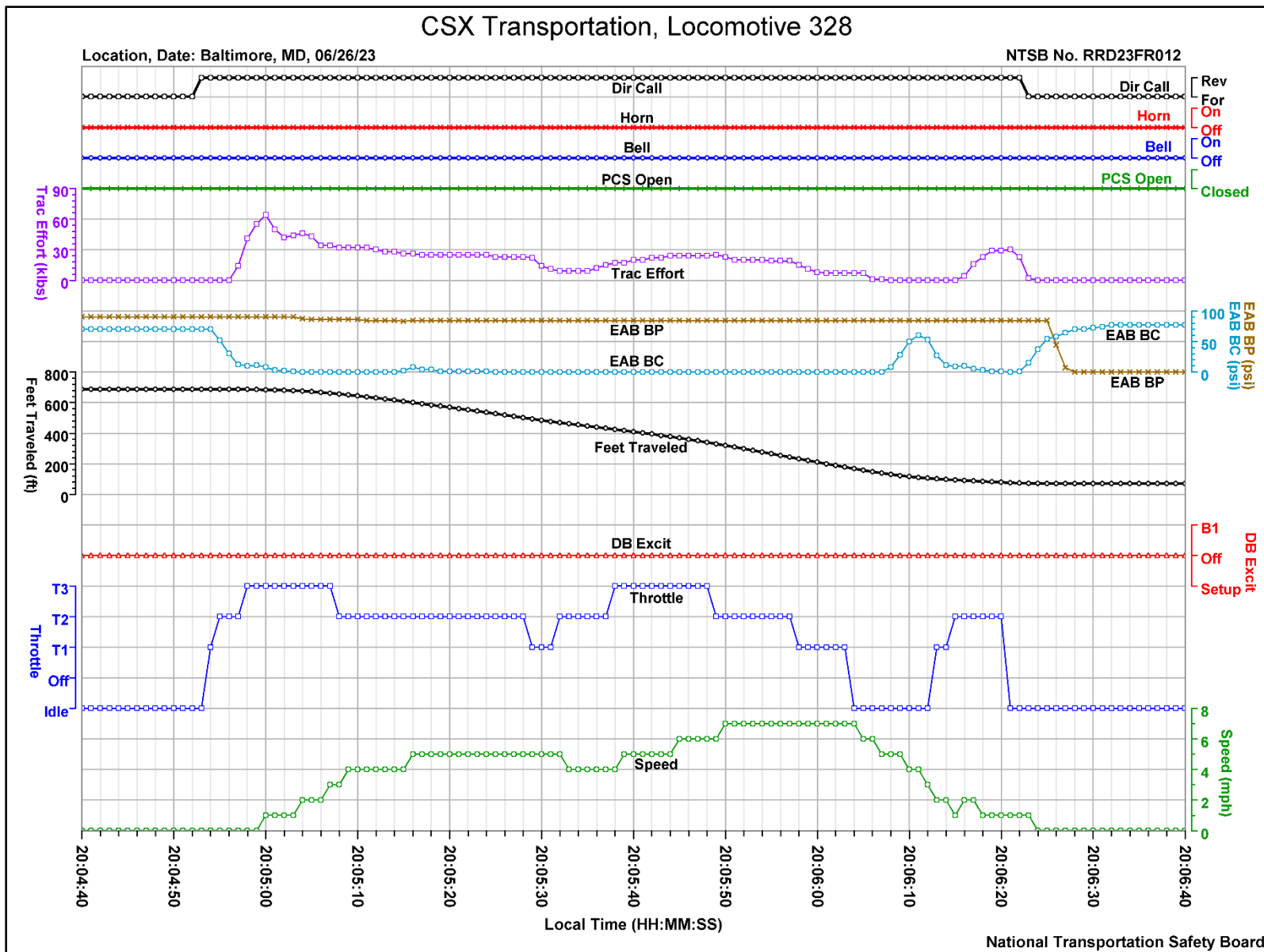


Figure 2. Locomotive 328's locomotive event recorder parameters showing movement from 20:04:40 EDT to 20:06:40 EDT.

APPENDIX A. VERIFIED AND PROVIDED PARAMETERS

This appendix describes the locomotive event recorder parameters provided and verified in this report for locomotive 328. Table 1 lists the parameters, 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 locomotive 328.

Parameter	Parameter Description	Unit
Bell	Bell	
DB Excit	Dynamic Brake Excitation	
Dir Call	Direction of Travel	
EAB BC	Electronic Air Brake - Brake Cylinder Pressure	psi
EAB BP	Electronic Air Brake - Brake Pipe Pressure	psi
Feet Traveled	Feet Traveled	ft
Horn	Horn	
Miles Traveled	Miles Traveled	miles
PCS Open	Pneumatic Control Switch	
Speed	Speed	mph
Throttle	Throttle Position	
Trac Effort	Tractive Effort	klbs

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
B1	Brake Position 1
B2	Brake Position 2
B3	Brake Position 3
B4	Brake Position 4
B5	Brake Position 5
B6	Brake Position 6
B7	Brake Position 7
B8	Brake Position 8
For	Forward
ft	feet
klbs	kilo pounds
mph	miles per hour
psi	pounds per square inch
Rev	Reverse
T1	Throttle Position 1
T2	Throttle Position 2

Unit and Discrete State Abbreviation	Description
T3	Throttle Position 3
T4	Throttle Position 4
T5	Throttle Position 5
T6	Throttle Position 6