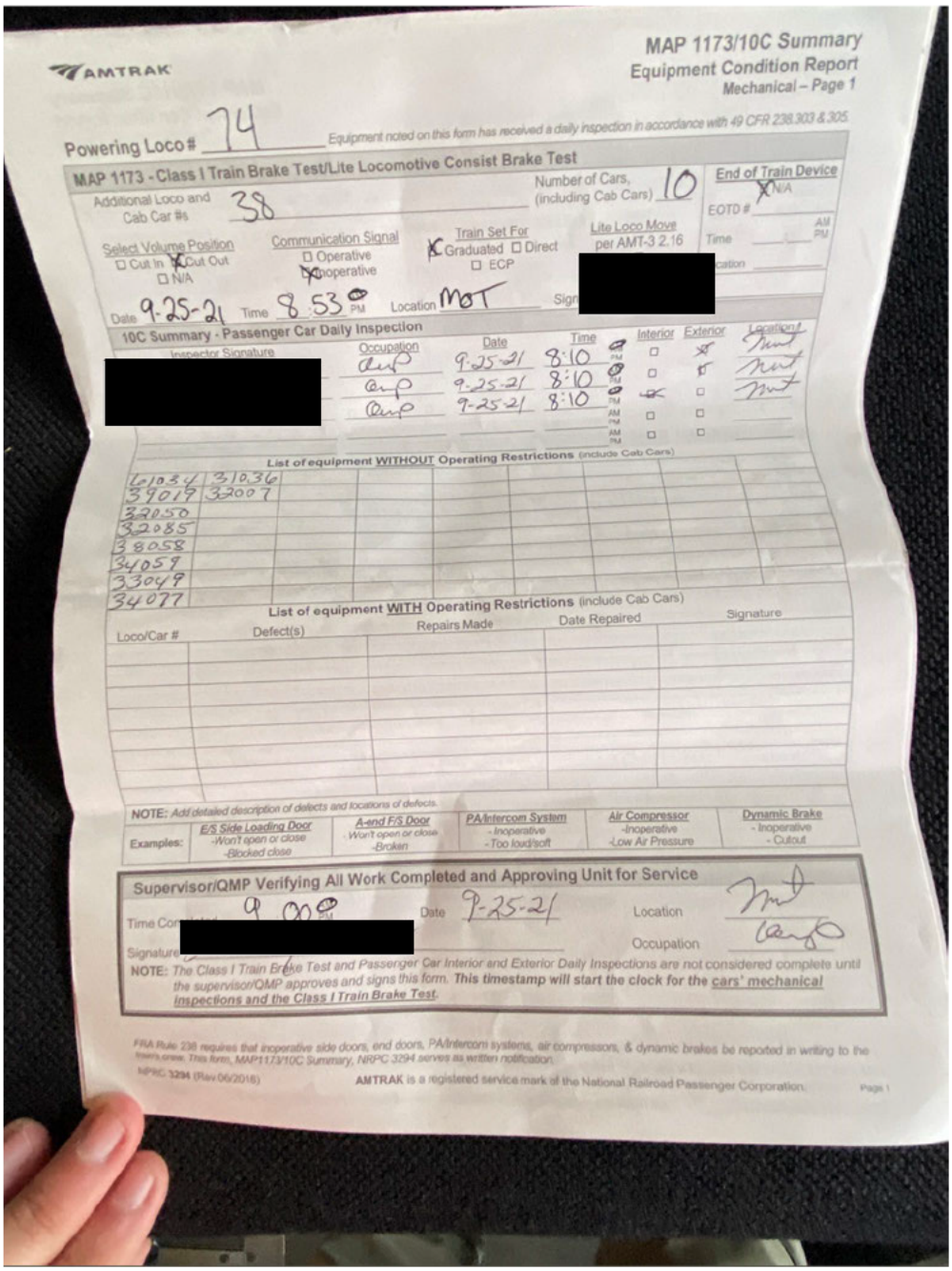
Amtrak 7(24) 1500 Mile Class I Air Brake Test Event Recorder Analysis

- **Date:** 10/25/2021
- **Data Source:** AMTK 74 Event Recorder Download (Wi-Tronix remote download)
- **Analysis Conducted by** Kelley L. Carr, Sr. Manager Locomotive Operations Safety.
- **Objective:** Capture event recorder artifacts of the QMP conducted Class I Air Brake Test application, release, and leakage test.

Map 1173 Screen Shot: Train 7(24) Form 1173 (Air Brake Test and Inspection), completed at 1500 Mile Inspection Point (MOT).



AMTRAK

MAP 1173/10C Summary
Equipment Condition Report
Mechanical – Page 1

Powering Loco # 74 — Equipment noted on this form has received a daily inspection in accordance with 49 CFR 238.303 & 305.

MAP 1173 - Class I Train Brake Test/Lite Locomotive Consist Brake Test

Additional Loco and Cab Car #s: 38 — Number of Cars, (including Cab Cars): 10 — End of Train Device: X N/A — EOTD #

Select Volume Position: ☐ Cut In ☒ Cut Out ☐ N/A — Communication Signal: ☐ Operative ☒ Inoperative — Train Set For: ☒ Graduated ☐ Direct ☐ ECP — Lite Loco Move per AMT-3 2.16 — Time — AM PM

Date 9-25-21 Time 8:53 PM Location MOT Sign [redacted]

10C Summary - Passenger Car Daily Inspection

Inspector Signature [redacted]

Occupation	Date	Time	Interior	Exterior	Location
QMP	9-25-21	8:10 PM	☐	☒	MOT
QMP	9-25-21	8:10 PM	☐	☒	MOT
QMP	9-25-21	8:10 PM	☒	☐	MOT
		AM PM	☐	☐	
		AM PM	☐	☐	

List of equipment WITHOUT Operating Restrictions (include Cab Cars)

61034	31036
39019	32007
32050	
32085	
38058	
34059	
33049	
34077	

List of equipment WITH Operating Restrictions (include Cab Cars)

Loco/Car #	Defect(s)	Repairs Made	Date Repaired	Signature

NOTE: Add detailed description of defects and locations of defects.

Examples:	E/S Side Loading Door -Won't open or close -Blocked close	A-end F/S Door - Won't open or close -Broken	PA/Intercom System - Inoperative - Too loud/soft	Air Compressor -Inoperative -Low Air Pressure	Dynamic Brake - Inoperative - Cutout

Supervisor/QMP Verifying All Work Completed and Approving Unit for Service

Time Completed 9:00 PM Date 9-25-21 Location MOT

Signature [redacted] Occupation QMP

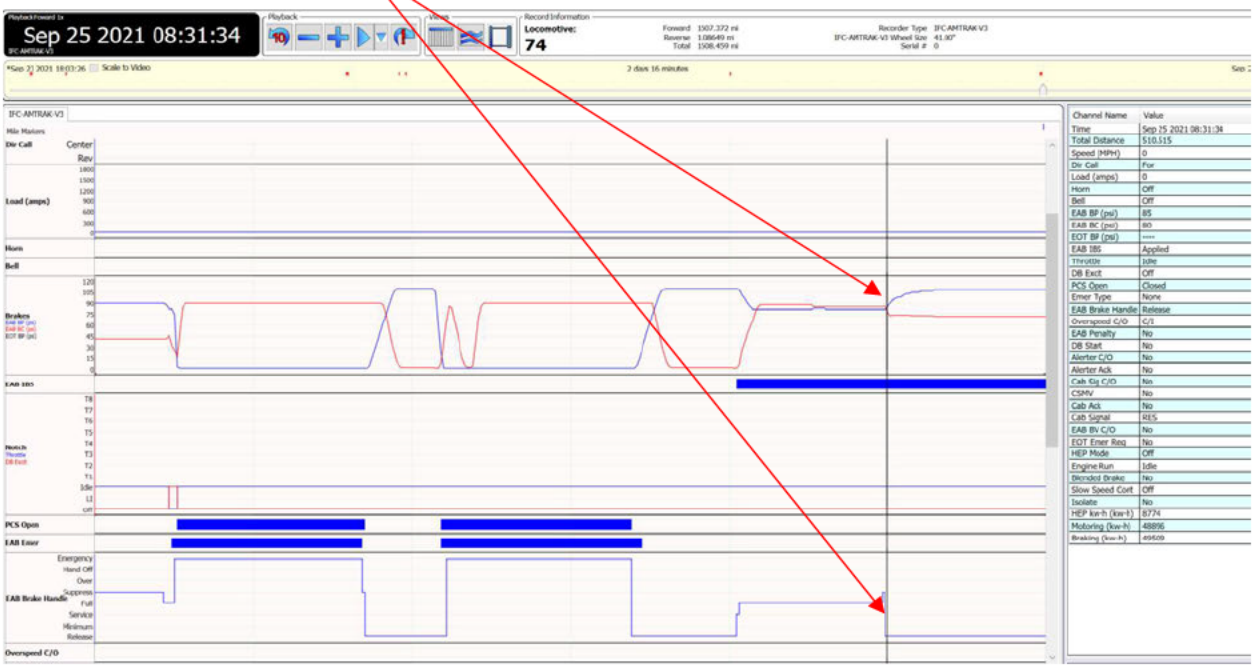
NOTE: The Class I Train Brake Test and Passenger Car Interior and Exterior Daily Inspections are not considered complete until the supervisor/QMP approves and signs this form. This timestamp will start the clock for the cars' mechanical inspections and the Class I Train Brake Test.

FRA Rule 238 requires that inoperative side doors, end doors, PA/intercom systems, air compressors, & dynamic brakes be reported in writing to the train crew. This form, MAP1173/10C Summary, NRPC 3294 serves as written notification.

NRPC 3294 (Rev 06/2018) AMTRAK is a registered service mark of the National Railroad Passenger Corporation. Page 1

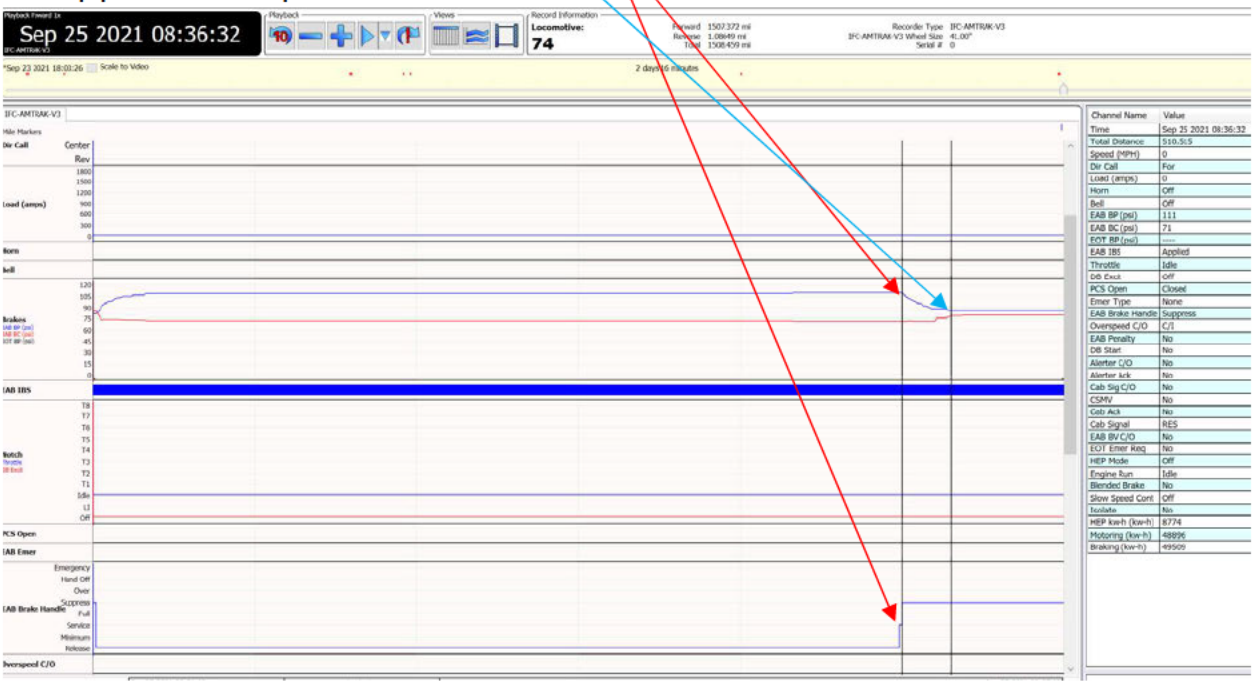
Train 7(24) Class I Initial Terminal (Minot) Airbrake Test ER Analysis

1) Train air brakes are released at 08:31:34 for an extended period. This is presumed to be the start of brake pipe charging period.

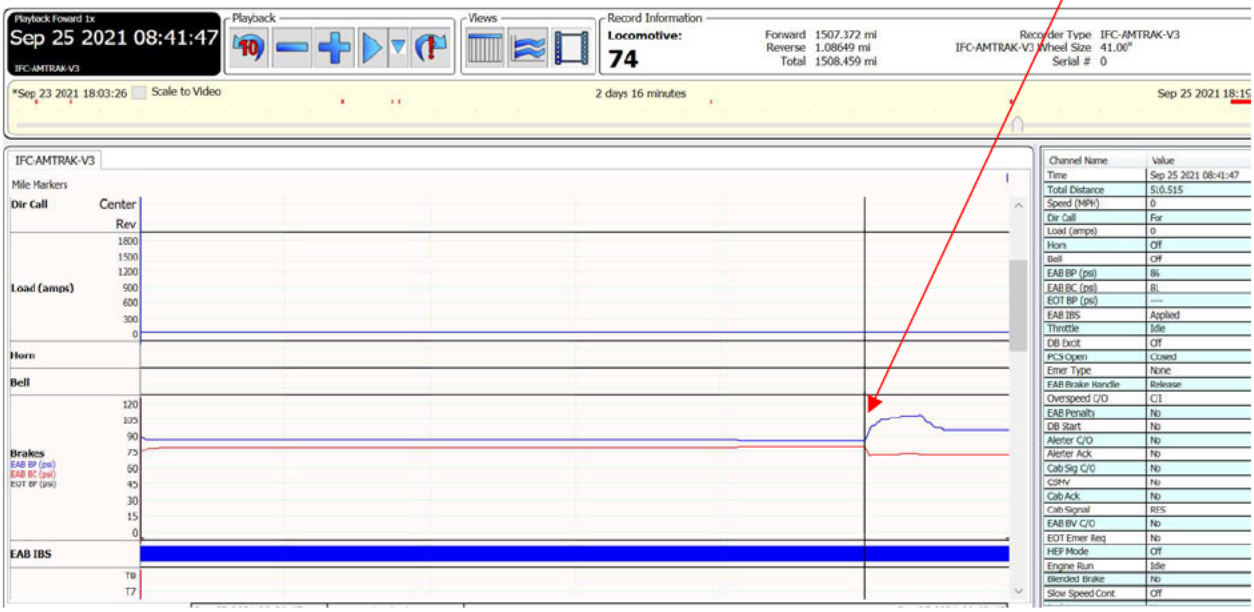


2) Initial 20 psi brake application begins at 08:36:32.

3) Brake pipe reduction equalizes around 08:36:52.

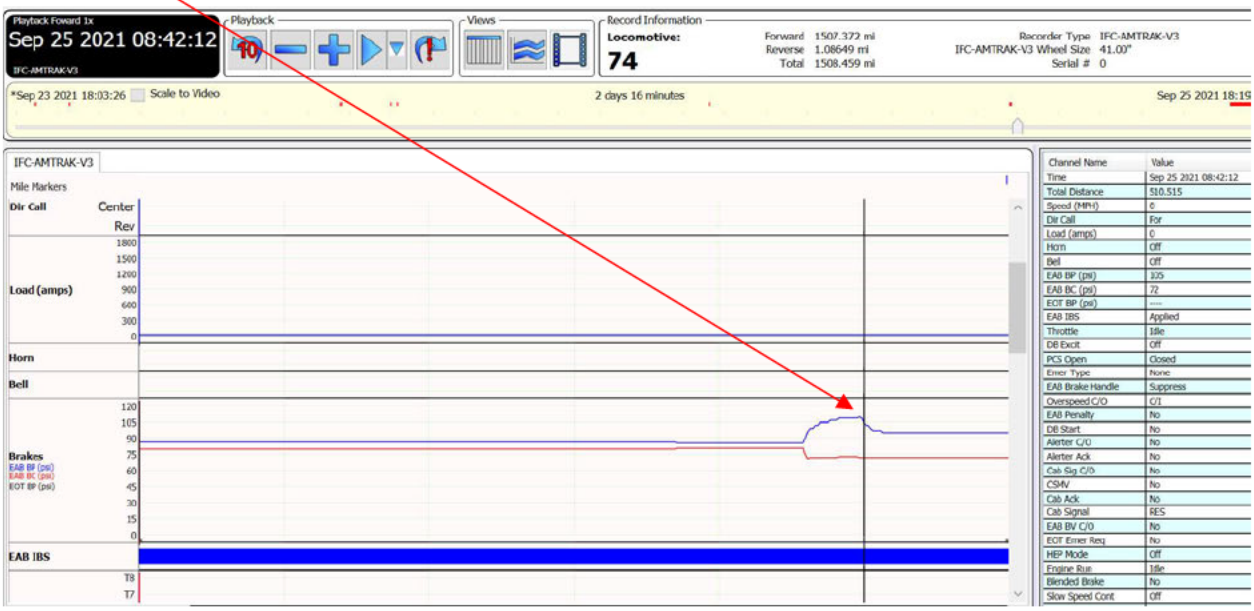


4) At 08:41:47, brake pipe pressure begins to increase (brakes releasing) in direct response to ABV (Automatic Brake Valve) handle being moved to the "Release" position. This action indicates that the P2A was not moved from the "Test" or "Cut Out" position (which controls locomotive brake pipe pressure maintaining) to the "Cut In" position after release of the ABV handle.



5) The train air brakes are released, and Class I air brake test concludes.

6) At 08:42:12, the train air brakes are applied and remain in this state until train departure at 09:05:36.



Drummac Inspecting QMP Q&A Session Items of Note

- On 10/6/2021, Amtrak Mechanical, Operations Safety and Drummac management performed a Q&A with the inspecting Drummac QMP who performed the 1500-mile Class I air brake test on train 7(24) in Minot.
- During the Q&A it was stated that locomotive tests and inspections testing occur immediately upon train arrival and before Class I train air brake testing. Additionally, this was confirmed as normal practice by the Division Road Foreman of Engines after the Q&A session.
- The Drummac QMP stated that the brake pipe angle cock is closed between the locomotive consist and passenger cars before locomotive tests and inspections. Brake pipe pressure is restored to the passenger cars (angle cock opened) immediately before the Class I air brake test.
- Below is brief narrative of Class I air brake test steps stated by QMP
    - Train brakes are released on the train.
    - Train air brakes are set and the QMP waits one (1) minute before advancing test.
    - Train air brakes are cut out by placing the P2A in the "Test" position (cutting out pressure maintaining feature). The QMP waits one (1) minute before advancing test.
    - The ABV handle is moved to release, and the QMP waits one (1) minute.
    - The P2A is cut in, placed in "Pass", and brake pipe pressure is restored to the train.
    - The train brakes are applied (service rate) to secure train, MAP 1173 documentation signed, and the train is transferred over to the outbound train crew.

Analysis Overview High Level Summary

Review of the locomotive event recorder revealed Class I air brake test discrepancies around Amtrak ABTH (Air Brake & Train Handling Rules) Class I brake test procedures. A brief overview of findings is listed below:

1) Locomotive pressure maintaining feature cut in action was not clearly observed (see Amtrak ABTH P4.2.1; steps 21 and 22). This suggests that locomotive pressure maintaining was not cut out to observe for train brake pipe leakage.
2) The sequence of Class I air brake test steps stated by the Drummac QMP does not align with Amtrak ABTH Class I Air Brake Test procedures. Although not in accordance with Amtrak ABTH it should be noted that the brake test step actions stated by the Drummac QMP were not observed in the locomotive event recorder.
3) Only 24 seconds elapsed from final air brake release to the service brake application used to secure the train at completion of the air brake test. Although more than one mechanical personnel may have participated in ground inspections during the air brake test, it cannot be reasonably expected that Amtrak ABTH Class I Air Brake Test procedure steps 23 and 24 were executed adequately in 24 seconds on a 10 passenger car train.

Amtrak ABTH Class I Air Brake Test Procedures:

P4.2 Train Brake Tests & Inspection

P4.2.1 Class I Brake Test / HST Departure Test

A. Class I Brake Test Requirements

1. Commuter & Short-Distance Intercity Passenger Trains:
   a. Once each calendar day that the train is placed or continues in passenger service.
   b. If a train has not been inspected today and will be in passenger service past 11:59pm tonight a Class I brake test and mechanical inspections are required before 11:59pm tonight.
2. Long-Distance Intercity Passenger Train:
   a. Prior to train's departure from originating/initial terminal, and
   b. Every 1,500 miles or once each calendar day, whichever occurs first, that the train remains in continuous passenger service.
3. When Class I brake test has expired proceed per instruction 10.1.18E.

B. Class I Brake Test Procedure (Engineer may participate in test by manipulating ABV handle, performing leakage and alerter test.

1. Apply proper Blue Signal protection.
2. Secure equipment per instruction 3.5.
3. Fully apply locomotive independent brake.
4. Electro-pneumatic brake disabled/turned off, if equipped.
5. Angle cocks / cutout cocks, and retaining valve handles must be properly positioned.
6. Each brake disc is free of any condemnable defect.
7. Charge train to required pressure. Check state of charge by cutting out the pressure-maintaining feature. If brake pipe pressure drops within 5 seconds, the train is not fully charged or excessive leakage exists. Find and correct any source of leakage. Before proceeding with test, be sure to cut in the pressure-maintaining feature.
8. Await signal to apply.
9. When signal is given to apply, make 20 psi brake pipe reduction.
10. After exhaust has stopped, cut out pressure-maintaining feature.
11. Wait 30 seconds. On longer trains such as Auto Train, wait 45 seconds.
12. Check brake pipe leakage-must not exceed 5 psi per minute.
13. Determine that brakes are applied on each car and all brake shoes / pads are firmly seated against the wheel or disc.
14. Each brake shoe or pad is not below the minimum thickness (varies depending on length of trip).
15. Each brake shoe or pad is securely fastened and correctly aligned in relation to the wheel / disc.
16. Brake rigging does not bind or foul.
17. Piston travel is within prescribed limits.
18. Brake indicators operate as intended (indicate brakes applied).
19. The communication of brake pipe pressure changes at the rear of the train is verified (by an application and release of the brakes on the last car in the train).
20. Await signal to release automatic brake.
21. When signal to release is given, release automatic brake.
22. Cut in pressure-maintaining.
23. Determine that all brakes release on each car. Ensure proper shoe / pad clearance exists.
24. Brake rigging must not bind or foul.
25. Brake indicators must operate as intended. (indicate brakes released)
26. Await signal to enable / turn on electro-pneumatic brake, if equipped.
27. When signal is given enable / turn on electro-pneumatic brake.
28. Test EP brake in accordance with local railroad procedures.
29. Make a walking inspection of electro-pneumatic application and release.
30. Communicating (Conductor's) Signal System must be tested and known to be operating as intended. A tested and operating two-way radio system meets this requirement.
31. MU equipment - Emergency Brake application, Alerter, Dead Man Pedal, or other emergency control devices must be tested if not indicated on the MAP 100. (Locomotives, MU equipment, and Cab Cars).

C. HST Departure Test Requirements

NOTE: The High-Speed trainset Class I Brake Test is a combination of a Class I and Locomotive Brake Test.

1. Prior to train's departure from originating/initial terminal, and
2. Every 1,500 miles or once each calendar day, whichever occurs first, that the train remains in continuous passenger service.
3. A High Speed Trainset that misses a scheduled HST Departure test due to delay en route may continue in service to the location where the inspection was scheduled to be performed.

NOTE: Locomotives, including Power Cars must be inspected and tested per Instructions 2.1 and 2.2 each calendar day, regardless if train was delayed en route.