



WMSC Commissioner Brief: W-0275 – Improper Vehicle Movement – near Van Dorn Street Station – May 24, 2023

Prepared for Washington Metrorail Safety Commission meeting on May 14, 2024

Safety event summary:

On Wednesday, May 24, 2023, a Train Operator of a Blue Line train experiencing mechanical issues on track 2 between Van Dorn Street and Franconia-Springfield stations improperly operated the train without permission from Rail Operations Control Center (ROCC) Rail Traffic Controller and at speeds exceeding the maximum authorized speed.

The Train Operator notified the Radio Rail Traffic Controller in the Rail Operations Control Center that their train was experiencing mechanical issues and would not move. The Train Operator had already begun troubleshooting procedures by recycling the Automatic Train Control System and initiating stop and proceed procedures. Vehicle Monitoring System (VMS) data reviewed for this investigation showed the train experienced a speed command failure. And that the speed readout continuously dropped from 65 MPH to 0 MPH before the train came to a complete stop.

The Train Operator requested to cut out Automatic Train Protection (ATP). This system is designed to ensure safe operation by imposing speed limits designed to ensure safe train separation and to match civil speed restrictions. Deactivating or “cutting out” the system is necessary in certain circumstances in order to move a disabled train. While being assisted with troubleshooting procedures by the Radio Rail Traffic Controller, the Train Operator made several requests to cut out ATP but was not granted permission. During an investigative interview the Train Operator stated they experienced difficulty communicating with the ROCC due to a high volume of radio traffic. This was verified through radio recording review.

The Radio Rail Traffic Controller instructed the Train Operator to activate Power Knockout, which allows the train operator to take a point of power even if the brakes do not release. The Radio Rail Traffic Controller gave the Train a permissive block to a signal outside Franconia-Springfield. A permissive block is a section of clear track ahead of a train in the established direction of traffic up to a specific point into which no other train is permitted.

After several attempts by the Radio Rail Traffic Controller to contact the Train Operator went unanswered, the Train Operator reported that after activating Power Knockout did not work, they cut out ATP and the train moved. VMS data showed that Power Knockout was not initiated.

The Train Operator stated they were moving under permissive block to Franconia-Springfield. During an investigative interview the Train Operator stated that they became frustrated and cut out ATP and acknowledges that they did not follow procedure or the instructions given by the Radio Rail Traffic Controller.

VMS data showed that while ATP was cut out, the Train Operator moved the train 7,942 feet with passengers on board at speeds up to 31 MPH. This exceeded the maximum authorized speed when ATP is deactivated of 15 MPH.

The Train Operator was removed from service at the Franconia-Springfield Station Terminal for post-event toxicology testing and instructed on proper procedure by the Terminal Supervisor.

An inspection by Office of Automatic Train Control Maintenance personnel found that the Cross Bond inside the Wee-Z Bond, located in the vicinity of where the Train Operator reported speed command issues, was wet and the resistor was corroded. The Wee-Z Bond was replaced.



Probable Cause:

The probable cause of this event was noncompliance with written operational rules and procedures.

Corrective Actions:

The Train Operator attended refresher training with an emphasis on MSRP Section 3 – Operating Rules 3.22 through 3.30.

CAP C-0256 addresses the finding that Metrorail systematically identifying and mitigating hazards related to automatic train control and signaling as required by its Agency Safety Plan. This CAP has just been approved for implementation and is expected to be completed in June 2025.

Metrorail currently has related open CAP C-0181 addressing the finding that elements of Metrorail have a culture that accepts noncompliance with written operational rules, instructions, and manuals. The WMSC is currently reviewing this CAP to ensure the deliverables and intended outcomes of this CAP have been met.

WMSC staff observations:

Metrorail is implementing corrective action plans (CAP C-0181) associated with the WMSC's Rail Operations Audit issued in April 2022. Metrorail has committed to completing this CAP by October 2024. This CAP addresses consistent supervisory oversight, effective training, safety promotion, "just culture," and other elements Metrorail has committed to in its Public Transportation Agency Safety Plan (PTASP). Metrorail has revised its Safety Management System related to Rail Operations. This has included implementing new methods of hazard and risk reporting, training of personnel on reporting and implementation of a new data collection system for those issues so they can be properly evaluated and addressed. The WMSC is currently reviewing this CAP to ensure the deliverables and intended outcomes of this CAP have been met.



Washington Metropolitan Area Transit Authority
Department of Safety (SAFE)
Office of Safety Investigations (OSI)

FINAL REPORT OF INVESTIGATION A&I E23346

Date of Event:	May 24, 2023
Type of Event:	Improper Rail Vehicle Movement
Incident Time:	12:12 hours
Location:	Between Van Dorn Street Station and Franconia-Springfield Station, track 2 (CM J2 809+00)
Time and How received by SAFE:	12:30 hours SAFE/MAC
WMSC Notification Time:	12:48 hours
Responding Safety Officers:	WMATA: N/A WMSC: N/A Other: N/A
Rail Vehicle:	Train ID 409 (L6082-6083, 6111-6110, 6114-6115T)
Injuries:	None
Damage:	Wee-Z Bond – Water Damage
Emergency Responders:	N/A
SMS I/A Incident Number:	20230607#109024

Franconia Springfield Station – Improper Rail Vehicle Movement

May 24, 2023

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Abbreviations and Acronyms

AIMS	Advanced Information Management System
AOM	Assistant Operations Manager
ARS	Audio Recording Systems
ATC	Automatic Train Control
ATP	Automatic Train Protection
CCTV	Closed-Circuit Television
CM	Chain Marker
CMOR	Office of the Chief Mechanical Officer
IIT	Incident Investigation Team
MAC	Mission Assurance Coordinator
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
OM	Operations Manager
OSI	Office of Safety Investigations
QA/QC	Quality Assurance/Quality Control
RTC	Rail Traffic Controller
RTRA	Office of Rail Transportation
ROCC	Rail Operations Control Center
SAFE	Department of Safety
SMS	Safety Measurement System
VMS	Vehicle Monitoring System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

This accident investigation and candid self-evaluation aim to collect and analyze available facts, determine the incident's probable cause(s), identify contributing factors, and make recommendations to prevent a recurrence.

Investigative Methods

Upon receiving notification of the Improper Rail Vehicle Movement between Van Dorn Street Station and Franconia-Springfield Station, track 2 at CM J2 809+00 on May 24, 2023, SAFE dispatched a cross-functional team to assess the scene and conduct the subsequent investigation. SAFE team members worked with relevant WMATA subject matter experts to review the incident's facts and data.

The preliminary investigative methodologies included the following:

- Site assessment through video and document review
- Formal Interviews – SAFE interviewed the Train Operator of Train ID 409 as part of this investigation. The interview included persons present at, during, and after the incident, those directly involved in the response process, and representatives from the Washington Metrorail Safety Commission (WMSC).
- Informal Interviews – Collected through conversations with individuals during the investigation to provide background and supporting information. Written statements were reviewed by personnel present during the event.
- Documentation Review – A collection of relevant work history information and process documentation in Metro record systems. These records include the following:
 - Train Operator Training Records
 - Train Operator Certifications
 - Train Operator 30-Day work history review
 - Metrorail Safety Rules and Procedures Handbook (MSRPH)
 - National Oceanic and Atmospheric Administration (NOAA)
 - Maximo Data
- System Data Recording Review – A collection of Metro Data Recording Systems information. This data includes:
 - Audio Recording System (ARS) playback
 - Advanced Information Management System (AIMS)
 - Office of the Chief Mechanical Officer/ Incident Investigative Team (CMOR/IIT) Analysis

Investigation

On Wednesday, May 24, 2023, at 12:12 hours, the Train Operator of Train ID 409 (L6082-6083, 6111-6110, 6114-6115T) reported to ROCC that they were located between Van Dorn Street Station and Franconia-Springfield Station on track 2 when the train experienced issues with speed commands causing the train to stop at CM J2 809+00.

The Audio Recording System (ARS) revealed that the Train Operator advised ROCC that they had recycled the Automatic Train Control (ATC) System, requested to cut out ATP, initiated the stop and proceed procedure, and the speed commands dropped to zero. The Radio RTC inquired

if the Train Operator had begun the stop-and-proceed procedure. The Train Operator replied that they had initiated the stop-and-proceed procedure, and nothing worked to get the train to move.

At 12:13 and 12:14 hours, the Train Operator repeatedly requested permission to cut out ATP and was advised to stand by. The Train Operator again asked permission to cut out ATP, and the Radio RTC inquired if the train's brake cylinder pressure was dropping. The Train Operator confirmed that the brake cylinder pressure was dropping.

The Radio RTC instructed the Train Operator to activate the Power Knockout and granted a permissive block to the J03-08 signal outside Franconia-Springfield Station.

The AOM contacted the OM and advised that Train ID 409 was troubleshooting.

At 12:16 hours, the Radio RTC attempted to contact the Train Operator three times to inquire if Train ID 409 was moving, but there was no response from the Train Operator. Seconds later, the Train Operator responded that they activated the Power Knockout, and it did not work; they cut out ATP, and the train moved. The Train Operator advised that they were moving the train under the permissive block that the Radio RTC previously granted. The Train Operator failed to follow troubleshooting procedures, so it was unclear if ATP needed to be cutout.

At 12:19 hours, the Train Operator contacted the Franconia-Springfield Station Terminal and advised the Terminal Supervisor of the train's arrival. The Terminal Supervisor instructed the Train Operator to remove the train from service.

The AOM notified the OM that the Train Operator cut out ATP without permission and continued to Franconia-Springfield Station. The OM instructed the Terminal Supervisor to reinstruct the Train Operator on the following procedures. At 12:25 hours, the Button RTC contacted the Terminal Supervisor and advised them to reinstruct the Train Operator to follow the procedures.

An analysis of the Vehicle Monitoring System (VMS) data revealed that Train ID 409 departed from Van Dorn Street Station towards Franconia-Springfield Station. Approximately 9,019 feet after leaving Van Dorn Street Station, the train experienced speed readout problems, with the speed readout continuously dropping from 65 MPH to 0 MPH. After traveling an additional 1,755 feet, the train came to a complete stop. The Train Operator performed a key down and backup process.

During this time, the ATP cut-out switch was disabled, resulting in the deactivation of ATP protection. The master controller was set to coast, and the train resumed movement towards Franconia. With the ATP cut-out activated, the train traveled a distance of 7,942 feet at speeds of up to 31 MPH.

Eventually, the train stopped 8 feet from the 8-Car marker at Franconia-Springfield, Track #1. The right-side doors were briefly opened and then closed. The Train Operator performed a key-down procedure, and the ATP cut-out signal returned to normal.

During the formal interview, the Train Operator stated that they departed Van Dorn Street Station towards Franconia-Springfield Station. While en route, the train experienced an issue with the speed commands, and the train would not move any further. The Train Operator stated that they initiated stop and proceed, and the problem continued. They contacted ROCC and requested to cut out ATP.

The Train Operator stated that there were many transmissions on the radio, and they were having difficulty contacting ROCC. The Train Operator stated that ROCC began to ask questions about

troubleshooting the train. The Train Operator stated that ROCC granted permission to activate the Power Knockout. Activating the Power Knockout did not help. The Train Operator stated that they became frustrated, cut out ATP, and then the train could move.

The Train Operator acknowledged that they did not follow the procedures and instructions from ROCC.

The Office of Automatic Train Control Maintenance (ATCM) was notified of an intermittent false occupancy on the track circuit at J2 812+00. Upon inspection, ATCM found that the Rx Bond (Cross Bond) inside the Wee-Z Bond was wet, and the resistor was corroded. On May 27, 2023, ATCM replaced the damaged Wee-Z Bond.

Chronological Event Timeline

A review of ARS playback, i.e., phone and radio communications, revealed the following timeline:

Time	Description
12:12:39 hours	<u>Train ID 409</u> : Reported an issue with speed commands at J2 809+00, recycled the ATC. Requested to cut out ATP and reported being unable to move the train. Attempted to move, entered stop and proceed, speed commands drop to zero. <u>ROCC Radio RTC</u> : Inquired, "Have you initiated stop and proceed?" <u>Train ID 409</u> : Reported nothing is working. Attempted to move, entered stop and proceed, speed commands drop to zero. [Radio Ops 3]
12:13:48 hours	<u>Train ID 409</u> : Requested permission to cut out ATP. <u>ROCC Radio RTC</u> : No response. [Radio Ops 3]
12:14:00 hours	<u>Train ID 409</u> : Requested permission to cut out ATP. <u>ROCC Radio RTC</u> : Instructed, standby. [Radio Ops 3]
12:14:17 hours	<u>Train ID 409</u> : Requested permission to cut out ATP. <u>ROCC Radio RTC</u> : Inquired, "What's your lead car number?". <u>Train ID 409</u> : Responded, 6082. <u>ROCC Radio RTC</u> : Inquired, "Is the brake cylinder pressure dropping?" <u>Train ID 409</u> : Confirmed the brake cylinder pressure dropping. [Radio Ops 3]
12:14:48 hours	<u>ROCC Radio RTC</u> : Granted permission to activate power knockout and permissive block to J03-08 to contact Franconia-Springfield Terminal. <u>Train ID 409</u> : Acknowledged and repeated. [Radio Ops 3]
12:15:54 hours	<u>AOM</u> : Notified OM that Train ID 409 was troubleshooting. [Phone Rail 1]
12:16:11 hours	<u>ROCC Radio RTC</u> : Inquired if Train ID 409 was moving. <u>Train ID 409</u> : No response. [Radio Ops 3]
12:16:23 hours	<u>ROCC Radio RTC</u> : Inquired if Train ID 409 was moving. <u>Train ID 409</u> : No response. [Radio Ops 3]
12:16:41 hours	<u>ROCC Button RTC</u> : Notified ROIC that Train ID 409 was troubleshooting. [Phone Ops 3]
12:16:43 hours	<u>ROCC Radio RTC</u> : Inquired if Train ID 409 was moving. <u>Train ID 409</u> : No response. [Radio Ops 3]
12:16:59 hours	<u>ROCC Radio RTC</u> : Attempted to contact Train ID 409. <u>Train ID 409</u> : Advised Power Knockout was activated and did not work, cut out ATP, and the train moved on the permissive block to J03-08. <u>ROCC Radio RTC</u> : Acknowledged and repeated. [Radio Ops 3]
12:17:29 hours	<u>ROCC Button RTC</u> : Instructed Franconia-Springfield Terminal Supervisor to remove the train from service. [Phone Ops 3]

Time	Description
12:19:29 hours	<u>Train ID 409</u> : Contacted Franconia-Springfield Terminal. <u>Terminal Supervisor</u> : Instructed to place the train out of service. [Radio BLKH J03]
12:19:50 hours	<u>AOM</u> : Notified the OM of the event. <u>OM</u> : Instructed to have the Train Operator reinstructed on procedures. [Phone Rail 1]
12:21:50 hours	<u>AOM</u> : Instructed the Button RTC to contact Franconia-Springfield Terminal and have them to reinstruct the Train Operator on following procedures. [Phone Ops 3]
12:25:26 hours	<u>ROCC Button RTC</u> : Instructed the Franconia-Springfield Terminal to reinstruct the Train Operator on following procedures. [Phone Ops 3]

***Note: Times above may vary from other systems' timelines based on clock settings and reporting sources.*

Automated Information Management System (AIMS)

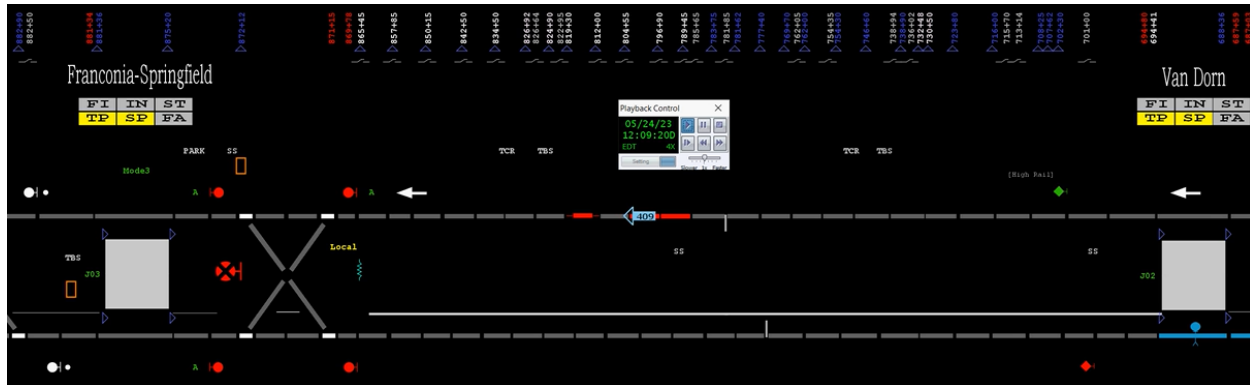


Figure 1 – AIMS Playback depicting Train ID 409 approaching the down track circuit at 12:09:20 hours.

The Office of Chief Mechanical Officer (CMOR) / Vehicle Monitoring and Diagnostic System (VMDS)

Adopted from CMOR IIT report with minor formatting and grammatical edits:

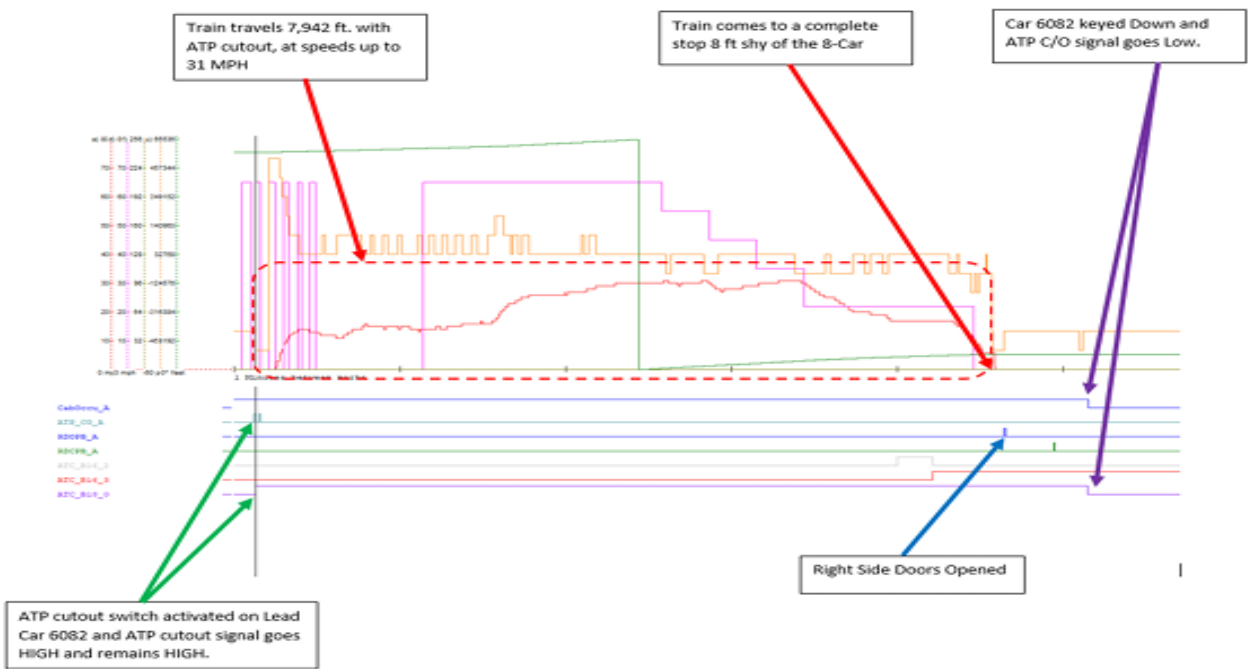
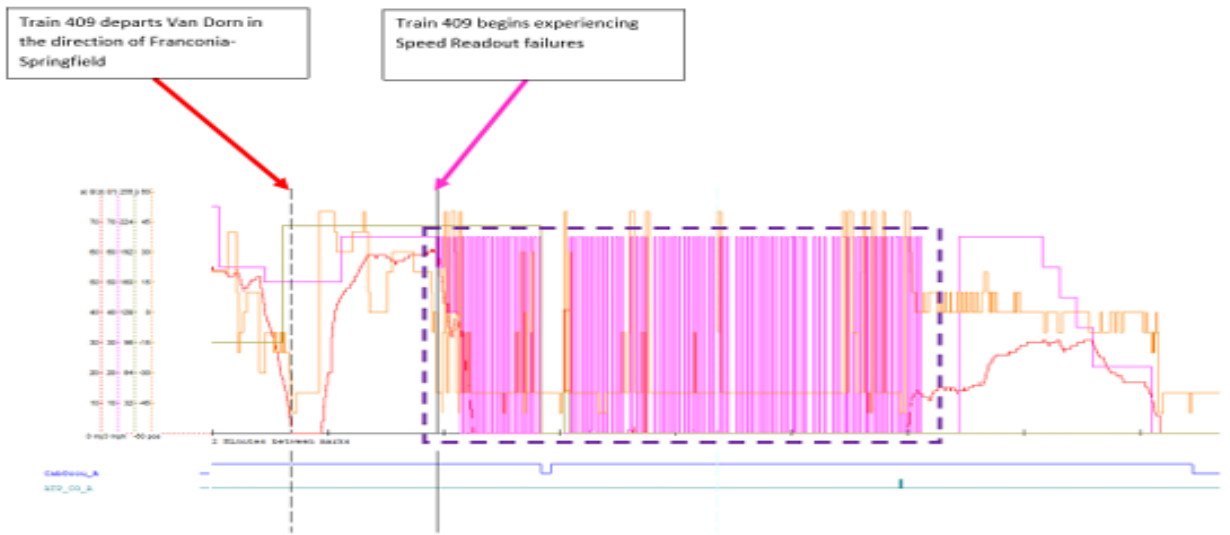
"IIT has completed the download and analysis of data from Train ID 409.

Based on VMS data, Train ID 409 departed Van Dorn Street Station toward Franconia-Springfield Station. At 9,019 feet after leaving Van Dorn Street Station, the train began to experience speed readout problems, with the SROs continuously dropping from 65 MPH to 0 MPH. After traveling an additional 1,755 feet, the train stopped and keyed down and back up. The ATP cut-out switch was cut out, and ATP protection was disabled. The master controller was moved to coast, and the train again began to move towards Franconia-Springfield Station. The train traveled 7,942 feet with ATP cut-out activated, traveling at a speed of up to 31 MPH. The train stopped 8 feet from the 8-car marker at Franconia-Springfield Station, Track 1. The doors were opened on the right side and closed shortly afterward. The train was keyed down, and the ATP cut-out signal normalized.

The train did experience a speed readout failure. However, no fault with the train contributed to the cause of the reported incident of moving without a permissive block."

See timeline of events below:

Time	Description of Events
12:09:26.572	9,019 ft. after departing Van Dorn, Train ID409 began to experience Speed Readout problems. VMS shows Speed Readouts repeatedly dropping from 65 MPH to 0 MPH
12:10:03.437	The train came to a complete stop after traveling an additional 1,755 ft. with SROs continuing to drop in and out.
12:11:12.772	Lead Car 6082 keyed down.
12:11:22.621	Car 6082 keyed back up.
12:12:49.320	Master Controller placed in a P4 power mode and train moves 7 ft. and comes to a complete stop
12:17:22.112	ATP cutout switch activated and ATP cutout signal goes high and remains high
12:17:27.132	The Master Controller was placed on P5 Power Mode and the Train began to move with ATP cutout.
12:17:38.096	The Master Controller placed in Coast, Train speed was 14 MPH, SROs still repeatedly falling to 0 MPH.
12:17:38.096 - 12:21:48.128	The Master Controller was cycled back and forth utilizing multiple operating modes ranging between from P2 Power Mode and B2 Braking Mode. Traveling at speeds up to 31 MPH.
12:21:18.140	Train entered into Franconia Springfield Station at a speed of 17 MPH, with the Master Controller in the Coast position.
12:21:48.320	Master Controller placed in a P5 Power Mode, Train speed was 6 MPH,
12:21:49.185	Train came to a complete stop 8 ft. from the 8-Car Marker at Franconia-Springfield, Track #1, traveling a total of 7,942 ft. with ATP cutout.
12:21:52.540	Right Door Open pushbutton activated, and Right side doors open.
12:22:10.507	Right Door Close pushbutton activated, and Right side doors Close.
12:22:23.232	Car 6082 Keyed Down, ATP cutout signal goes Low.



Graph 1 – VMS Graph

Office of Systems Maintenance, Office of Radio Communications (COMR)

The Office of Radio Communications conducted comprehensive radio checks (TX/RX) at Franconia-Springfield Station on tracks one and two. No trouble was found.

Automatic Train Control Maintenance (ATCM)

ATCM was notified of an intermittent false occupancy on the track circuit at J2 812+00. Upon inspection, ATCM found that the Rx Bond (Cross Bond) inside the Wee-Z Bond was wet, and the resistor was corroded. On May 27, 2023, ATCM replaced the damaged Wee-Z Bond.

Office of Rail Transportation (RTRA)

Adopted from RTRA report:

The investigation determined that the Train Operator cut out ATP without permission on Mainline. The Train Operator received disciplinary action concerning this event, including a Written Reprimand.

Interview Findings

As part of the investigation launched into the event, SAFE interviewed the Train Operator. The interview identified the following key findings associated with this event. The findings detailed below include reported information from involved personnel and may conflict with other data sources contained in the report.

- The Train Operator stated that en route to Franconia-Springfield Station, the train experienced an issue with the speed commands and would not move any further.
- The Train Operator stated that they initiated stop and proceed, and the issue continued.
- The Train Operator stated that they immediately knew they needed to cut out ATP for the train to move. They contacted ROCC and requested to cut out ATP.
- The Train Operator stated that there were many transmissions on the radio, and they were having difficulty contacting ROCC.
- The Train Operator stated that ROCC began to ask questions about troubleshooting the train.
- The Train Operator stated that ROCC granted permission to activate power knockout. Activating power knockout did not help.
- The Train Operator stated that they became frustrated, cut out ATP, and then the train was able to move.
- The Train Operator acknowledged that they did not follow the procedures and instructions from ROCC.

Weather

On May 25, 2023, at the time of the incident, NOAA recorded the temperature as 50° F, with clear skies. The weather was not a contributing factor in this event. (Weather source: NOAA – Location: Springfield, Virginia).

Related Rules and Procedures

MSRPH Section 3 Operating Rules – 3.22 through 3.30
SOP #15 – Absolute Block/Permissive Block

Human Factors

Evidence of Fatigue

Conditions were evaluated at the time of the incident to distinguish whether evidence of fatigue was present. The Train Operator reported feeling fully alert at the time of the incident. The Train Operator reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

The incident data was evaluated for fatigue risk factors for the Train Operator. Risk factors for fatigue were not present for the Train Operator. Since fatigue evidence and risk factors were

absent, the biomathematical fatigue modeling application (SAFTE-FAST Web SFC) was not applied.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that the Train Operator complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6.

Training and Work History

The Train Operator had no reported safety violations within the last three years. According to RTRA QA/QC records, the Train Operator obtained QL-1 certification on May 19, 2022.

Findings

- Wee-Z Bond failure led to a track circuit malfunction at J2 812+00 due to water intrusion.
- The Train Operator cut out ATP without permission from ROCC.
- After ATP was cut out, the Train Operator operated the train at speeds greater than the restricted speed (15 MPH).
- The Train Operator reported initiating Power Knockout; however, the VMS data does not support the Train Operator's statement.

Immediate Mitigation to Prevent Recurrence

- The Train Operator was removed from service.
- The train consist was removed from service for post-incident inspection.
- The damaged Wee-Z Bond was replaced.

Probable Cause Statement

The probable cause of the Improper Rail Vehicle Movement event on May 24, 2023, was a failure to follow established procedures. This included the Train Operator's failure to follow the Radio RTC's troubleshooting instructions and adhere to the maximum authorized speed of 15 MPH with ATP disabled. A contributing factor to this event was a Wee-Z Bond failure that caused the intermittent bobbing track circuit causing the train to stop.

Recommended Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
109024_SAFE CAPS_RTRA_ 001	Train Operator to attend refresher training with an emphasis on MSRP Section 3 – Operating Rules 3.22 through 3.30.	RTRA	Completed

Appendices

Appendix A – Interview Summary

The below narratives summarize the incident and represent the statements made by the involved individual. As such, times and details may present a conflict with the data contained in systems of record.

The Train Operator is a WMATA employee with thirteen years of service and five years of experience as a Train Operator. The Train Operator holds a Roadway Worker Protection (RWP) Level 2 certification that expires in August 2023.

During the formal interview, the Train Operator said they departed Van Dorn Street Station towards Franconia-Springfield Station. While en route, the train experienced an issue with the speed commands, and the train would not move any further. The Train Operator stated that they initiated stop and proceed and the problem continued. The Train Operator noted that they immediately knew they needed to cut out ATP for the train to move. They contacted ROCC and requested to cut out ATP.

The Train Operator stated that there were many transmissions on the radio, and they were having difficulty contacting ROCC. The Train Operator said that ROCC seemed to take a long time to respond.

The Train Operator stated that ROCC began to ask questions about troubleshooting the train. The Train Operator said that ROCC granted permission to activate power knockout. Activating power knockout did not help.

The Train Operator stated that they became frustrated, cut out ATP, and then the train could move.

The Train Operator acknowledged that they did not follow the procedures and instructions from ROCC. The Train Operator stated that they thought they were having radio communication issues and there was a misunderstanding of the instructions.

CATEGORIES / SUBCATEGORIES	QUALITY LEVEL	REMARKS (Remarks are required for a quality level score of 2 or 3) - ALL TIMES (are in minutes)
I. Preparation for Service		
1. Exterior Inspection	1	Cars Used: 7476 X 7585 X 7302 X 7409 TRUCK C/D - 7303, BARRIER - 7609, ROTARY DRUM SWITCH - 7609
2. Interior Inspection - Trailing Cab	1	EMERGENCY LIGHT C/D TRIPPED - 7302
3. Interior Inspection - Each Car	1	HORN C/D - 7409, BOARD REMOVED - 7408
4. Interior Inspection - Oper. Cab	1	DOOR OPEN 10 #9
5. Rolling Test / Rolling Brake Test	1	Time Allotted: 35:00 / Actual Time: 02:5 / 1:00
II. Mainline Operation		
6. Communications	1	
7. Door Oper. & Station Stopping	1	
8. Use of Horn	1	
9. Speed Adherence/Manual Oper.	1	
10. Turn Back Moves	1	Location: BULLSTON K04-04 Time Allotted: 02:00 / Actual Time: 05:2 05:4
11. Manual Route Selection	1	Location: K06-18
12. EV Shutoff	1	Time Allotted: 00:30 (01:00) / Actual Time: 10:20 / 10:20
III. Yard Operation		
13. Communications	1	
14. Yard Movements	1	
15. Coupling	1	Time Allotted: 08:00 (12:00) / Actual Time: 8:07 : 8:14 Cars Used: 7477 + 7585 X 7302 X 7609
16. Uncoupling	1	Time Allotted: 05:00 (07:30) / Actual Time: 9:05 : 9:09 Cars Used: < 7476 X 7584 > 7303 X 7609
17. Isolation (Self-Recovery)	1	Time Allotted: 15:00 (22:30) / Actual Time: 8:43 : 8:57 Cars Used: 7476 X 7586 X 7302 X 7609
18. Manual Switch Operation	1	313
IV. Miscellaneous		
19. Recovery Train Operation	1	Time Allotted: 12:00 (18:00) / Actual Time: 10:46 : 10:58 Cars Used: 7303 X 7609 7584 X 7477
20. Troubleshooting	1	9 # 10 DOOR STUCK OPEN BLE

Document 2 – Train Operator's Certification, Page 2 of 2

Incident Date: 05/24/2023 Time: 12:12 hours
 Final Report – Improper Rail Vehicle Movement
 E23346

Drafted By: SAFE 711 – 07/12/2023
 Reviewed By: SAFE 707 – 07/23/2023
 Approved By: SAFE 70 – 07/24/2023

Appendix C – Maximo Work Order



Washington Metropolitan Area Transit Authority Maintenance and Material Management System Work Order Details

Page 1 of 2
MX76PROD

Work Order #: 17902040
Type: CM



Status: CLOSE
05/27/2023 15:27

Work Description: J03: Intermittent false occupancy on track circuit #J2-812
Job Plan Description:

Work Information			
Asset: A:J2-812	ATCS, HF TRACK CIRCUITS, J03, J2-812	Owning Office: ATCS-TSSM	Parent:
Asset Tag:		Maintenance Office: ATCS-TSSM-CRFO	Create Date: 05/26/2023 11:15
Asset S/N: J2-812		Labor Group: ATCSD2C99	Actual Start: 05/27/2023 11:48
Location: 10741	J03, FRANCONIA-SPRINGFIELD, STATION, PLATFORM, ROOM 121, TRAIN CONTROL ROOM (J03 1B FT)	Crew:	Actual Comp: 05/27/2023 15:27
Work Location:		Lead:	Item:
Failure Class: ATCS002	HIGH FREQUENCY TRACK CIRCUITS	GL Account: WMATA-02-33530-50499270-042-*****.****.OPR**	
Problem Code: 3455	FALSE OCCUPANCY	Supervisor:	Target Start:
Requested By: [REDACTED]		Requestor Phone: [REDACTED]	Target Comp:
Chain Mark Start:		Chain Mark End:	Scheduled Start:
Create-Mileage: 0.0		Complete-Mileage: 0.0	

Task IDs						
Task ID	Description	Component	Work Accomplished	Reason	Status	Warranty?
10	Found defective Wz-18. Working on replacement				CLOSE	N
20	Arranged new bond. is in J98 TCR				CLOSE	N
30	changed WZ-18. Pre-shunted track and adjusted F9, F10 frequencies for J2-805 and J2-812.				CLOSE	N

Planned Materials						
Task ID	Item	Description	Storeroom	Issue Unit	Quantity	Line Cost
	G57530445	IMPEDANCE BOND:GR 0702, 8K AMP TRK-2	400	EA	1	\$6,927.90
	G57530019	IMPEDANCE BOND:GR 2002 TRK 2	400	EA	1	\$6,398.00
	G57530018	IMPEDANCE BOND:GR 2001 TRK 1	400	EA	1	\$6,775.00
Total Planned Materials:						\$20,100.90

Document 3 – ATCM Maximo Work Order 17902040, Page 1 of 2

Incident Date: 05/24/2023 Time: 12:12 hours
Final Report – Improper Rail Vehicle Movement
E23346

Drafted By: SAFE 711 – 07/12/2023
Reviewed By: SAFE 707 – 07/23/2023
Approved By: SAFE 70 – 07/24/2023



Washington Metropolitan Area Transit Authority
Maintenance and Material Management System
Work Order Details

Work Order #: 17902040
Type: CM



Status: CLOSE
05/27/2023 15:27

Work Description: J03: Intermittent false occupancy on track circuit #J2-812
Job Plan Description:

Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
30		05/27/2023	05/27/2023	00:30	05:30	Y	05:00	00:00	\$209.49
30		05/27/2023	05/27/2023	00:00	05:30	Y	05:30	00:00	\$237.25
30		05/27/2023	05/27/2023	00:00	05:30	Y	05:30	00:00	\$271.45
30		05/27/2023	05/27/2023	00:00	05:30	Y	05:30	00:00	\$227.04
30		05/27/2023	05/27/2023	00:30	05:30	Y	05:00	00:00	\$233.00
30		05/27/2023	05/27/2023	00:30	05:30	Y	05:00	00:00	\$201.36
		05/26/2023	05/26/2023	12:00	14:30	Y	02:30	00:00	\$90.61
		05/26/2023	05/26/2023	12:00	14:30	Y	02:30	00:00	\$90.61
		05/26/2023	05/26/2023	12:00	14:30	Y	02:30	00:00	\$104.75
		05/26/2023	05/26/2023	12:00	14:30	Y	02:30	00:00	\$121.09
		05/26/2023	05/26/2023	12:00	14:30	Y	02:30	00:00	\$104.75
Total Actual Hour/Labor:							44:00	00:00	\$1,891.41

Actual Materials									
Task ID	Item	Assetnum	Description	Storeroom	Trans Date	Issue Unit	Quantity	Unit Cost	Line Cost
	G57530019	05572528	IMPEDANCE BOND:GR 2002 TRK 2	400	05/26/2023	EA	1	\$6,398.00	\$6,398.00
	G57530445	05579692	IMPEDANCE BOND:GR 0702. 8K AMP TRK-2	400	05/27/2023	EA	1	\$6,927.90	\$6,927.90
Total Actual Materials:									\$13,325.90

Related Incidents				
Ticket	Description	Class	Status	Relationship
8672956	ROCC/Ops-3 reports intermittent false occupancy on track circuit #J2-812	SR	CLOSED	ORIGINATOR

Failure Reporting				
Cause	Remedy	Supervisor	Remark Date	
4521	DEFECTIVE IMPEDANCE (WZ) BOND	4425	REMOVED, REPAIRED, REINSTALLED & RETESTED	05/27/2023

Remarks: Replaced WZ-15, Pre-shunted track and adjusted F9, F10 frequencies for J2-805 and J2-812.

Document 4 – ATCM Maximo Work Order 17902040, Page 2 of 2

Incident Date: 05/24/2023 Time: 12:12 hours
Final Report – Improper Rail Vehicle Movement
E23346

Drafted By: SAFE 711 – 07/12/2023
Reviewed By: SAFE 707 – 07/23/2023
Approved By: SAFE 70 – 07/24/2023

Appendix D – Scene Photographs



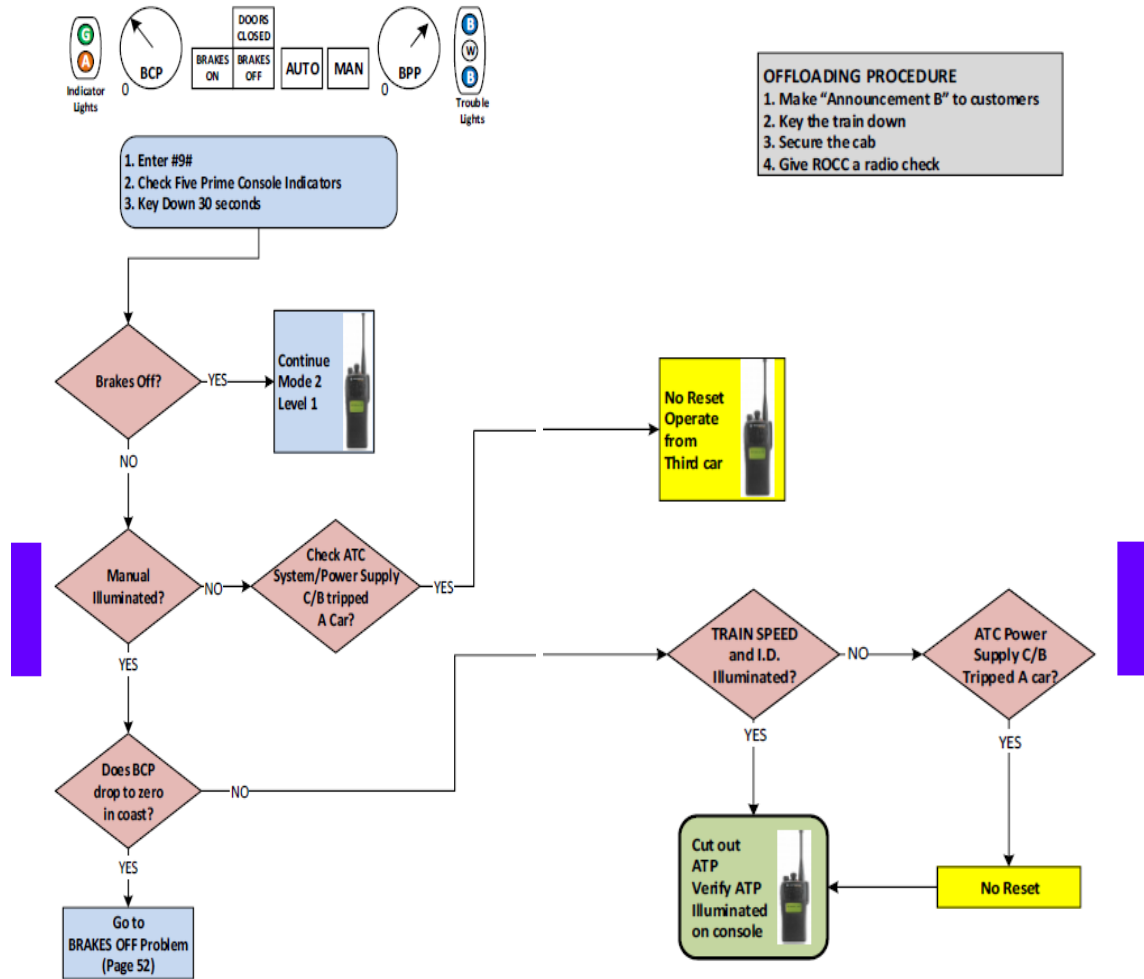
Image 1 - Photo #1, the cover of the Wee-Z Bond with the anti-vibration pad saturated in water. Photo #2, corrosion on the control board. Photo #3, replacement Wee-Z Bond installed.

Appendix E – Train Operations Guide & Procedural Checklists

LEGACY TROUBLESHOOTING GUIDE CHECKLISTS

LEGACY TROUBLESHOOTING GUIDE CHECKLISTS

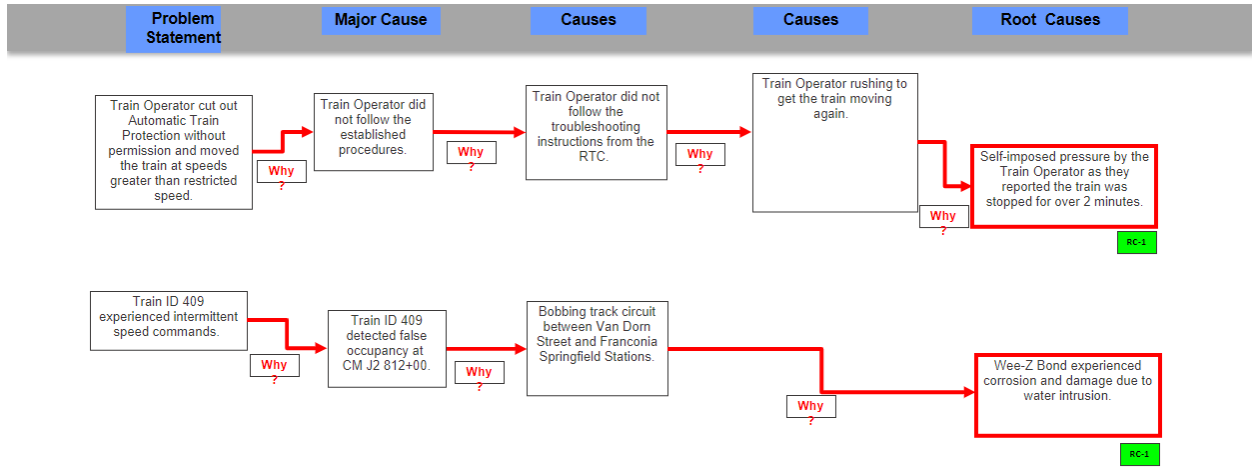
ATC Problem



56

57

Appendix F – Why-Tree Analysis



6 Root Cause Analysis

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

